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Carl Menger: Founder of Neoclassical Individualist Economics

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Abstract

This essay interprets Carl Menger's *Principles of Economics* as a deductive theory, or set of theorems, that he employs to explain economic growth under capitalism. The theory initiated what I call neoclassical individualist economics, which culminated with Ludwig Von Mises's *Human Action*. This economics aims to deduce the consequences of distinctly human action under various conditions.

The essay shows how Menger used the “composite step-by-step procedure” and the “state-of-rest method” to deduce various arrangements, institutions, and roles. Simultaneous with making these deductions, he produced a theory of growth based on the recognition of the classical economists that higher productivity of labor can be achieved by expanding the division of labor. This work was carried on by Eugen Böhm Bawerk, F. A. Hayek and Mises. Other prominent members of the neoclassical individualist economics class are J. B. Clark, Frank Fetter, Herbert Davenport, Philip Wicksteed, Frank Knight, Lionel Robbins, and W. H. Hutt.

Many professional historians of economic thought use the term neoclassical economics to refer to mathematical representations or models of economic behavior. In an appendix I use Menger's theory to assess the mathematical economics of W. S. Jevons, Leon Walras, and their successors.

Carl Menger: Founder of Neoclassical

Individualist Economics

I use the term “neoclassical individualist economics” to refer to the economics associated with what Mises variously called “the subjective theory of value” (Mises 1966: 3, 126), the “modern theory of value” (*ibid.*: 3, 121, 162), the “subjectivist theory of value” (*ibid.*: 22, 219), the “modern theory of value and exchange” (*ibid.*: 33n), the “marginal theory of value” (*ibid.*: 78), the “elementary theory of value and prices” (*ibid.*: 121, 201,

Neoclassical individualist economics: the economics, invented by Menger, based on the consumer utility theory of value as expressed in the Austrian theory of value and cost and the marginal productivity theory of distribution. Prior to Mises, it was advanced by the subsequent work on the entrepreneur role by Davenport, and Knight and on consumer sovereignty by Hutt.
Consumer utility theory of value: value in economics consists of the utility of individuals in the consumer role.

202), and “the modern theory of value and prices” (*ibid.*: 201, 636). Perhaps the best term to associate with Mises is the first term – the subjective theory of value – since this is the term he used in his earliest works on the topic.¹

Mises wrote that the theory was founded by Hermann Gossen (*ibid.*: 334), Menger, and W. S. Jevons (*ibid.*: 78). This reflects the fact that Jevons (1965 [1871]), Walras (1954 [1874]) and Menger (1981 [1871]) made more or less simultaneous yet independent discoveries of the marginal utility theory of value. However, the first two most likely discovered this theory in a very different way from Menger. And they certainly expressed it in a different way. Moreover, their goals were also different. Jevons and Walras proposed a mathematical economics based on the concept of total utility maximization. Menger proposed an individualist economics based on the limits faced by individuals in their efforts to *increase*

¹See Mises 1981 [1933], ch. 4. I believe that Mises should have used a still different term that reflected his recognition of the integration of economic functions. He should have seen that what he had earlier called the subjective theory of value was in fact the *consumer utility theory of value*. This theory maintains that, with respect to market interaction, value can be traced to the desires of individuals acting in the consumer role. The term reflects the incorporation of W. H. Hutt’s writings on consumer sovereignty, which holds that the achievement of consumer utility by means entrepreneurial supply is the salient characteristic of a free market economy (Hutt: 1936, 1940).

utility in an environment containing other individuals with the same general motive (see the discussion below). My interest in this essay is with individualist economics, which is a legacy of Menger. Since many readers of this essay have been trained as neoclassical mathematical economists, however, I present a brief history of the rise of mathematical economics and its legacy in the Appendix One.

The purpose of this essay is to present neoclassical individualist economics. I begin by explaining my rationale for the choice of this term. Next, in order to present a firm foundation for neoclassical individualist economics and to prepare the reader to understand Mises's economics, I present a somewhat extensive review of Menger's *Principles of Economics*. Then I turn briefly to what I regard as the crucial important subsequent developments prior to and incorporated into Mises's treatise.

1. WHAT IS NEOCLASSICAL INDIVIDUALIST ECONOMICS?

None of the terms that Mises uses to refer to the ideas on which Mises based his own economics is adequate. Hindsight suggests two other terms that have been used by historians of economic thought to describe this economics. The first is the "Austrian theory of value and cost." This term reflects the state of the art in the US around the turn of the century (Davenport 1908,

chapter 17).² A more widely accepted name in modern professional economics is the "marginal productivity theory of distribution," which is sometimes traced to J. B. Clark³ and Philip Wicksteed. My

Neoclassical mathematical economics: the economics of Jevons and Walras and that of their followers whose economic models envision a total societal utility or some facsimile.

Menger's economics: the economics of Menger which employs the individual utility-maximizing model to identify arrangements, "institutions," and roles of a real market economy.

²See Gunning 1998. A history of neoclassical individualist economics remains to be written and I am not prepared to do so at this time. A few brief remarks are provided in Appendix Two.

³Clark used the terms "principle of final productivity" and the "final-productivity law" to refer to the theory as it was presented in his own works (Clark 1899: ix-x).

decision to use the term “neoclassical individualist economics” is based partly on the evident relationship between (1) the American neoclassical economists, Clark, Frank Fetter, Davenport, and Knight, and (2a) the Austrian economists Menger and Eugen Böhm Bawerk, Wicksteed, and (2b) Mises. Each of these employed what Mises called “the principle of methodological individualism.” In other words, they employed the procedure of trying to “understand the meaning” that individual actors attach to the prospect of taking actions that result in what these economists conceived as the performance of the economic functions of consuming, saving, supplying material factors of production, supplying labor, and acting entrepreneurially.

I use the term “neoclassical individualist economics.”⁴ By using this term, I suggest a continuity between classical economics described by Mises in the Introduction to his treatise, the economics of the early Austrians, the economics of various mostly American economists of the early 20th century, who learned from Clark and the early Austrians, and Mises’s economics. I also differentiate this economics from the mathematical economics, which many modern professional economists regard as the only post-classical economics.

2. MENER’S GROWTH ECONOMICS

I will spend some time on Menger’s economics because it is the starting point for all later neoclassical individualist economics. Specifically, I will try to present a concise report on his *Principles of Economics*. In my interpretation, his economics is both a theory of economic growth and a theory

⁴Because of this, it would be more accurate to describe this economics with the phrase “neoclassical methodological individualist economics.” However, the gain in clarity seems to me not worth the loss in grammatical smoothness.

designed to explain conditions and characteristics of real market interaction.⁵ I begin by describing his goal, procedure and method. Then I turn to an interpretation of the text.

Goal, Procedure and Method

Goal

In his *Principles*, Menger built a theory of the development of the economic system in which the division of labor continually expands. He does not state this as a goal and this fact has resulted in some errors of interpretation.⁶ This is not his most fundamental goal, however. The more fundamental goal is to “serve a public interest of the highest importance...” by discovering the “fundamentals of our science” (Menger 1981: 46). He writes that to achieve the goal, he intends

to reduce the complex phenomena of human economic activity to the simplest elements that can still be subjected to accurate observation, to apply to these elements the measure corresponding to their nature, and constantly adhering to this measure, to investigate the manner in which the more complex economic phenomena evolve from their elements according to definite principles.

This method of research...is...common to all fields of empirical knowledge, and should properly be called the empirical method (*ibid.*: 46-7).

This statement of how he plans to achieve his ultimate goal is crucial in my interpretation. To understand it requires a most penetrating investigation of the words. Probably the most important step is to realize that by “simplest elements,” he is referring to human beings who possess freedom of will (*ibid.*: 48). He defines these elements as “economizing men” (*ibid.*). Thus, he

Menger’s goal: to present a theory of economic growth by means of deducing characteristics of an observable market economy from the assumption that economizing men discover ways to improve their positions in an environment in which an expansion of the division of labor may lead to higher productivity. The theory is both a set of deductions and an evolutionary theory.

says that economic scientists study economizing men; material scientists study phenomena that do not

⁵The following interpretation is based partly on the English translation of his preface and partly on what he actually accomplishes and how he does so in his book. I do not read German. No doubt, my knowledge of what has come to be called “transaction costs economics” helped in this interpretation.

⁶F. A. Hayek for example, has suggested that Menger’s aim was to build a uniform theory of price. I discuss this claim in Appendix Three.

possess free will. The second step is to interpret his statement that his book investigates how the “phenomena of human activity” evolve, according to “definite principles,” from these elements (i.e., from the free will-possessing economizing men). What he means is that his method consists of showing how these phenomena would result, over time, from the actions of economizing men. In different terms, his secondary goal is to build a system of theorems about how the complex relations among economizing men evolved from the simpler ones, where the ultimate simplest image is that of a single, isolated, economizing, free will-possessing human being.

The term “evolve” in this context has a double meaning. To show how complex economic activity evolves implies, on the one hand, his intent to produce a logical system based on the definition of distinctly human action and of the consequences of action under various assumed conditions. In different terms, it is to produce a pure economic theory based on the concept of action. On the other hand, it implies his intent to produce an explanation of the evolution of what one might crudely define as capitalism. I will show that his explanation makes the assumption that actors persistently seek to achieve consumer utility (a) by taking advantage of the higher productivity of the division of labor and (b) by directing its production away from consumer goods (goods of the first order) to capital goods (goods of successively higher orders).⁷ It is this characteristic that is the basis for Menger’s belief that his theory is directly related to human welfare and, therefore, that it serves the public. If one can identify the lay out the principles by means of which economic growth has occurred in the past, he is in a position to evaluate policies that are intended to promote growth in the future.

The Step-by-Step Compositive Procedure

It is worth pausing to recognize the extraordinary insight involved in these ideas. Anyone who is familiar with the history of physics – i.e., with the writings of the historians who describe what physicists

⁷Mises does not use the term “utility.” See my discussion below concerning why I substitute the term utility for his words.

have accomplished – realizes that the greatest insights have come from trying to build an image of a situation that prevailed before the phenomena to be explained evolved. I define the phenomena to be explained as P_n . The physicist proceeds by imagining a time before P_n existed. I define the phenomena that existed at the time imagined by the physicist to be P_1 . Having conceived of P_1 , the physicist tries to conceive of a second set of phenomena, P_2 , that is more complex. P_2 is more complex in the sense that the elements in P_1 have been combined or transformed in some way. P_1 , she says, has evolved into P_2 . She then conceives of the manner of combination or transformation that enabled this evolution to occur. If $P_2 = P_n$, her task is complete. However, if P_2 differs from P_n , she may proceed, by the same mode of thinking, to build images of P_3, P_4, \dots, P_{n-1} until, ultimately, she builds P_n .

Thus, physical scientists explain a mountain by building images of a world that existed before the mountain evolved into its current state. P_1 may represent relatively flat land that is near the place where two tectonic plates are clashing. If necessary – i.e., if it is appropriate, given the audience for his theory – he may define P_1 as an image of a universe that existed before the earth itself came into existence in order to help explain why the tectonic plates exist. Such a physical scientist proceeds, step-by-step, to build images of earlier times and places in which simpler constituent elements evolved into the more complex phenomena of recent times.

The same procedure is used by evolutionary biologists when they build a system of theorems about the evolution of the ability of modern humans to think and plan. The scientists start with images of the simplest type of non-planning and non-thinking life or even with a system of theorems about how living things evolved from the constituent elements of material things that lack the characteristics that he defines as life.

Note that in all cases, one might say, scientists use an approach that, on the one hand, can be called evolutionary and, on the other, can be called deductive and compositive. When Menger labels his method “the empirical method” (*ibid.*: 47) and he relates it to the task of identifying the “empirical foundations of economics” (*ibid.*: 45), this is what he has in mind. To use the empirical method, according to this

terminology, is to build a deductive and compositive sequence of events that traces the phenomena one aims to explain to its constituent elements.

The term “empirical,” as it is used today, has a totally different meaning from its meaning in the English translation of Menger’s preface. Because of this, I prefer the term step-by-step compositive procedure of building economic theory.⁸ It consists of

Step-by-step compositive procedure for building economic theory:

Menger’s method of producing a theory of economic growth which consists of deducing a succession of stages of development in which individuals act in ways that enable them to overcome limits to their achievement of consumer utility.

deducing a succession of stages of development in

which individuals act in ways that enable them to overcome limits to their achievement of consumer utility. It follows that instead of entitling this section “Menger’s Growth Economics,” I could, with equal meaning, have entitled it “Menger’s Compositive Economics.” I discuss the rise of “modern empiricism” indirectly in Appendix One.

State-of-rest Method

Each step in the compositive method employs a beginning image, a final image, and a set of deductions about how the beginning image gets transformed into the final image. In economics, the cause of this transformation is human choice. In light of this, Menger expresses the transformation by writing about the limits faced by individuals in their pursuit of consumer utility and about how they overcome such limits. Beginning with a state of rest that is dictated by the fact that the achievement of utility is limited in some way, the economist deduces means through which the individual (s) can overcome the limits. After the limits are overcome, a new state of rest is achieved in which new limits are faced by the actor (s). Thus, Menger “completes a step” by assuming an initial state of rest in which an individuals,

⁸Hayek, referring to a note written by Menger (Hayek 1952: 212 and chapter 4), also uses the term “compositive method.” William Jaffé (1976: 522), perhaps based on the same note, says that Menger used the term analytic-compositive method. The compositive procedure that I describe here seems slightly different from that used by Hayek. Hayek (1952.: 39) implies that the compositive method applies only to “social phenomena” that are not designed by any individual. As Menger uses the compositive procedure, it applies both to social phenomena that are designed and to those that are not designed.

or an individual, face limits on the achievement of consumer utility. Next, he deduces a particular action or set of actions, an institution, a non-institutional arrangement, or a role. The deduction is made by accounting for the choices individuals make that enable them to identify means of overcoming the assumed limits. Thus, the process⁹ of overcoming the limits causes the further action, an institution, etc. Finally, he describes and elucidates a new state of rest in which the limits faced in the initial state of rest have been removed yet which also contains new limits. The second

State-of-rest method: Menger's three-part method, or template, of deducing actions, institutions, non-institutional arrangements, and roles in his theory of economic growth:

1. Build an image of an initial state of rest in which individuals reach a particular limit or set of limits on the achievement of consumer utility.
2. Describe actions, an institution, a non-institutional arrangement, or a role that constitutes a means of overcoming the limits that the individuals are assumed to perceive.
3. Describe and elucidate an image of a new situation in which individuals have employed the means of overcoming the limit.

two of these parts necessarily overlap due to the purpose of using the method to derive a preconceived outcome of deliberate choice. Anticipating the method that Mises used to deduce his economic theorems, I call this the state-of-rest method.¹⁰

Among the initial situations Menger considered is an actor who is isolated from all others, two individuals who aim to gain from exchange, many individuals in the absence of private property rights, many individuals in the absence of competition, and many individuals in the absence of money. The result was insights into the emergence of these particular institutions, arrangements, and specialized roles. In the following subsections, I show how he used this method, or template, in successive chapters of his *Principles*.

⁹That is, the individual choice, or set of choices in combination.

¹⁰Mises (1966: 248) referred to this method as the “static method,” although he mixed his elucidation of the method with the concept of the “evenly rotating economy,” which was not employed in neoclassical individualist economics until after Menger's writings.

Preliminaries: Chapters 1-3

Menger begins his eight-chapter book with three introductory chapters. The main purpose of the first chapter, I surmise, is to distinguish his theory of economic growth (“human progress”) from that of Adam Smith. He is concerned with Adam Smith’s assertion that progress is due to an expanding division of labor. He points out first that progress could occur without an expansion of the division of labor. All that is needed is for a population to progressively direct “the goods of ever higher orders to the satisfaction of its needs” (Menger: 1981: 73). Thus an expansion of the division of labor is not required for growth to occur. Moreover, one can imagine a collectivist society that contains a division of labor yet could stagnate. If the higher productivity of the division of labor always causes growth, then how could stagnation be possible? To find a true cause, one must take account of distinctly human action. To demonstrate this, Menger considers the actions that former members of a stagnant collectivist society would take if they were suddenly to be granted freedom. He proposes that they would begin to produce for the purpose of exchange, the result being more capital (higher order) goods and an expanded division of labor. It follows, says Menger, that the essential cause of progress is not the division of labor. It is, more fundamentally, the desire for consumer utility (*ibid.*: 74). It is true that individuals must believe that they can increase their utility by producing more capital goods as opposed to consumer goods and by taking advantage of the higher productivity due to an expanding division of labor. They must possess knowledge of “the causal connections between things...and human welfare” (*ibid.*: 74). But the driving force of growth is deliberative distinctly human choice.

Fundamental Limits to Achieving Consumer Utility

Menger’s first chapter contains three fundamental limits to achieving consumer utility. The first is implied by his statement that for a thing to have “goods character,” someone must know that it can be

used to satisfy a want, either directly or indirectly.¹¹ Thus, an actor is limited in her ability to achieve her consumer utility by the lack of knowledge of how to cause the thing to be used to satisfy her wants. The second is similar. It is implied by his statement that for a thing to have “goods character,” someone must be capable of gaining command over it. The actor is also limited if she does not have command, or full command, over the thing. Thus Menger writes that the amounts of consumer goods that individuals can gain “are limited only by the extent of human knowledge of the causal connections between things, and by the extent of *human control* over these things” (*ibid.* 74, italics added).

The third limit refers to the time required for the production of consumer goods. At the extreme, it is possible that a consumer good would take so long to produce, that it is not worth waiting for. In every other case, the ability of a person to satisfy a want for a particular consumer good depends to some extent on how long it takes to produce it. One can interpret this to mean that a longer waiting time, other things equal, entails a greater limit to utility achievement than a shorter one (*ibid.*: 67-9). I call these three limits “fundamental” because they apply no less to the solitary actors than they do to actors in market interaction.

Even at this early part of his book, Menger’s state-of-rest method becomes evident. The existence of the three limits described in the last paragraph implies that actors can overcome limits in some circumstances by gaining knowledge, by identifying means of attaining control over previously uncontrolled things, and by identifying shorter means of producing goods that they want. One could (1) build an image an initial state of rest containing each limit; (2) assume the discovery of new knowledge, or a gain of control over something that was previously uncontrolled, or knowledge of a shorter method of production; and (3) deduce a new state of rest after these events occurred. For example, the control limit can be deduced by assuming an individual who cannot satisfy a particular want because he cannot

¹¹My use of the term “consumer utility” is justified by what Menger had written the previous paragraph. He wrote that if “we both recognize [the causal connection between choice and the satisfaction of needs by means of “useful things”], and have the power actually to direct the useful things to the satisfaction of our needs, we call them goods” (*ibid.*: 52).

gain personal control over the item needed to satisfy it. Crusoe, for example, may not satisfy his want for a cocoanut because he lacks control over the tools needed to reach it in the tree. By first producing these tools or by discovering a means of reaching it without using tools, he can overcome this limit.

Economizing

Menger's second chapter is meant to define economizing. To economize does not mean to simply select on the basis of given preferences. The economizer is subject to error (*ibid.*: 120), she must make judgments (*ibid.*: 121), she deals with *prospects* (*ibid.*: 150), and, therefore, must be engaged in planning for an uncertain future. Nor does economizing require money. Other things are discussed in the chapter but they mainly reinforce ideas presented in other chapters of his book. Nothing is of further interest regarding the theory of economic growth.

Diminishing Marginal Utility, Subjectivity of Utility, the Utility of Higher-order Goods, the Entrepreneur and Private Property Rights

Once he had introduced the concept of the economizer, Menger was in a position to write about the consumer utility of goods to the economizing individual. He does this in his chapter 3, entitled "The Theory of Value." He defines value as "the importance that individual goods or quantities of goods attain for us because we are conscious of being dependent on command of them for the satisfaction of our needs" (*ibid.*: 115). It is evident that what he calls "value" is what the British economists, following Bentham, had called "utility."¹² Since a modern reader would probably be able to better comprehend Menger's chapter if she substituted the term "utility" for "value" I make this substitution here.

¹² According to the material in what the translator of Menger's *Principles* converted from a footnote into an appendix, Menger might well have preferred to use the term utility, since he cites the British economists use of this term favorable. Also significant in this footnote-appendix is his recognition that a substitute for the term value in exchange is "price" (*ibid.*: 306-8). In the writings of the early Austrians, or perhaps partly in the translations of those writings, the use of the term "value" left much to be desired. See Davenport, 1902.

This chapter seems to have three purposes. The first is to introduce the concept of diminishing marginal utility and the principle that an economizing individual becomes more and more willing to forego an additional unit of a good as he acquires more of it (*ibid.*: 122-141).¹³ This principle takes effect when an individual must choose the degree to which different needs must remain unsatisfied. Such situations are pervasive. “[D]etermining the degree to which the [various wants] are to be satisfied...is the very part of the economic activity of men...that is exercised almost continually by every economizing individual” (*ibid.*: 128). Second, he aims to make the point that all utility is subjective (*ibid.*: 145-148). Third he aims to identify the utility of the factors of production for both the isolated actor¹⁴ and an “economy.”

In the case of an economy the marginal utility of each factor tends to equal the price, which is determined by a decision of someone acting as an entrepreneur. This is evident from his section entitled “The Principle Determining the Value of Goods of Higher Order.” In that section, he writes about the higher-order, or capital goods, that are employed in causing the consumer goods to be produced. He says that the “process of transforming goods of higher order into goods of lower or first order, provided it is economic in other respects, must also always be planned and conducted, with some economic purpose in view...” Then, in the same paragraph he introduces what he conceives as the function of “entrepreneurial activity.”

Consumer Utility, the Factors of Production and the Entrepreneur

Referring mainly to an image of an isolated actor, Menger aims to establish a principle. He writes:

¹³In referring to marginal utility, Hayek says that Menger uses the “somewhat clumsy but precise phrase, ‘the importance which concrete goods, or quantities of goods, receive for us from the fact that we are conscious of being dependent on our disposal over them for the satisfaction of our wants.’” (*ibid.*: 18). This is consistent with Hayek’s view that Menger “attaches more importance to a careful description of a phenomenon than to giving it a short and fitting name.”

¹⁴Thus he writes: “The determining factor in the value of the good [including a factor of production]...is...the magnitude of importance of those satisfaction with respect to which we are conscious of being dependent on command of the good” (*ibid.*: 147).

[T]he principle that the value of goods of higher order is governed, not by the value of corresponding goods of lower order of *the* present, but rather by the prospective value of the product, is the universally valid principle of the determination of the value of goods of higher order (*ibid.*: 151).

He goes on to show that this principle applies to the traditionally-classified factors of land, capital (goods) and labor (*ibid.*: 165-174).

Of special significance to the future of neoclassical individualist economics is his treatment of the entrepreneur. Up to this point in his book Menger paid no attention to roles and functions. Practically every passage could be interpreted as an application of the image of an isolated actor. For example, in the quoted passage, Menger writes in a way that allows one to substitute the phrase “utility to the isolated actor of” for “value of.”

His introduction of the entrepreneur represents an unrecognized departure this possibility of making this substitution. He makes a definite shift from conceiving value as marginal utility to conceiving it as price, even though he continues to use the term “value” to refer to both. This is evident from his introduction of the term “present value.” After he introduces the entrepreneur role, the reader can confidently substitute the phrase “price of” for the phrase “value of.”¹⁵

Menger does not go so far as to identify this role with distinctly human action under market economy conditions, as I will claim Mises did. He nevertheless identifies characteristics that are similar to those that Mises identified. He writes that entrepreneurial activity includes:

(a) obtaining information about the economic situation; (b) economic calculation – all the various computations that must be made if a production process is to be efficient (provided that it is economic in other respects); (c) the act of will by which goods of higher order (or goods in general—under conditions of developed commerce, where any economic good can be exchanged for any other) are assigned to a particular production process; and finally (d) supervision of the execution of the production plan so that it may be carried through as economically as possible (*ibid.*: 160).

Although this list includes some of the activities of the entrepreneur role, Menger explicitly downplays what he calls “risk bearing,” by which he really means the bearing of uninsurable risk. He says that this

¹⁵That this is so is evident from his description of the entrepreneur. The entrepreneur engages in economic calculation. Included in economic calculation are “all the various computations that must be made if a production process is to be efficient (provided that it is economic in other respects)” (*ibid.*: 160). Mises catapulted this idea into the pivotal argument against socialist planning (Mises 1966: ch. 15 and 16).

uncertainty “is only incidental and the chance of loss is counterbalanced by the chance of profit” (*ibid.*: 161). I will show that uncertainty-bearing is an essential property of the entrepreneur role. It is also important to note that although Menger refers to information and economic calculation in this passage, he is not referring to the knowledge of the particular circumstances of time and place or to monetary calculation as understood in the writings of Hayek (1945: 521) and Mises. As a result, his exposition lacks many of the details that would be filled in by a later generation of Austrian writers.

Private Property Rights

Also in this chapter he deduces the institution, or interactive arrangement, of private property rights by showing how creating it overcomes various limits to achieving consumer utility. He writes that in a world where the available goods (consumer goods and capital goods) are insufficient to lead to the satiation of everyone’s wants, a struggle would ensue over those goods that are capable of satisfying wants. The struggle is evidence that the individuals aim to gain command over a thing. In the absence of private rights to command a good, the means of satisfying wants would be limited by the aggressive behavior of an adversary and by the scarcity of factors of production to overcome the adversary. To avoid this struggle,

it becomes necessary for society to protect the various individuals in the possession of goods subject to this relationship against all possible acts of force. In this way, then, we arrive at the economic origin of our present legal order, and especially of the so-called protection of ownership, the basis of property (Menger 1981: 97).

I interpret this to mean that individuals, faced with a situation in which they cannot gain command over a thing (image P_1), have an incentive to establish the institution or arrangement of private property rights in order to remove this limit (image P_2). Thus it is an example of the state-of-rest method.

Barter Trade: Chapter 4

After the preliminaries, Menger proceeded to take the next steps toward his goal of building a theory of economic growth. The first of these is to describe limits by discussing exchange between two farmers. His fourth chapter on “The Theory of Exchange” begins by describing a barter situation. After presenting tables of reciprocal offers of quantities of cows for quantities of horses, he tells the reader of the limit that one farmer faces in acquiring cows by trading away horses. The limit is due to the other farmer’s diminishing marginal utility for additional horses. Because of the diminishing marginal utility for horses faced by the second farmer, she demands larger and larger amounts of horses for each cow. At some point, the first farmer reaches a limit on how many horses he is willing to give up to obtain an additional cow.¹⁶ The first farmer also faces diminishing marginal utility with respect to cows. As a result, the limit is reciprocal. The two farmers trade up to this limit, or state of rest. Beyond that point, there are no further gains from trade. Thus, Menger shows how trade enables the farmers to achieve greater utility than in the absence of trade. It allows them to overcome the limits of self sufficiency. Yet there are limits to how much individuals can gain from trade. The beginning point is a state of rest without trade (P_1). Individuals perceive gains from trading up to an endpoint at which there is a second state of rest (P_2).

Transactions Costs

His second use of the example is most interesting. It is to explore various costs of transactions. He points out that individuals often can not take full advantage of the gains from new trade because they lack the knowledge of new trading opportunities or lack of power to carry out the trades (*ibid.*: 188). He translates this immediately into the means available to governments “toward removing impediments,” including “the construction of good roads and other means of transport and communication, etc.” (*ibid.*:

¹⁶Thus he concludes that “we see that in the reality of practical life men do not trade indefinitely and without limit” (*ibid.*: 187).

189). He goes on to consider other “economic sacrifices” that are often required to carry out exchanges (*ibid.*: 189). This leads him to identify various functions entailed in exchange interaction that would not be evident to someone who focuses solely on production. Thus he refers to

(f) freight costs, loading charges, tolls, excise taxes, premiums for marine and other insurance, costs of correspondence, commissions and other sales costs, brokerage charges, weighages, packaging costs, storage charges, the entire cost of the commercial banking system, even the expenses of traders and all their employees...(*ibid.*: 189).

Menger refers to ‘various costs.’ However, from the point of view of the composite, step-by-step procedure, he is presenting theorems on the evolution of a number of entrepreneurial roles, such as insurers, sales agents, brokers, storage providers, guarantors, and money transfer agents. With regard to institutions, he is presenting a theorem about the evolution of banking. He derives these roles and institutions by means of the state-of-rest method. By relentlessly pursuing the idea first that human beings economize, second that their abilities to achieve the consumer goods they want in various ways are limited (lack of knowledge, lack of command over factors, lack of power to exchange, etc.), and third that they can overcome these limits; he is led to recognize that when individuals face what professional economists almost a hundred years later would call transaction costs, they search out and create roles and institutions in order to partly overcome them. Looking backward toward the classical economists, Menger is showing how to derive various positions in the division of labor.

Moreover, he seems to appreciate what he has accomplished and its implication for policy, since he writes the following:

Implicit in what has been said is an explanation of the source from which all the thousands of persons who are intermediaries in trade derive their incomes. Because they do not contribute directly to the physical augmentation of goods, their activity has often been considered unproductive. But an economic exchange contributes, as we have seen, to the better satisfaction of human needs and to the increase of the wealth of the participants just as effectively as a physical increase of economic goods. All persons who mediate exchange are therefore – provided always that the exchange operations are economic – just as productive as the farmer or manufacturer. For the end of economy is not the physical augmentation of goods but always the fullest possible satisfaction of human needs (*ibid.*: 190).

Menger is speaking directly to those who still subscribe to the labor theory of value. He is saying that various roles which help to comprise the division of labor cannot be characterized in terms of labor that

contributes to production. Yet, these roles perform the same function of helping consumers achieve utility.

The Theory of Prices and Price Changes: Chapter 5

Menger's chapter 5 is entitled "The Theory of Price." In the terms used in modern professional economics, it is about price determination under the market structures of monopoly and competition. Although the theories he develops are somewhat similar to the textbook theories, Menger's method serves as another example of his procedure of deducing these market structures from by means of the state-of-rest method. Thus, he writes that prices "are only incidental manifestation" (*ibid.*: 191). The main point is that the structures they form and the prices that emerge are the result of economizing individuals striving "to better their economic positions as much as possible (*ibid.*: 192-4). On this basis, his first task in the chapter is to show that although the price paid by a buyer and received by a seller are equivalent, both individuals attach a utility to making the exchange that is greater than price paid or received.

In his previous chapter, he had deduced what modern professional economists call bilateral monopoly. He goes on in this chapter to use the state-of-rest method to deduce monopoly and then competition. His treatment of monopoly consists of two stages. The first consists of the auction of a single indivisible monopolized good. The second consists of the sale of a divisible monopolized good. After this, he deduces the arrangement of competition, where there are many buyers of horses with grain and many sellers of horses who accept grain in exchange.

After conjecturing that the price in a bilateral monopoly situation is indeterminate, he proceeds to consider monopoly for an indivisible good. His procedure is to begin with the state of rest achieved as the result of a bilateral exchange and then to introduce a change in the form of additional buyers of a monopolized good. He proposes that such additional buyers appear with the "progress of civilizations" (*ibid.*: 197). In the case of a single indivisible monopolized good, the monopolist exchanges it with the

highest bidder. He expresses this result by referring to the limits between the minimum selling price of the monopolist seller and the maximum price that the highest-demand buyer is willing to pay. In relation to bilateral monopoly, he says, the effect of adding competing buyers is to narrow these limits. By approaching the subject in this way, he aims to compare the final state of rest for the bilateral monopoly that entails an indivisible good with the final state of rest of the monopolist who contemplates selling an indivisible good to a number of buyers (*ibid.*: 201-3).

Next, he assumes that the monopolized good is divisible. His treatment of monopoly is similar to that of the modern textbook with one important exception. He deals with a monopoly that either has no costs of production or whose costs have already been paid and, therefore are sunk and irrelevant to the initial state of rest, P_1 , where he sells to only one buyer. It is unclear whether he assumes other costs. In any case, he concludes that to maximize profit in the presence of many buyers, the monopolist must charge a specific price and sell a specific quantity that may not be the entire amount that he has available to sell (*ibid.*: 211-6).¹⁷

Next, he considers competition. Again his method is both evolutionary and deductive. As the population and wealth of a small town grow, the time eventually arises where the monopolist's actions toward buyers – her price discrimination or her exclusion of lower-demand buyers – makes it profitable for a competitor to emerge.

The increase of population, the increased needs of the various economizing individuals, and their growing wealth, drive the monopolist, in many instances even while increasing production, to exclude progressively larger classes of the population from consuming the monopolized good, and permit him at the same time to drive his prices higher and higher (*ibid.*: 217).

“The economic situation...is...such that the need for competition itself calls forth competition (*ibid.*: 217)”. P_1 , as I referred to it above is a situation in which there is only one buyer. A growing population and wealth raises the demand for the monopolist's product. Eventually, an opportunity to profit from

¹⁷His analysis also contains brief recognitions of price discrimination and of the transaction cost basis for charging a single price (*ibid.*: 212). However, his analyses of these are sketchy.

competing with the monopolist is recognized. P_2 emerges when a competitor has recognized and availed himself of the opportunity.

Menger constructs a hypothetical example of a monopolist who dies and bequeaths his holdings to two heirs who compete. This enables him to show that competition also eliminates what modern professional economists call “deadweight loss” and price discrimination.¹⁸ As in the case of a monopoly, Menger is concerned at first with the distribution of a fixed amount of the product, which the two competitors are assumed to bring to market. In his discussion of competition, however, he goes beyond this to consider what happens as more and more competitors enter a previously-monopolized market as producers. At this point, he abandons the state-of-rest method. In effect, he says that the arrangement of competition does not, in reality, lead to a state of rest and that, in fact, it is a promoter of economic growth:

[U]nder competition, where no single competitor has the power to regulate by himself either the price or the quantity of a good traded, each individual competitor desires even the smallest profit, and the exploitation of existing possibilities of making such profits is no longer neglected. Competition leads therefore to large-scale production with its tendency to make many small profits and with its high degree of economy, since the smaller the profit on each unit the more dangerous becomes every uneconomic waste, and the brisker the competition the less possible becomes an unthinking continuation of business according to old-established methods (*ibid.*: 225)¹⁹

The Barter Fiction

An aspect of Menger’s discussion that I would like to emphasize is his use of the barter situation. The buyers in Menger’s example do not use money. They use bushels of grain. It follows that Menger is employing an image of what Mises calls “direct exchange.” In fact, all of the presenters of the marginal productivity theory of distribution used this method. However, the others did not so explicitly acknowledge it. For Mises, to explicitly acknowledge an image of direct exchange is to inform the reader

¹⁸Thus, he writes that under competition:

Neither the destruction of part of the available quantity of a commodity subject to competition in supply, nor the destruction of a part of the factors serving for its production, is in the interest of separate competitors, and the successive exploitation of the various social classes becomes impossible (*ibid.*: 223).

¹⁹The term “large-scale” does not seem to necessarily refer to larger factories. He may simply mean larger quantities of output.

of an extremely important part of the compositive, step-by-step procedure that is not evident in Menger's deductive theory. It is that, although certain theorems that apply to both the image of direct exchange and indirect exchange, the applicability of those theorems must be reconsidered when there is a money economy. Specifically, the image of indirect exchange assumes that individuals have a demand to hold money balances and it accounts for the possibility that changes in the money supply distort the signaling that entrepreneurs rely on to make their undertaking decisions. (Mises 1966: chapter 17). Menger stopped short of presenting including a theory of the demand for and supply of money. In his chapter on "The Theory of Money," he only showed how to deduce what Mises would later call the "the services which a good renders in its capacity as a medium of exchange" (*ibid.*: 407).

Price Changes

Menger separates the theory of price determination from the theory of price changes by presenting the latter in his chapter 6. Aside from distinguishing between utility (value in use) and price (value in exchange), his purpose in this brief chapter is to discuss the conditions that could give rise to changes in the demand for or supply of goods that an individual may use in exchange. What causes changes in the exchange value of exchangeable goods?, he asks. The modern professional economic textbooks would call these determinants of demand and supply. His first is a determinant of demand – tastes (*ibid.*: 231-3). His second is a determinant of supply – the quality of goods (*ibid.*: 233). The third is another determinant of demand – wealth.²⁰

²⁰Menger presents this theory only briefly and uses a terminology that is very different from the modern professional textbook, largely because he does not introduce money until the last chapter of his book. Especially odd is his use of the term "economic form of value" (*ibid.*: 231), by which he means relative price in an image of a complex barter economy – i.e., in the barter fiction, which I discussed in the last sub-section.

The Emergence of a Medium of Exchange: Chapters 6 and 7

It should be obvious that Menger's theory of the determination of prices applies to a money economy. Why, then, does he not discuss price determination in a money economy? The answer is that he wants to have a separate discussion of how the use of money helps to overcome the limit on the achievement of consumer utility in an image of an economy in which individuals must trade without its use. Thus Menger's third additional step entails identifying the limit that exists by virtue of the absence of a medium of exchange and then showing how a medium of exchange emerges. He presents this step in two chapters. In the first, chapter 7, he introduces the concept of "marketability." Money could not emerge, he suggests, until the division of labor and the extension of supply chains expands sufficiently to give businesspeople an incentive to accumulate what he calls "commodities." At one point he calls the sufficient expansion of the division of labor and extension of supply chains this a "higher level of civilization" (*ibid.*: 239).

A close examination shows that what he means by "commodities" is inventories. To introduce inventories into his theory of development, he traces the expansion of the division of labor through the supply of services for households, such as weaving, flower milling and carpentry (*ibid.*: 237); to the accumulation of inventories of cloth by weavers, grain by millers, and wood by carpenters in order to enable them to produce clothes, flour, and chairs for sale (*ibid.*: 238); to the emergence of a special class or retailers (*ibid.*), who hold inventories of commodities. Marketability refers to the "facility" with which such inventory commodities can be exchanged for other commodities (*ibid.*: 242). He goes on to identify several "limits on marketability." In effect, he is defining the goods held in inventories in terms of their greater or lesser marketability. He aims to combine (1) the marketability characteristic of a good that is capable of being held in inventories and which is worth holding there with (2) other characteristics of commodities that would enable them to acquire money-character (*ibid.*: 276-7).

In this case, the initial state of rest, P_1 , is a situation that Menger might call a "lower level of civilization." To overcome the limits of carrying out exchange without money, distinctly human action

continue to adjust to the fact that they can gain by expanding the division of labor and extending supply chains. These leads to the emergence of inventories of commodities, some of which have characteristics of being more marketable than others. The existence of this higher level of civilization is necessary but not sufficient for money to emerge, however. Thus it would be insufficient to say that this situation is a state of rest in which money is used in exchange. To apply the state-of-rest method here, one would have to regard P_2 as a transition stage.

It is important to note that Menger seems to have subtly shifted added to the notion that distinctly human action deliberately produce institutions in order to overcome obstacles. A long time is required to reach the higher level of civilization. He must be supposing that during that time, the separate exchange actions among numerous pairs of individuals and in numerous markets for different consumer goods and factor of production gradually leads to the higher level of civilization.

Once one defines marketability, it is a simple matter to build a theory in which the most marketable commodity becomes the medium of exchange. This is Menger's final step, which he takes in chapter 8.

The story is familiar.

As each economizing individual becomes increasingly more aware of his economic interest, he is led by this interest, without any agreement, without legislative compulsion, and even without regard to the public interest, to give his commodities in exchange for other, more saleable, commodities, even if he does not need them for any immediate consumption purpose. With economic progress, therefore, we can everywhere observe the phenomenon of a certain number of goods, especially those that are most easily saleable at a given time and place, becoming, under the powerful influence of custom, acceptable to everyone in trade, and thus capable of being given in exchange for any other commodity (*ibid.*: 260).

The new state of rest is thus established. P_2 is a money using economy.

I believe that only two further ideas need to be emphasized. The first is Menger's reference to custom.

As I understand him, the essential fact is that the vast

majority of people cannot be certain whether, at the time when they accept a particular marketable commodity in exchange for their goods, they will, at some future time, be able to exchange that

Menger's theorem of the emergence of money: Under a barter system with a sufficiently expanded division of labor, it is in each individual's best interest to acquire the most marketable commodities for the purpose of exchanging them for other goods.

commodity for the goods that they want. There is a certain degree of “taking for granted.” If using money to make exchanges in the past has led to sufficiently “good results,” they do not try to determine, for each instance of exchange involving that commodity, whether good results will again prevail. They expect that they will. This is the sense in which custom (i.e., widespread expectations that accepting the commodity in exchange will enable a person to exchange further with good results) leads uncertain actors to accept a particular marketable commodity as money. This may be the source of Mises’s point that individuals employ the prices of the immediate past in making decisions about the prices of the future (Mises 1966: 330, 336, 409).

The second idea is Menger’s mention of “economic calculation.” “Under conditions of developed trade,” he writes, “the only commodity in which all others can be evaluated without roundabout procedures is money” (Menger 1981: 276). He does not use the term

Economic calculation-facilitating function of money: the assistance given by money in enabling the entrepreneur role to make the calculations needed to determine the benefit to the net benefit to the consumer role.

“economic calculation” in the discussion. He prefers the term “the valuation of a good in terms of money” (*ibid.*). In essence, the invention of this economic calculation-facilitating function of money is a bonus – an unintended consequence. Individuals were at first looking only for the quickest and cheapest way to obtain the goods that yield consumer utility. With the help of custom, their search led to the emergence of money due mainly to the fact that some commodities are more marketable than others. Afterwards, as it turns out, everyone is in a position to use what later economists called capital accounting to determine the profitability of alternative courses of action.

3. SUMMARY AND CONCLUSION

Menger's deductive theory and his explanation of the history of capitalism emphasized (1) knowledge and (2) control over a consumer good or factor of production (*ibid.*: 52). He began, in essence, by defining the situation to be deduced and the history of capitalism as the expansion of the division of labor and the extension of factor supply chains. The basic assumption, or driving force, of these changes are distinctly human actors seeking to achieve increased consumer utility. In their quest, they seek out knowledge and attempt to increase their control of the means of production.

The compositive step-by-step procedure employs the state-of-rest method of showing how actors successively overcome limits. The limits to an isolated actor's achievement of consumer utility are lack of knowledge and a limited command over consumer goods and factors of production. The isolated actor achieves progress from gaining knowledge about consumer goods or factors of production and of gaining command over such items which he previously lacked. For an actor involved in exchange, Menger stressed, in addition, lack of knowledge of exchange opportunities and lack of power to effectuate and exchange (*ibid.*: 188). Progress can thus be achieved by establishing private property rights and by removing various impediments to transportation and communication – or, in modern terms, by reducing transaction costs. As more and more impediments are removed, population and wealth begin to grow, raising the demands for consumer goods. Markets emerge in which there are many buyers and sellers of goods. Given the absence of regulations, these markets progress from an initial monopoly, in which the characteristics of price discrimination and deadweight loss prevail, to competition in which competitors search out ways to reduce costs and therefore, price, vis a vis their competitors. An outcome is large-scale production. With the expansion of the division of labor and the extension of supply chains, marketable commodities emerge, some of which have the capacity of being used as money. When the same commodity comes to be widely accepted by buyers and seller, a money economy emerges. A bonus of the money economy is that economic calculation is greatly facilitated.

By approaching market interaction in this way, Menger pursued a line of inquiry that was successful both in understanding the development of capitalism and in preparing his successors to evaluate arguments pertaining to market intervention. This is evident in retrospect from the achievements of later members of the Austrian school of economics. First, both Mises and Hayek produced devastating critiques of socialism that were impossible for the mathematical economists to fathom. In his 1922 book *Socialism* and later in his chapter 25 and 26 of *Human Action*, Mises criticized socialism on the basis of the argument that the actors who make production decisions cannot engage in economic calculation. And in his 1945 essay “The Use of Knowledge in Society,” Hayek expanded Menger’s knowledge requirement to the requirement that individuals who occupy specialized positions in the division of labor have knowledge of the causal connections. To represent this requirement, he introduced the concept of “knowledge of the particular circumstances of time and place” (Hayek 1945: 521). Socialist planners, he wrote have no way of acquiring this knowledge. Second, Mises later incorporated the idea of a more time-consuming technique of production into his explanation of a trade cycle (Mises 1912 and 1966, chapter 20).

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APPENDIX ONE

NEOCLASSICAL MATHEMATICAL ECONOMICS AND ITS PROGENIES

To understand the development of neoclassical mathematical economics from its inception to the present day, it is necessary to start with the vision of its founders, Jevons and Walras. They envisioned a pure mathematical economics based on the equations of the total utility-maximization problem. They also envisioned a complementary study of applications. The latter study would, on the one hand, describe the achievement of total utility in a real economy and, on the other hand, suggest and evaluate proposals to improve matters with an orientation that centers on “social wealth.”

The aspiration of Jevons and Walras for an applied economics could not be realized. The equations of the maximization problem are incapable of representing distinctly human action. Yet one who attempts to determine the effects of a policy aimed at increasing total utility by means of market intervention would have to know how, in a real market economy, distinctly human actors establish the prices and quantities of goods and factors. The mathematicians did not pause to consider the subject matter of economics, however. They subconsciously channeled their minds and proceeded headlong. By the mid-1950s, they had developed several classes, or branches, of neoclassical mathematical economics. The aim of this appendix is to describe three of these: (1) modeling, (2) representing market failure, and (3) theoretical welfare economics. I begin by elaborating on my statement that the aspirations of Jevons and Walras are unrealizable. Then I describe the three classes and provide critiques based on the ideas presented in the description of Menger contribution to neoclassical individualist economics.

Why the Aspirations of Jevons and Walras on the Future of Economics Could Not be Realized

The writings of Jevons and Walras are filled with optimism about the new field of economics that they believed they had developed by means of the use of mathematics. Calling their solution to the total utility-maximization problem “pure economics,” they hoped that it would someday provide guidance for an *applied economics*.²¹ In their vision, the applied economist would evaluate a proposed policy on the basis of whether it increases or decreases total utility. She would compare two systems that are alike except for the fact that one contains the proposed policy. Specifically, Walras defined *applied economics* as the applied science of economics that is concerned with what “ought to be from the point of view of material well-being” (*ibid.*: 60).²² It is “the theory of the economic production of social wealth, that is, of the organization of industry under a system of the division of labor...” (Walras 1954: 76). He gives an example:

Branches of economic theory according to the neoclassical mathematical economists:

1. Pure economics: the mathematical model of total utility-maximization.
2. Applied economics: matching the events of the real world with the variables, functional form, and solutions of pure economics.
3. Evaluation of a proposed market intervention in the real world by referring to the hypothetical solution to the utility-maximization of pure economics.

²¹ No doubt they were inspired by Jeremy Bentham’s “felicific calculus” (Wesley Mitchell: 1918). They sought a blueprint for maximizing total utility and believed they had found it in the market economy with perfectly free competition.

²² Here one sees, at the very origin of neoclassical mathematical economics, the distinction between “normative” and “positive.”

Free competition among entrepreneurs is...not the only means of bringing selling price into equality with cost of production. It is the part of applied economics to inquire whether free competition is always the best means (*ibid.*: 40n).

Thus, applied economics, as defined, is the theory of how the “social wealth” is best produced. There is no presumption that it will be best produced under any particular conditions, including those of a market economy.²³

It is interesting to note in passing that he proceeds to differentiate between applied economics and *ethics*. Whereas applied economics is concerned with how “material well-being” is produced through the division of labor; ethics, which requires a theory of justice, is concerned with whether the consumer goods that contribute to material well-being are “appropriately” distributed (*ibid.*: 75). The subject of ethics would presumably explore the varieties of ideas that might be identified in order to add substance to the term “appropriately.”

Jevons was similar. In his pure theory of total utility-maximizing, he referred to the assumption of “perfectly free competition” (*ibid.*: 86). Later, he wrote about a “new branch of political and statistical science.

If such a thing is possible, we need a new branch of political and statistical science which shall carefully investigate the limits to the *laissez-faire* principle, and show where we want greater freedom and where less. It seems inconsistent that we should be preaching freedom of industry and commerce at the same time that we are hampering them with all kinds of minute regulations. But there may be no real inconsistency if we can show the existence of special reasons which override the general principle in particular cases (Jevons 1876: 204-5).

What he had in mind is an applied economics that uses what today’s economists would call a benefit-cost analysis of proposals for intervention (Walras’ applied economics) as well as for redistribution (Walras’ ethics).²⁴

No equation in the total utility maximization problem is capable of representing the distinctly human action that causes the emergence of market phenomena. To demonstrate this, I consider the two acts of (1) producing and utilizing the knowledge needed to cause “social wealth” to be produced under realistic conditions and (2) inventing. I discuss each in turn.

Producing and Utilizing Particular Knowledge

To do applied economics, as envisioned by Jevons and Walras, one must be able to match the consumer goods price solutions of the maximization model to the real prices charged under market economy conditions. One must also be able to match the solution prices for the factors of production to real factor prices. To determine real consumer goods and factor prices, one must know the wants of consumers for each consumer good and, more importantly, the derived demands of each producer at each link in each factor supply chain. Under market economy conditions, such knowledge is possessed by the separate specialists who occupies each position. The specialist is an expert on knowledge in his vicinity. He acquires this knowledge partly through education from predecessors and direct communication with

²³ Although Walras did not presume that free competition would yield greater wealth or utility, he did seem to believe that industrial production under the division of labor would bring “abundance” (*ibid.*: 74-5). In fact, he first substituted “social wealth” in his applied economics for the “total utility” in his pure economics and then substituted “material well-being” for “social wealth” (*ibid.*: 75). Thus, while he sought formally to maintain a strict separation between pure and applied economics, he was willing to blur that distinction in order to promote applied economics. It is difficult to reach any other conclusion than that his main goal in this verbal subterfuge was to promote himself.

²⁴ Jevons (1876: 22) also suggested that statistics be employed in order to “verify” the propositions of pure economics, although he did not specify how this could be accomplished. He thus anticipated the recommendations of neoclassical mathematical economists of the mid-twentieth century.

customers and others who employ similar knowledge. He also acquires it through price signaling and responses to his price signals and those of others in his vicinity. Such signals are intentionally sent and the responses are also intentional. No one possesses all of this particular knowledge. Indeed, to possess all of it would be impossible (Hayek 1945).

The mathematical economist can easily set up and solve a total utility-maximization problem that yields prices and quantities of consumer goods and factors of production as solutions. However, her solutions are irrelevant to evaluating policies toward market interaction. Such evaluations must contain judgments about how real prices and quantities are determined. Such prices and quantities are established jointly and interdependently by the largely uncountable and to some extent unidentifiable specialists and their customers.

A deceptively simple way to express this is to say that mathematicians are totally unable to deal with the “complexity” of real market interaction. The more astute way to express the point is to say that the knowledge needed by the mathematician to represent total utility maximization under real market conditions is, by definition, beyond her capacity to obtain. In short, mathematical economics is irrelevant to the effort to do the kind of applied economics envisioned by Jevons and Walras.

Inventing and the Unpredictability of Growth

The second reason why the mathematical economist cannot match the solution values of the total utility maximizing equation to the prices and quantities of real market interaction is the presence, under market economy conditions, of imagination, creativity, and inventiveness. The maximization problem has no place for the economic growth that results from these. Adam Smith (1776) claimed that a market economy tends to grow because individuals have a propensity to take advantage of the higher productivity of a division of labor. Menger’s theory of economic growth assumed, in addition, that individuals would learn to employ longer and longer supply chains. In the more advanced presentations of neoclassical individualist economics, growth is a more or less natural process resulting from human innovation, although in form it is as unpredictable as the discoveries that drive it. The economist cannot tell which new consumer goods, factors, or methods of production will be discovered and put into practice. Nothing of this sort was proposed or even recognized in the mathematical models of Jevons or Walras.

The Institutionalization of Mathematical Economics

The aspirations of Jevons and Walras for a division of economics into pure and applied could never be realized. And, in fact, no serious effort was made to realize them. What actually happened is that the mathematical economics of these pioneers became institutionalized. In conjunction with the growing professionalization of the study of economic phenomena and the bureaucratization of higher education, it morphed into two parts. First, the pure economics developed into the field of mathematical modeling. It later joined with the study of empirical uniformities to become modern professional economics. Second, non-mathematical applied economics of a sort developed later in England and became the predecessor of two mathematical sub-fields: market failure theory and theoretical welfare economics. I discuss each in turn.

Pure Economics as Modeling

The mathematical model of total utility maximization was touted by its founders both as a model of an abstract economy *and* as a reference for applied economics. Vilfredo Pareto (1909) and his British counterpart F. Y. Edgeworth (1881) were mathematical economists who, respectively, followed Walras and Jevons. They promoted the system of equations as a model of an economy and used the “purely competitive market equilibrium” to represent a real economic system or at least a semblance of one. Taking cues partly from real policy discussions, later mathematical economists modified and tweaked the total utility maximization model by inserting various assumptions about the nature of the variables

and parameters. For these writers, pure economics became a kind of pure mathematics that is related to policy only in the sense that the new assumptions are *analogous* to those used in policy discussions.

A major figure in building such models was mathematical economist Paul Samuelson. Samuelson believed that economics is based on observations of empirical facts and that mathematics is merely a language, which human beings use to communicate about such facts (Samuelson 1952). The difference between mathematics and other languages, he maintained, is the extent to which error is likely in its use. One can best avoid error by using the mathematical language. Samuelson was indeed successful in identifying errors and omissions in various theorems that had been expressed in words.

The fact that a mathematical model is less likely to contain errors than a verbal model is not relevant to the activities of theorem production in neoclassical individualist and Misesian economics since these cannot be mathematicized. Theorems in these fields deal with the entrepreneur role. This role is not a maximizer but an imaginative, creative, and inventive appraising decision-maker who must bear uncertainty about the actions that other distinctly human actors will take in the future. An individual acting in the entrepreneur role must make judgments about the meaning of the price signals she receives from all of the buyers and sellers who she judges to be relevant to her calculations. Mathematical economics is totally incapable of representing the judgments and inventive activity of the entrepreneur role. It is true enough that in their efforts to deal with such complexity, neoclassical individualist economics made many errors in reasoning that can be detected by systematically identifying the relationships among words, mathematics itself is totally incapable of comprehending the causal relationships that are necessary to explain historical events or to evaluate arguments concerning intervention in market interaction.

This fact about neoclassical mathematical economics was noted by Fritz Machlup. In commenting on Samuelson's views, Machlup wrote that "the basic human attitudes that underlie economic conduct – and must be understood if we are to understand economics – cannot be described and analyzed exclusively in mathematical language" (1952: 69).²⁵

The idea that mathematics is a language is harmless.²⁶ Mathematics is certainly not the appropriate language for the ideas expressed by Menger, Hayek and Mises. But that is a different matter. The danger, which has manifest itself all too obviously in modern professional economics, is that it facilitates the pseudo-scientific, or scientistic, view that the task of economics is to build mathematical models for the purpose of explaining or predicting "empirical regularities," which typically means regularities in government agency-produced statistics. This "modern empiricism is responsible for a professional norm that has led higher education bureaucrats to impede the teaching of neoclassical individualist economics by imposing a major unnecessary hurdle for aspiring Ph.D. economists at the typical university in the U.S., Europe and the rest of the world. The bureaucrats compel their students to acquire the skills needed to statistically test whether a model of such regularities could be employed to make accurate predictions

²⁵The problem is that further information is needed to decide whether a mathematical model is relevant to any particular problem. No judgment can be made about the relevance a particular mathematical model purporting to represent a theorem without a clear statement of the goal with respect to which the theorem is said to be relevant.

²⁶Far more harmful to the development of neoclassical individualist economics was Samuelson's 1948 book *Economics*, which became the prototype for a division of economics into microeconomics, à la Marshall, and macroeconomics, à la J. M. Keynes. In effect, both of these "branches" of modern professional economics almost totally ignore the neoclassical individualist economics initiated by Menger, followed by the major figures in early 20th century American economics, and applied by Hayek and Mises.

of future statistics.²⁷ Students who succeed in this typically develop no conception of economics in the neoclassical individualist sense.

Market Failure and Theoretical Welfare Economics

A. C. Pigou, who succeeded Marshall as the chair at the University of Cambridge in 1908, was not a mathematician. Nevertheless, he accepted the vague claims of Jevons and Walras that in a pure market economy with perfect competition, total utility would be maximized. Drawing on Marshall's concept of external economies and diseconomies, he went on to note that there would be a deviation from utility maximization if the goods produced exhibited an *externality*, or external effect. An example is pollution of the air by a manufacturer. A manufacturer may carry out his operations to the point where the extra benefits to individuals in the consumer role are less than the combined opportunity costs of production and sale and the harm due to the externality. He proceeded to compile a catalogue of cases in which he proposed that some law or action by the government might improve matters over those that would prevail exist without the law (Pigou: 1912, 1938). Later economists added to this list the notion of *public goods*. These are goods for which the production costs are lower than the *sum* of the benefits to some combination of consumers and producers yet the producers are unable to sell their products at a price that will enable them to recover their costs. An example is a dam to reduce the probability of flooding in a valley. Because the production and sale of such goods is unprofitable, they would not be produced, or not be produced in sufficient amounts, under pure market economy conditions. Today, professional economists call these externality and public good situations examples of *market failure*.

The aim of the mathematicians was to apply mathematics to economic problems. By the 1930s, mathematical economists were struggling to become a more substantial part of professional economics and they were competing for positions in higher education. Two sets of such applications emerged in relation to A. C. Pigou's effort to do applied economics in the spirit of Walras. I discuss each in turn.

Mathematical Market Failure Economics

Pigou was not a neoclassical individualist economist. He did not try to determine how prices and quantities are determined by distinctly human actors who use economic calculation, possess specialized knowledge, and communicate by means of price signaling. The main contribution of his work was the opening that it provided to the mathematicians to apply mathematics. These economists developed the mathematics of utility maximization in order to demonstrate Pigou's assertion that the existence of situations of externalities and public goods provide a *prima facie* case for market intervention. They developed mathematical models to show, in the terms used by Walras and Jevons, that free competition would not lead to total utility maximization. Good examples of well known seminal essays that define market failure situations in terms of mathematical models are Samuelson (1954), Bator (1958), and Buchanan and Stubblebine (1962).

It is evident that arguments favoring market intervention must begin with a full understanding of how prices and quantities of consumer goods and factor of production are determined. It is only with such an understanding that one can explain market interaction in the past and compare the achievement of ends by means of a market intervention with their achievement in the absence of the intervention. Accordingly, one must appreciate the fact that the prices and quantities that emerge from market interaction are caused by individuals acting as entrepreneurs who occupy the various positions along the various supply chains in the supply of each product. One must also appreciate the inventive character of distinctly human action. No mathematical model can represent these.

²⁷ A second reason for this norm is the bureaucratization of higher education, which elevates knowledge of mathematics as a screening tool. The cost of "educating" an economics major is lower if the material she is required to study and to be tested on is language. Bureaucratic administrators, unable to define economics independently, rely on the teachers to do it for them. The teachers, being bureaucrats themselves, choose subject matter the mastery of which is easiest to accurately assess.

Insofar as the purpose of mathematics is merely to communicate situations of market failure, it is insignificant. The danger lies in the ease with which the non-cautious user of mathematics can disregard the hard work entailed in evaluating an intervention argument. In short, mathematical analyses of market failure situations provide no significant benefit and they carry with them a great danger of ignoring the true individualist economic analyses required to properly evaluate intervention argument.

Theoretical Welfare Economic

Pigou took a somewhat cavalier attitude toward the relationship between utility and “social welfare.” This is vividly demonstrated by his definition of “economic welfare” and his discussion of its relevance (Pigou 1912: ch 1). This attitude was counterbalanced by one of the early Pareto, who succeeded Walras as chair of the University of Lausanne. Staying within the realm of pure economics, Pareto quickly pointed out that in order to determine whether a policy would raise total utility, an economist must make interpersonal comparisons of utility. He thereby raised the consciousness of economists regarding how judgments about who should gain (or the absence of such judgments) could easily bias the identification and evaluation of proposals to intervene in market interaction (Boulding 1952: 2-3, 12). The mathematical economists who followed – the theoretical welfare economists – re-labeled pure economics and proceeded to show, in effect, that the bridge that Jevons and Walras envisioned between pure theory and applied economics could not be built. In other words, they used mathematics to help show that the aspirations of Jevons and Walras were futile.

Such work can only be regarded as part of economics if one thinks that the aims of economics can be achieved by representing distinctly human action with mathematics.

APPENDIX TWO

SOME REMARKS ON NEOCLASSICAL INDIVIDUALIST ECONOMICS

Ideally, for my purpose, someone would have written a history of economic thought on “neoclassical individualist economics” to which I could refer a reader when I use this term. Alas, no one has and I cannot. In this appendix, I will provide little more than an impression of what such a history might look like. Fortunately, it is unnecessary for me to verify my claim that such economics exists. It is evident in the writings of Menger and in my interpretations of Mises.

The history I have in mind would contain three different strains that, so far as I have been able to determine from the literature, are more or less independent. The first and most important begins with the Austrians. It begins with Menger and includes the ideas of Böhm Bawerk (1890), Wieser (1899, 1914), Mises, Hayek and perhaps Joseph Schumpeter (1911).

The second strain begins with the late 19th century American economists. This history probably can be dated to a combination of publications about the Austrians or that directly or indirectly employed Austrian ideas. The seminal work was probably James Bonar’s 1888 paper, which introduced American economists to the early Austrian school and British economist William Smart’s *An introduction to the theory of value on the lines of Menger, Wieser and Bohm-Bawerk* in 1891. A translation of Böhm Bawerk’s *The Austrian Economists* appeared in 1891 volume 1 of the *The Annals of the American Academy of Political and Social Science*. An effort to interpret the new theory was made by MacVane (1893). In 1894, the Austrian theory of value was reflected in three papers on the subject of opportunity costs (David Green, Böhm Bawerk and Davenport). Each of these became the basis for further exploration. Davenport went on to produce a textbook (1896), many of the ideas of which were contained in his authoritative history of the theories of *Value and Distribution* (1906).

A development in American economist that complemented the early interest in Austrian economics was J. B. Clark’s publication in 1881 of his paper “Distribution as Determined by the Law of Rent,” which became the basis of his 1899 classic book *The Distribution of Wealth*. Clark also wrote several influential essays during the interim. Clark’s work was significant because of its division of actions into functions and, consequently, of its contribution to the eventual isolation of the entrepreneur role. Other relatively early major contributors were Frank Fetter (various essays [Fetter 1977] and his textbook, *Principles of Economics*, 1915) and a number of essays in various journals beginning in the 20th century) and Davenport, both of whom contributed to – indeed, one could say, invented – the time-related theorems described in Chapter Ten by virtue of their exploration of the concept of capitalization. Beginning with his publication of *Risk, Uncertainty and Profit* (1921), Knight integrated many of these ideas.

The third strain begins and more or less ends with Philip Wicksteed in England. The various ideas of Wicksteed (1910, 1914), Knight (1921), the Austrians, and Davenport found their way into the writings of Lionel Robbins (1974, 1945).

APPENDIX THREE

HAYEK ON MENDER'S AIM IN THE *PRINCIPLES*

In his introduction to Menger's *Principles*, F. A. Hayek wrote about Menger's aim. Menger, he said, aimed to build a uniform theory of price (Menger 1981: 17).²⁸ This view was reinforced by Endres (1995: 263). I am persuaded they are mistaken and that one result of this mistake is a broader misinterpretation of Menger's achievement. The purpose of this appendix is to present the basis for my belief.

It is easy to understand Hayek's interpretation. Menger writes:

I have devoted special attention to the investigation of the causal connections between economic phenomena involving products and the corresponding agents of production, not only *for the purpose of establishing a price theory based upon reality and placing all price phenomena (including interest, wages, ground rent, etc.) together under one unified point of view*, but also because of the important insights we thereby gain into many other economic processes heretofore completely misunderstood (*ibid.*: 49, italics added).

It certainly appears from this statement that producing a unified theory of price is important to Menger. This seems bolstered by the fact that it comes toward the end of his preface. Closer examination, however, suggests a different interpretation. Three paragraphs earlier, he had virtually reached the end of the preface with the statement:

It is now the task of the reader to judge to what results the method of investigation I have adopted has led, and whether I have been able to demonstrate successfully that the phenomena of economic life, like those of nature, are ordered strictly in accordance with definite laws (*ibid.*: 48).

He continues, however, by writing that he has unfinished business in the preface:

Before closing, however, I wish to contest the opinion of those who question the existence of laws of economic behavior by referring to human free will, since their argument would deny economics altogether the status of an exact science (*ibid.*).

This complex statement introduces his reply to critics. Human beings who have free will, the critics say, cannot also perform behavior that is subject to economic laws. He wants to rebut his critics before ending his preface.

His defense is as follows. Those who have this view simply do not understand the nature of *economic laws*. Such laws are obtained, he says by studying "the conditions under which men engage in provident activity [and, therefore, exercise their free will] directed to the satisfaction of their needs" (*ibid.*). He does not provide an example in his preface. The deductive system that he employed to explain economic growth is a vivid illustration of his point..

Although Menger's defense is interesting, what does it have to do with the paragraph on the unified theory of price quoted in the above statement? In fact, what does that statement have to do with anything. The answer, as I see it, is that Menger treats the "unified theory of price" as an economic law. That this is so is evident from the concluding sentence of the paragraph: "This (the theory of price) is the very branch of our science, moreover, in which the events of economic life most distinctly appear to obey regular laws" (*ibid.*: 49). My point in essence is that Menger regarded his theory of price as being derived from the assumption that economic behavior is performed by individuals with free will. Thus, his statement about building a unified theory of price is a statement about economic laws that assume free-willed individuals. It is intended to help rebut critics.²⁹

²⁸Also see Endres 1995: 263.

²⁹It is also worth pointing out that Menger refers to the theory of price only once in his preface.

Certainly, Menger does produce a unified theory of price. His chapter 5 is entitled “The Theory of Price.” But that is not all that he does. And it is a misinterpretation to say that this is his goal.³⁰

It is not really possible to comprehend his statement in the preface without examining what he actually does in the *Principles*. That is what I tried to do in the body of this chapter. In my view, his main goal is to build a theory in which the “economizing principle” leads to the gradual expansion of the division of labor and therefore of the development of more complex phenomena. In any case, as I have pointed out, his method of building an image of market interaction consists of first stating the limits facing an economizing actor or actors and then showing how the actor(s) overcome those limits. Whether one wishes to regard this, as I do, as a roundabout way of stating his goal of producing a theory of an expanding division of labor (a theory of economic growth) or whether one wishes to regard it as an implication of his methodological individualism, he does in fact build a theory of (i.e., a set of theorems that enable him to explain) the evolution of a system with an expanding division of labor that is based on the fundamental assumption that human beings act.

There is a correspondence between building a theory of economic growth and building an image of market interaction using methodological individualism. What is important to emphasize to those who conceive of economics from the latter point of view is that human beings are born into a world in which the potential individual gains from helping to expand the division of labor are already present. The “nature of things” contains a “bias toward progress.”

³⁰ Jaffé (1976: 519) writes that Menger did not aim to explain prices, although I do not believe that he tells the basis for his reasoning.

Neoclassical Individualist Economics

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2. Menger's Growth Economics
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Appendix 1: Neoclassical Mathematical Economics and its Progenies

1. Why the Aspirations of Jevons and Walras on the Future of Economics Could Not Be Realized
 - a. Producing and Utilizing Particular Knowledge
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Appendix 2: Some Remarks on Neoclassical Individualist Economics

Appendix 3: Hayek on Menger's Aim in the *Principles*

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