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Chapter 7

Critique of Mises on Equilibrium

Mises described two ways in which his concept of equilibrium -- the ERE -- should be used in economics: as an endpoint and as a counterfactual. Consider the following.

> The imaginary construction of the evenly rotating system is a limiting notion. In its frame there is in fact no longer any action. Automatic reaction is substituted for the conscious striving of thinking man after the removal of uneasiness. We can employ this problematic imaginary construction only if we never forget what purposes it is designed to serve. We want *first* of all to analyze the tendency, prevailing in every action, toward the establishment of an evenly rotating economy; in doing so, we must always take into account that this tendency can never attain its goal in a universe not perfectly rigid and immutable, that is in a universe which is living and not dead. *Secondly*, we need to comprehend in what respects the conditions of a living world in which there is action differ from those of a rigid world. This we can discover only by the *argumentum a contrario* provided by the image of a rigid [evenly rotating] economy. Thus we are led to the insight that dealing with the uncertain conditions of the unknown future -- that is, speculation -- is inherent in every action, and that profit and loss are necessary features of action which cannot be conjured away by any wishful thinking (Mises 1966: 249-250, italics added).

We have emphasized the second use in our discussion of the use of the robot economy to derive the properties of entrepreneurship. We were to some degree guided by Mises himself. First, we were inspired both by his statements in the latter part of the passage cited here and by the following

statements: (1) the ERE is a rigid system which "is not peopled with living men making choices liable to error; it is a world of soulless unthinking automatons; it is not a human society, it is an ant hill" (*ibid*.: 248); and "[i]n order to grasp the function of entrepreneurship and the meaning of profit and loss, we construct a system from which they are absent. This image is merely a tool for our thinking" (*ibid*., as quoted in Chapter Two). Second, we observed his use of the counterfactual to identify the properties of action in general: ends and means, time and uncertainty.

We have argued that the proper way for a praxeologist to understand these passages is to regard them as analogous to his statement that "we conceive the category of action by constructing an image of a state in which there is no action, either because the individual is fully contented and does not feel any uneasiness or because he does not know any procedure from which an improvement in his well-being (state of satisfaction) could be expected" (*ibid*.: 237). We must now point out, however, that Mises did not elaborate on these statements in his accompanying discussion. Moreover, in by far the majority of his discussions, Mises treated the ERE as a "final state of rest," or endpoint. Thus, we are not persuaded that Mises meant to give us the inspiration that we nevertheless took from his remarks. The reason for this, which we have suggested previously, is his preoccupation with the goal of presenting a more complete theory of imputation than Menger -- an Austrian theory of value and cost.

Instead of developing the idea of equilibrium as a counterfactual, he used it mainly as what he called a "final state of rest." For example, he referred to the ERE as "a fictitious system in which the market prices of all goods and services coincide with the final prices" (*ibid*.: 247). A final price is a price that we conceive by paying "attention to factors which are bound to bring about a tendency toward price changes. We try to find out to what goal this tendency must lead before all its driving force is exhausted and a new state of rest emerges" (*ibid*.: 245). Moreover, he writes that the only problems for whose treatment the evenly rotating economy is appropriate and indispensible are "the problem of the relation between the prices of products and those of the factors required for their production, and the implied problems of entrepreneurship and of profit and loss" (*ibid*.: 248). In effect, he says that the imaginary construction of the evenly rotating economy is useful primarily in conceiving of the theory of imputation, as it was understood in the 19th century. The secondary goal is to describe what he calls the market process and entrepreneurship, although the entrepreneurship he has in mind is that of

competing promoters, not entrepreneurship in the praxeological sense, as described in Chapters Two and Three. He states this secondary goal more clearly later in his book when he discusses the difference between the logical and mathematical economist.

> [t]he logical economist...shows how the activities of enterprising men, the *promoters and speculators*, eager to profit from discrepancies in the price structure, tend toward eradicating such discrepancies and thereby also toward blotting out the sources of entrepreneurial profit and loss. He shows how this process would finally result in the establishment of the evenly rotating economy. This is the task of economic theory...The problem is the analysis of the market process (*ibid*.: 355-6, italics added).

The main aims of this chapter are to describe Mises's use of the evenly rotating economy and to show how his conception of its role in the procedure of economics is wrong. We argue that because he misconceived its role, his descriptions of economic interaction were unimaginative and misleading from the point of view of economics as a branch of praxeology. The chapter begins by showing where his idea that the "market process" would result in the ERE fits into the procedure of economics. Since Mises elevates this notion to the status of the basic method of economics, he is led to make several errors and omissions. Among these are a simplistic description of the "operation of the market," a lack of clarity on the distinction between the analysis of change and the analysis of action, an inadequate critique of mathematical equilibrium, and a simplistic definition of the "market process." The chapter begins in part one with a critique of the view that there is a tendency in every action toward the ERE. We go on in successive parts to discuss "the operation of the market," the analysis of change, mathematical economics, and the "market process."

1. WHY THE ERE IS AN INADEQUATE ENDPOINT

As mentioned in the introduction, Mises used the ERE mainly as an endpoint or what he called a "final state of rest." Salerno has called this use "final state of rest analysis." In this analysis, the ERE is a set of final prices of consumers' goods and factors of production. To understand why this endpoint is inadequate, we must recognize its similarity to the IFSP, which we discussed in Chapter Six. In that discussion, we argued that building an image of the IFSP comprises part of the task of giving examples of entrepreneurship, which is the way we build economic theory. We supported its use by showing that it is similar to the image of

an endpoint, which we would have to use if we wanted to give examples of an isolated actor's action.

The Limited Usefulness of an Endpoint in Elucidating an Individual's Action

Consider the problem of elucidating the action of a single individual. As shown in Chapter Six, we achieve this by giving examples. To give an example, we may start with an image of a beginning point in which all the actor's behavior is fully consistent with her plans. Borrowing Mises's terminology, we could say that we first assume a final state of rest for the individual. Next we introduce a change in the data to motivate the actor to change her behavior. Starting with this change, we proceed to deduce an ending point in which a new set of behavior is fully consistent with her plans -- a new final state of rest. The example is not complete, however, until we go on to add that the end product is only an incomplete example of distinctly human action because the being in it does not exhibit imagination, creativity and inventiveness. What we have actually done is to build an image of a being whose behavior is programmed by algorithms that we have specified. To complete our example, we must add a statement about the actor's possession of imagination, creativity and inventiveness.

Using the ERE as an Endpoint to Help Understand Economic Interaction

A similar argument applies to Mises's final state of rest and the analysis for which it is used. It will not help us comprehend the human imagination, creativity and inventiveness and may even distract us from it. This limitation is more damaging in the case of economic interaction because individuals use these characteristics competitively, cooperatively, and in conflict. Competition continually demotes some of the competitors who, in order to maintain their previous standards of living, must innovate or copy other's innovations. In cooperation, financiers select partners and employers select employees who they "trust" to use their imagination, creativity and inventiveness even though they do not know exactly how they will use these characteristics. In conflict, persuasive and deceptive advertisers, con artists, and various other economic parasites use their imagination, creativity and inventiveness to take advantage of the error-proneness of others. And knowing that they are targets,

prospective victims use their own imagination, creativity and inventiveness to avoid being taken advantage of.

In short, "final state of rest analysis,"as used by Mises, is deficient because it is incomplete. It is incomplete because it neglects imagination, creativity and inventiveness. We know that it is incomplete from our contrast of the RRE with economic interaction under market economy conditions, as pointed out in part one of Chapter Six in this book.

2. A TENDENCY IN EVERY ACTION TOWARD THE ESTABLISHMENT OF THE ERE

Mises claimed that there is a "tendency, prevailing in every action, toward the establishment of an evenly rotating economy," although this "tendency can never attain its goal in a universe not perfectly rigid and immutable, that is, in a universe which is living and not dead" (*ibid.:* 250). What can he possibly mean by the tendency toward the ERE in every action? We can learn something by considering an analogous tendency in the action of an isolated individual.

Using an Image of an Endpoint to Give Examples of Isolated Action

All action is intended to achieve a goal. We assume a priori that every choice has an intended outcome. Furthermore, it seems reasonable to go on to assume that normal human beings are more likely than not to achieve the outcome they intend.[1] On the basis of these assumptions, we might be inclined to say that there is a tendency for the chooser to reach the *endpoint* he intended.

Although this kind of statement is reasonable enough, it would be misleading to write of the tendency in *every* action of a chooser to reach a *state of non-action.* There are at least two reasons. First, the isolated actor performs many actions simultaneously, each with a particular, typically different end. It seems unreasonable, even inconceivable, that all the endpoints of all of his particular actions would be reached

[1]Note the difference between the *intended* outcome and a *desired* outcome. A person who chooses an alternative that he judges to have only a low probability of causing his desired outcome will nevertheless achieve his intended outcome if the probability of achieving the desired outcome turns out to be as he expected it to be.

simultaneously. Even if there was a tendency to reach an endpoint in each action, at any point in time, (1) some actions would be nearing the endpoint, (2) some actions would be at an intermediate point, and (3) some actions would be just beginning. The idea that each action leads to a state of non-action cannot be logically supported by the assumption that an actor tends to reach the endpoint of all the actions he is performing.

Second, we know from experience that there are classes of action that are bound to lead to further action. An example is an action through time in which a later part of the action depends on the outcome of an earlier part. We might say that such actions have two properties: (1) the individual is uncertain about the outcome of the first part of the action and (2) he plans to pay attention to events as his choice "unfolds" in order to revise his choice of actions if he regards it as profitable to do so. In this class of actions, the first part of the action that we might conceive as having an endpoint changes the configuration of actions that an individual would regard as most appropriate for achieving that endpoint. The actor knows that he will acquire new knowledge. He may plan for this. However, since he cannot know in advance the content of his new knowledge, his plans must be contingent. It is true that the actor expects to gain from this kind of action. He expects to more adequately achieve his ends. However, even if he succeeds at this, he need not have reached an endpoint. Indeed, his success may lead him to abandon plans to complete other actions that he had started previously and to begin newly-planned actions.

An Endpoint of Economic Interaction

Thus there is problem enough with the notion that an isolated actor would reach a final state of rest. But now consider the notion as it is applied to the market economy. Suppose that it is somehow meaningful to say that an individual could achieve all his goals and reach a state of no action. In what sense would it be correct to say that such an individual's (or any individual's) action causes a tendency toward a final state of rest in an image of many actors? Clearly, in such an image, one person's choice to achieve his goals has the potential of facilitating another's achievement of her goals. But it also has the potential of interfering and of having absolutely no effect. We have already discussed some of the reasons why. We described the agency problem and taking advantage of others' propensity to err. To these we can add external effects. It is true that in a pure market economy with fully specified and costlessly enforced private property rights in all actions that have effects

on others, there would be no relevant external effects. If one defines the final state of rest as a state that would be reached in a *pure* market economy, it would be illogical to claim that he neglected the incompleteness of private property rights. But Mises makes the unqualified broader claim that there is a "tendency, prevailing in every action, toward the establishment of an evenly rotating economy" (as quoted above). He does not qualify his claim by mentioning the assumption of a complete private property system.

Where Mises's Assertion Fits Into the Procedure of Praxeological Economics

It is obvious, as Mises himself points out, that there is in reality no tendency toward a final state of rest. Why, then, should we use it? Mises's justification is that it helps us elucidate the market process, entrepreneurship, and profit and loss. This is true enough for the IFSP. However, the procedure used by Mises is incomplete because (1) it omits a step that is needed in order to elucidate entrepreneurship and (2) the ERE is not an IFSP. Consider first the missing step. As pointed out in the second part of Chapter Six, economics uses a specific procedure for giving examples of entrepreneurship and, in the process, building economic theory. This includes the use of two IFSPs and the specification of algorithms needed to reach them. However, the procedure of giving examples does not end when the endpoint and the actions and plans needed to reach it are fully spelled out. The praxeological economist must go on (1) to explore how imagination, creativity and inventiveness could modify the purely mechanical example and (2) to specify how the specialized entrepreneurship in the real market economy differs from the simulated entrepreneurship in the examples.

In making the assertion of a tendency toward equilibrium, Mises is careful to point out that in the real world equilibrium would never be reached because of the continuing changes in the data. However, he fails completely to identify praxeological entrepreneurship as a source of such changes and to deal with the reality of an incomplete private property system. He writes:

> The operation of the market reflects the fact that changes in the data are first perceived only by a few people and that different men draw different conclusions in appraising their effects. The more enterprising and brighter individuals take the lead, others follow later. The shrewder individuals appreciate conditions more correctly than the less intelligent and therefore succeed better in their actions. Economists must never disregard in their reasoning the fact that the innate and acquired inequality of men differentiates their adjustment to the conditions of their environment.

> The driving force of the market process is provided neither by the consumers nor by the owners of the means of production--land, capital goods, and labor--but by the promoting and speculating entrepreneurs (*ibid*.: 328-9).

He goes on in the subsequent paragraph to write that the ERE has no counterpart in reality because "[o]n the market, the agitation never stops. Nevertheless, he adds that "[t]hese endeavors of the entrepreneurs would finally result in the emergence of the evenly rotating economy if no further changes were to appear" (*ibid*.: 329).

The second reason why the procedure described by Mises is incomplete is the absence of time and planning in the ERE. The endpoint he conceives is not one in which plans are synchronized but in which no plans exist. As a result, his market process analysis is inadequate for dealing with such important market phenomena as transaction commitments, money holding, and the employment compact.

We must conclude that Mises's use of the ERE as an endpoint -- his "final state of rest analysis" (Salerno 1993: 122) -- corresponds, albeit incompletely, to the procedure used by praxeological economics to give examples. It is in this sense part of the procedure for building economic theory. But it is only a part. Mises's apparent elevation of this part to the status of a foundation for studying economic phenomena in general is a grave methodological error. And those who have followed in his footsteps and have extolled the virtues of Misesian "market process analysis" repeat this error.

3. THE ERE IN FACTOR PRICE DETERMINATION

In his section "The Prices of the Goods of Higher Order," Mises claims that in order to show how the prices of the factors of production are determined and to adequately and completely describe the operation of factor markets, we must use the ERE as an endpoint. He writes:

> The tasks incumbent upon the theory of prices of factors of production are to be solved by the same methods which are employed for treatment of the prices of consumers' goods. We conceive the operation of the market...in a twofold way. We think on the one hand of a state of affairs which leads to acts of exchange: the situation is such that the uneasiness of various individuals can be removed to some extent because various people value the same goods in a different way. On the other hand, we think of a situation in which no further acts of exchange can happen because no actor expects any further improvement of his satisfaction by further acts of exchange...The operation of the market is actuated and kept in motion by the exertion of the promoting entrepreneurs, eager to profit from differences in the market prices of the factors of production and the

> expected prices of the products. The operation of this market would stop if a situation were ever to emerge in which the sum of the prices of the complementary factors of production-- but for interest -- equaled the prices of the products and nobody believed that further price changes were to be expected. Thus we have described the process adequately and completely by pointing out, positively, what actuates it and, negatively, what would suspend its motion. The main importance is to be attached to the positive description. The negative description resulting in the *imaginary constructions of the final price and the evenly rotating economy* is merely auxiliary. For the task is not the treatment of imaginary concepts, which never appear in life and action, but the treatment of the market prices at which the goods of higher orders are really bought and sold (Mises 1966: 334, italics added).[2]

This quotation contains a number of unstated presuppositions. We must deal with these before we can assess the sentence on the evenly rotating economy. We shall make several points. First, in spite of appearances, Mises's goal in this section is not to describe real factor pricing or the operation of real factor markets. Second, his goal, which is unstated, is to provide a refutation of the socialist and Marxist thesis that labor is exploited. He aims to do this not from a base of praxeological economics but from a base of marginal productivity theory. Third, the best way to achieve this goal is to use a praxeological approach and to refer to the entrepreneur. After making these points, we briefly explain why the statement about the evenly rotating economy is incomplete.

Factor Markets are Neither Realistic Nor Praxeological

It is clear from the arguments we have presented so far that Mises description of factor markets is unrealistic because it is incomplete and that one reason for its incompleteness is that it is not praxeological. It is incomplete for the following reasons. First, a complete description of economic interaction requires a description not only of pricing but also of the nature of the items being exchanged and of the conditions of the exchange. A description of one characteristic of a transaction without including the others cannot be complete. Second, a complete description must also include errors and actions aimed at taking advantage of others errors. Third, it must include a recognition of the agency problem and of governance structures. The agency problem is a consequence of the impossibility exchanging a legal right to fully control a person's work and, in a free society, of acquiring anything more in this respect than a legal right to command a person's work within limits. Thus, one might say that the third reason is due to an incomplete private property system.

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[2]Mises attributes this method to Gossen, Carl Menger and Bohm Bawerk (*ibid*.).

Fourth, it must recognize that, because the private property system is always incomplete, factors may be employed to produce legal rights.

Mises's image of factor markets is non-praxeological because it refers only to the promoting entrepreneurs. For a description of a market to be praxeological, praxeological entrepreneurship must be part of the description. The description contains no appraisement, undertaking, or uncertainty-bearing. Also it disregards imagination, creativity, and inventiveness.

Goal is to Refute Socialist and Marxist Exploitation Theory Using Marginal Productivity Theory

If the description is neither complete nor praxeological, what is its purpose? We claim that Mises's ultimate goal in this section is to lay the groundwork for an evaluation of the socialist and Marxian hypothesis that labor does not earn an income commensurate with its contribution to production. It is "exploited." To understand the reasoning for this claim, we must consider other parts of *Human Action*, which contain similar descriptions of factor markets. Mises refers to the exploitation hypothesis as the "doctrine of the monopolistic manipulation of wage rates" (*ibid*.: 596-7). To refute this doctrine, it is sufficient to use marginal productivity theory, which he does with due acknowledgment. He deals with it in two sections of his book. The first is a section on "Monopoly of Demand," which appears later in his chapter on "Prices." The second is in a section of a later chapter entitled "Wages." In the section on prices, he builds a model in which two homogeneous, complementary factors of production, labor and capital, are employed to produce a product. He points out that, other things equal, if the owners of capital can form a cartel to limit supply, they can cause the price of capital to increase, which has the effect of reducing the demand for and price of labor. In this sense, "capitalists" can cause "laborers" to receive lower wages. His aim is to refute the claim that the lower wages are due to a monopoly in the demand for labor (monopsony) on the grounds that the ultimate cause of the low wages is the monopoly in supply of the capital.

In the second section, he applies this principle. But first he reiterates the theory of factor price determination. In writing about how wages are determined, he repeats the general principle:

> Each entrepreneur is eager to buy all the kinds of specific labor he needs for the realization of his plans at the cheapest price. But the wages he offers must be high enough to take the workers away from competing entrepreneurs. The upper limit of his bidding is determined by anticipation of the price he can obtain for the increment in

> salable goods he expects from the employment of the worker concerned. The lower limit is determined by the bids of competing entrepreneurs who themselves are guided by analogous considerations. It is this that economists have in mind in asserting that the height of wage rates for each kind of labor is determined by its *marginal productivity*. Another way to express the same truth is to say that wage rates are determined by the supply of labor and of material factors of production on the one hand and by the anticipated future prices of the consumers' goods (*ibid*.: 594, italics added).

Then he refers back to the doctrine of "the monopoly of the demand" (*ibid*.), implying that if there is a monopoly in the supply of specific forms of capital, the exploitation theory would be a theoretical possibility insofar as one is concerned only with the wages of a particular kind of labor. The additional point, of course, is that the real source of the lower wages is the monopoly over the supply of capital.

Taking the entrepreneurs to be the demanders of labor, he points out that if they "offer prices or wage rates that are too low, i.e., do not agree with the state of the unhampered market, they will succeed in acquiring what they want to acquire only if entrance into the ranks of entrepreneurship is blocked through institutional barriers" (*ibid*.). He goes on to discuss the possibility that employers would take concerted action. He asserts that this could only occur as a result of "institutional restriction of access to entrepreneurship" (*ibid*.: 595). He considers some other possibilities and concludes that the "central fact is that a monopoly of the demand for labor cannot and does not exist in an unhampered market economy. It could originate only as an outgrowth of institutional restrictions of access to entrepreneurship (*ibid*.: 596). In light of his previous discussion of "monopoly of demand," he is asserting here that in the absence of institutional restrictions, capitalists could not gain a monopoly over the supply of the particular kinds of capital goods needed to complement the labor. After this, he reiterates what he had previously written in his section on the determination of the prices of the factors or production. He says that

> [t]here prevails a tendency for wage rates to reach the point at which they are equal to the price of the marginal product of the kind of labor in question. If wage rates drop below this point, the gain derived from the employment of every additional worker will increase the demand for labor and thus make wage rates rise again. If wage rates rise above this point, the loss incurred from the employment of every worker will force the employers to discharge workers. The competition of the unemployed for jobs will create a tendency for wage rates to drop (*ibid*.: 597).

We conclude that Mises's main goal in writing the section on the determination of the prices of the factors of production was to refute the

monopoly exploitation theory of wages and that he proceeded to achieve this goal by using standard marginal productivity theory.

Praxeological Refutation of the Exploitation Hypothesis

The most important argument against the exploitation hypothesis is not that factors are paid according to their marginal product but that every supplier of labor is also an entrepreneur and consumer. Any employee who feels that he is not being paid sufficiently is permitted to try to become an employer. She can try to copy the actions of existing employers or she can innovate by developing some totally new product. Also if employers in some lines of business are paying lower wages than workers are worth to other employers, those other employers have an incentive to bid them away by offering higher wages. An employment compact may be complex. It often includes many things besides a commitment to pay wages and to supply generic work. Employers may break the commitments they are expected to keep, such as a commitment to pay a pension or to continue to offer employment for some indefinite length of time. Employees cannot avoid acting entrepreneurially in their decision to accept a particular employment compact.

The entrepreneurial nature of workers is important in other respects. A worker who does not invest in the skills needed to produce products that consumers demand or who does not make it easy for someone to hire him is likely to see his earnings decline relative to those who do invest and who do facilitate the hiring. In a society with growing population, new workers are continually entering the workforce. This puts pressure on those who already have employment that would not exist in the absence of such worker competition. Failure to prepare for this competition or to adapt to it in the appropriate way may cause a worker's wages to fall. Thus, the wages of workers who do not appraise their labor well, who do not undertake investments to raise their labor's value, and who are less willing or able to bear the uncertainty of making changes -- in short, workers who are less willing or less able to act entrepreneurially -- can expect the price paid for their work to fall unless others find discover a valuable use for it.

It is also necessary to account for the fact that workers are also consumers. If we neglect error, monopoly, and external effects; the entrepreneurial actions of producers and other workers lead to the discovery and satisfaction of their wants as consumers. The same free enterprise pressures that demand entrepreneurship from workers also operate to benefit them in their role as consumers. It is entirely possible

that although an individual is harmed by competition from other workers, her harm will be more than offset by her gain from free enterprise as a consumer. Of course, her gain as consumer may also be less than her loss as worker.

The argument here is not that Mises was wrong. The exploitation hypotheses does fail to consider the cause of the so-called monopoly of demand. The Austrian theory of value and cost, which is the correct basis for marginal productivity theory -- enables one to show this. Mises is also correct to try to explain monopoly by looking at restrictions on free enterprise. It is that he pays too little attention to praxeological entrepreneurship.

Socialists and Marxists attract followers with their offer of a world in which a laborer need not be an entrepreneur in order to be assured of a moderate standard of living. However, they do not make it clear how they will provide this assurance while at the same time maintaining giving people a standard of living that people would regard as acceptable in light of the alternative. Indeed, they evidently would make the most imaginative, creative, and inventive people dependent on bureaucrats for their well being and thereby deny ordinarily people the lush fruits of their energies. The market economy, with freedom of enterprise, can provide no such assurances for workers. In the market economy, free enterprise and the private property system combine to provide the institutional framework that gives individuals incentives to act entrepreneurially. Although some entrepreneurial actions are erroneous and others aim to take advantage of the errors of others, the mainstay of of entrepreneurial action is its supply of goods and services that others want more than their alternatives. In view of the imagination, creativity, and inventiveness of which human beings are capable, we can expect the market economy to lead to a steadily improving standard of living for the typical individual, absent the most harsh conditions of material resource deterioration.

Why the Evenly Rotating Economy Statement is Incomplete

Let us refer now back to the statement on the ERE at the beginning of this section. What Mises appears to do is to use a model of entrepreneurs to give an example of economic interaction under restrictive conditions. If we assume that by ERE, he meant IFSP; we can hypothesize that he aims to gives an example of pricing under highly restrictive conditions that the nature of the factors and the conditions of exchange are fixed and known by the bidding entrepreneurs. In Chapter Six, we pointed out that to give an example, the economist must use a beginning point and an endpoint. Mises's ERE presumably functions as an endpoint. In the

transition from the beginning to the endpoint, the entrepreneurs act according to the specifications of the economist. When Mises says that the promoting entrepreneurs perceive and take advantage of price discrepancies and that they would not act if such discrepancies ceased to exist, he is in effect suggesting that it is possible to specify how they will act under the conditions.

If our hypothesis was correct and Mises's did aim to give an example, we must conclude that his example is incomplete. First, the economists cannot presume to know the appraisals, planned undertakings, and means of dealing with uncertainty that might be adopted by the indefinite number of specialized, real individuals acting in the role of entrepreneurs. Second, to complete any example of entrepreneurship, Mises would have to go on to stress that imagination, creativity, and inventiveness of entrepreneurship would preclude the reaching of an endpoint even if there was no change in any of the material conditions and wants of consumers.

Since it is clear that Mises's description of the operation of pricing in factor markets is not complete from a praxeological view, we must ask why he would have said it is. Note that he also used the term "adequate." Adequacy refers to the idea that an image of interaction or an argument can achieve the goal it is intended to achieve. Perhaps he means to say that the image is completely adequate to accomplish the goal he intends to accomplish.

4. CHANGE IN THE DATA VS. ACTION IN ECONOMIC THEORY

Another use to which Mises claims the ERE can be put is to "analyze the problems of change in the data..." Consider the following statement:

> [I]n order to analyze the problems of change in the data and of unevenly and irregularly varying movement, we must confront them with a fictitious state in which both are hypothetically eliminated...This so called static method is precisely the proper mental tool for the examination of change. There is no means of studying the complex phenomena of action other than first to abstract from change altogether, then to introduce an isolated factor provoking change, and ultimately to analyze its effects under the assumption that other things remain equal...The static method, the employment of the imaginary construction of the evenly rotating economy, is the only adequate method of analyzing the changes concerned without regard to whether they are great or small, sudden or slow (*ibid*.: 247-8).

This quotation contains three phrases that require reconciliation before one can assess its meaning. It begins with the phrase "in order to analyze the problems of change in the data..." But it also refers to the "means of studying the complex phenomena of action..." And then it mentions "analyzing the changes concerned." Let us try to reconcile these three phrases by assuming that the most general is the "complex phenomena of action." Then, judging from the chapter of his book entitled "The Data of the Market," his discussion of the "problems of change in the data and of unevenly and irregularly varying movement" refers to the problems entailed in building economic theory. Using the term "catallactics" to mean economics, Mises begins that chapter by writing:

> Catallactics, the theory of the market economy, is not a system of theorems valid only under ideal and unrealizable conditions and applicable to reality merely with essential restrictions and modifications. All the theorems of catallactics are rigidly and without any exception valid for all phenomena of the market economy, provided the particular conditions which they presuppose are present (*ibid*.: 646).

Economics, then, is a system of theorems. Then he writes about praxeology and the data:

> Praxeology deals with human action as such in a general and universal way. It deals neither with the particular conditions of the environment in which man acts nor with the concrete content of the valuations which direct his actions. For praxeology data are the bodily and psychological features of the acting men, their desires and value judgments, and the theories, doctrines, and ideologies they develop in order to adjust themselves purposively to the conditions of their environment and thus to attain the ends they are aiming at. These data, although permanent in their structure and strictly determined by the laws controlling the order of the universe, are perpetually fluctuating and varying; they change from instant to instant (*ibid*.).

Having written that praxeology deals with action in a universal way, he goes on to discuss the problem of dealing with the "fullness of reality:"

> The fullness of reality can be mentally mastered only by a mind resorting both to the conception of praxeology and to the understanding of history; and the latter requires command of the teachings of the natural sciences. Cognition and prediction are provided by the totality of knowledge. What the various single branches of science offer is always fragmentary; it must be complemented by the results of all the other branches...(*ibid*.: 646-7).

He uses the term data again in the context of criticizing the "historical school" and the "institutionalists." He writes:

> The Historical School and the Institutionalists want to outlaw the study of praxeology and economics and to occupy themselves merely with the registration of the data or, as

> they call them nowadays, the institutions. But no statement concerning these data can be made without reference to a definite set of economic theorems (*ibid*.).

In light of these statements that occur later in the text, one concludes that to "analyze the problems of a change in the data..." means to construct economic theorems that are relevant to helping one understand reality under the conditions of the market economy. In the language of this book, the phrase means to "build economic theory." As we have seen, to accomplish this, one must use the IFSP to give examples of entrepreneurship.

We conclude that the "complex phenomena of action" is meant to refer to the data studied by the economist in his effort to deal with the "fullness of reality." In order to study those phenomena one must use economic theory. When Mises writes about "analyzing the changes concerned," he is referring to the phenomena of action, particularly action under the conditions of the market economy. These phenomena are equivalent to the change in the data." "Unevenly and irregularly varying movement," we presume, adds the descriptor "irregular" to this phenomena of action that the economist aims to analyze.

All this said, there seems to be a great deal of room for misinterpretation. Why not simply write that in order to build a body of economic theorems, it is necessary to use the evenly rotating economy in the way suggested?[3]

In any case, Mises is only partly correct in his belief that to build economic theory, one uses the evenly rotating economy in the way he suggests. This conclusion is based on the uses of the equilibrium-like constructions we said are necessary in Chapter 2 of this book. Mises is correct when he writes that to understand the problems of economic action, we must confront this action with a hypothetical state in which the action is eliminated. But the purpose of this construction -- namely, the RRE -- is to identify the properties of entrepreneurship. That construction is not suited for the task of building economic theory by giving examples of action. When Mises goes on to suggest that it *is* suited for this task, he demonstrates the limits of his reasoning about the praxeological method. Apparently, he conflates two different and separate steps in the procedure

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[3]Rothbard uses similar language in his discussion of the use of imaginary constructions as "thought experiments." He writes that the praxeologist uses thought experiments to hold "all other variables constant, while he examines the effect of changing one variable on another" (Rothbard 1997: 130). One should substitute the term "data" for "variable" and the term "change in action" for "effect."

for doing economic theory. The latter step consists of building an image of robot entrepreneurs whose at first perform no "actions" because their plans are fully synchronized at some beginning point. Then, after some change in the data that de-syncrhonizes their plans, they proceed to act in such a way that a new endpoint is reached in which their plans are again fully synchronized. This step is followed by a step in which we instill the robot entrepreneurs of the image of fully synchronized plans with the qualities of imagination, creativity, and inventiveness. But Mises's statement suggests that it is possible to comprehend action without taking this last step. As a result, he seems to recommend a procedure that would be readily accepted by the more mechanical neoclassical economists but which should be constantly criticized by praxeological economists. Clearly, he is on the right track. But just as clearly, he has not fully worked out the procedure for doing praxeological economics.

Let us try to rephrase Mises's statement by using terms that have a praxeological foundation.

> In order to comprehend economic interaction, we must first confront it with a fictitious state in which it is hypothetically eliminated. This counterfactual method is necessary to define action. In addition, we must give examples of action. To do this, we need IFSPs. There is no means of giving examples of complex market phenomena other than first to assume an IFSP, then to introduce an isolated factor that motivates entrepreneurial action, and ultimately to analyze its effects under the assumption that other things remain equal. Finally, we must consider the imagination, creativity and inventiveness of the specialized actors which we could never fully represent in our exercise.

5. WHAT'S WRONG WITH MATHEMATICAL EQUILIBRIUM

Mises uses the idea of a tendency toward the ERE to argue against mathematical economics, which also uses the notion of equilibrium. He says that the

> mathematical economists disregard dealing with the actions which...are supposed to bring about the evenly rotating economy...They stress exclusively the imaginary state of equilibrium which the whole complex of such [speculative] actions would attain in the absence of any further change in the data. They describe this imaginary equilibrium by sets of simultaneous differential equations. They fail to recognize that the state of affairs they are dealing with is a state in which there is *no longer any action* but only a succession of events provoked by a mystical prime mover...They deal with equilibrium as if it were a real entity and not *a limiting notion*, a mere mental tool. What they are

> doing is vain playing with mathematical symbols, a pastime not suited to convey any knowledge (1966: 250, italics added, as quoted above).

In contrast, the "logical economist"

> shows how the activities of enterprising men, the *promoters and speculators*, eager to profit from discrepancies in the price structure, tend toward eradicating such discrepancies and thereby also toward blotting out the sources of entrepreneurial profit and loss. He shows how this process would finally result in the establishment of the evenly rotating economy. This is the task of economic theory...The problem is the analysis of the market process (*ibid*.: 355-6, italics added, as quoted above).

Because he is concerned only with the final state of equilibrium, the

> mathematical economist does not contribute anything to the elucidation of the market process [i.e., the process in which the promoters and speculators are the driving force]. He merely describes an auxiliary makeshift [the ERE] employed by the logical economists as a limiting notion, the definition of a state of affairs in which there is no longer any action and the market process has come to a standstill. That is all he can say. What the logical economist sets forth in words when defining the imaginary constructions of the final state of rest and the evenly rotating economy and what the mathematical economist himself must describe in words before he embarks upon his mathematical work, is translated into algebraic symbols. A superficial analogy is spun out too long, that is all" (*ibid*.: 355).

Thus the difference between the mathematical and the logical economist is that the former pays no attention to the market process, which Mises defines as the actions of promoters and speculators that would cause the ERE to be reached if there were no further changes.

It is evident that the object of Mises's discussion is the theory of imputation. He is comparing the theory of imputation in the work of writers like Walras and Pareto with the theory as he conceived its development in the tradition of, for example, Menger and Bohm Bawerk. But we can make a more penetrating critique of mathematical economics. In light of (1) subsequent developments in the arguments made by interventionists and (2) the praxeologically-based economics described in this book, we can claim today that Mises's argument against mathematical economics is not as convincing as it could have been.

The most fundamental argument against mathematical economics is that whereas mathematical models are designed to be simulations, the equilibrium constructs of praxeological economics perform different functions. First, the robot economy in praxeological economics is useful because we know from intuition and experience that human beings would

never be in it. That is, it functions as a counterfactual to help us identify the properties and characteristics of entrepreneurship. Second, the IFSP is mainly useful because it functions as a starting point and ending point in giving examples of entrepreneurship and therefore for building adequate and relevant economic theory. But an image of "entrepreneurs" who cause the change from one endpoint to another is only part of procedure for accomplishing this latter purpose. To complete the job of giving an example, we must recognize the imagination, creativity and inventiveness associated with entrepreneurial behavior that we specify in each of the separate specializations.

Mathematical economics may help us build and describe images of complex robot economies -- i.e., of robot economies with various specializations. In this, it can help us build more relevant counterfactuals to help us appreciate the imagination, creativity and inventiveness of the entrepreneurship in the manifestation of its properties of appraisement, undertaking, and uncertainty-bearing. And it can help us keep track of the specialized entrepreneurial behavior that we specify in our examples. However, the goal of simulating the market economy is fundamentally unrealizable. Unless the mathematical economist explains how a model will help us comprehend action and/or to give examples of entrepreneurship -- in other words, unless his ultimate aim is to do praxeological economics -- he has no reason to think that his work will contribute to the task of understanding economic interaction. And to the extent that he gives such an explanation, he is closer to being a praxeological economist.

Mises did not see the potential role of a mathematical model in helping to build complex counterfactuals. The reason is probably that he did not himself employ the counterfactual to identify the properties of entrepreneurship. Because he mainly used the equilibrium notion as an endpoint in a part of the praxeological procedure of giving examples (his market process analysis), he presumed that the only use of a mathematical model is as an endpoint. Recognizing that an endpoint is only an auxiliary part of giving examples, he criticized the mathematical economists for being overly concerned with model-building as opposed to describing the means through which the endpoint is reached. However, as we have indicated, descriptions of the behavior needed to reach the endpoint are only part of the praxeological procedure of giving examples. The next step -- which we have maintained Mises did not take -- is to use the descriptions of the behavior needed to reach the endpoint as counterfactuals for showing how imagination, creativity and inventiveness are employed in competitive, cooperative, and conflicting market economy situations. Mathematical economics can help in keeping

track of the various specialized behavior that we assume. Still, it can play only a bit part in the totality of praxeological economics. Nor is it necessary; it is only a convenient shorthand. And its use is full of temptations for abuse.[4]

Discovery of Price Discrepancies?

The shortcoming of Mises's criticism of mathematical economics is that he had no concept of the praxeological entrepreneur to use as a reference. One result of this is his assertion that promoting and speculating entrepreneurs *discover price discrepancies* (*ibid*.: 355-6, as quoted above).[5] Mises probably means by this something more general that what is indicated by the words themselves. He probably means that the entrepreneurs discover the wants and opportunities to satisfy them in light of his uncertainty about how others will act.[6] Even if we assume that his meaning is broader than the words suggest, however, Mises's focus is still on discovery and not action. The aim of praxeological entrepreneurship's discovery is not price discrepancies but *profitable transactions* that can be made. Some individuals do this by making various provisional transaction commitments in order to signal other individuals of their willingness to trade. Their discoveries occur when others react to their provisional commitments. The making and receiving of such signals is an interactive process. Recognizing this, we are led to pay attention to the subjectivity of the commitment-making and commitment-assessing in the interaction connected with making transactions. Consider a seller's commitment to sell at a particular price. To evaluate this commitment, a person must learn about the nature of the product and conditions that the seller attaches (e.g., a warranty). The importance, or credibility, of a commitment to sell must be assessed by each prospective buyer. One prospective buyer may regard the commitment as highly credible, another may doubt its credibility, and a third may not know enough about the

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[4]The issue here is that economics today is mainly taught and learned in universities where teachers are under pressure to please as large a number of students as possible. Since knowledge of mathematical economics is easier to test, if not to teach than praxeological economics, teachers tend to favor it for the wrong reasons.

[5]Coase uses similar language in his 1937 paper, where he writes that one of the costs of using the market mechanism is the cost of discovering market prices.

[6]That this is so is suggested by his use of the term "speculating entrepreneur." See his statements to the effect that every action is a speculation (*ibid*.: 106, 113, 252).

seller, the product or accompanying conditions to make a judgment. Moreover, a particular announcement of a commitment may be intended to convey different information to different individuals. For example, the announcement may be intended as an announcement of a take-it-or-leave-it price to prospective buyer A, while it is intended as an announcement of a first price to buyer B. Individuals are continually sorting out these possibilities through an interactive process which, viewed in retrospect, leads exchanges for money to eventually occur.

Entrepreneurship or Robot Entrepreneurs?

It easy to interpret Mises's statements about the discovery of price discrepancies as a non-praxeological exercise. In presenting examples of entrepreneurship, the economist begins with an endpoint, introduces a motivation to act in the form of a perceived opportunity for profit, and then describes the entrepreneurial behavior that is necessary to reach a new endpoint. In this exercise, we can use the term price discrepancy to describe the motivation to act. The entrepreneur perceives a profit because the prices he expects to receive for his production and sales actions exceed the prices he must pay for the factors of production needed to complete these actions plus an interest premium. In describing the behavior that brings about the endpoint, we can say that it reduces these price discrepancies. But however we decide to describe it, we ought not forget that the image we are building is not of entrepreneurial action, properly understood, but of assumed entrepreneurial *behavior*. If we use the term "entrepreneur" in this context, we must be careful to convey the message that entrepreneurship is a much deeper concept. One way to accomplish this is to use the term robot entrepreneur. In this language, we can represent a change from one endpoint to another by referring to robot entrepreneurs who are programmed to perceive price discrepancies. We proceed to introduce change in the form of a set of price discrepancies that are identified by robot entrepreneurs behaving in accord with algorithms that we also specify. In this image, we can specify that robot profit-maximizers differ from each other and that objective time will pass to differentiate early discoverers from potential late discoverers. We may further assume that some of the robots identify discrepancies sooner than others and that some are mere copiers. By doing this, we may deduce a conceptual behavior path toward the new equilibrium.

In praxeological economics, of course, our task of giving examples does not end here. We must add imagination, creativity, and inventiveness. The description of robot entrepreneur behavior functions as both an auxiliary and a counterfactual. It is an auxiliary in the sense that it helps

us delimit the examples we aim to give. It is a counterfactual because, in order to complete the example-giving, we must refer to the imagination, creativity, and inventiveness that actors under the conditions specified are likely to exhibit.[7]

6. IS THE MARKET PROCESS COOPERATIVE?

An important clue to Mises's reason for using the "tendency toward equilibrium" concept is his discussion of the market process. In his first statement about the market process he says that it "is the adjustment of the individual actions of the various members of the market society to the requirements of mutual cooperation" (1966: 258). Since he uses this term in conjunction with the idea of a tendency toward equilibrium, it would appear that one of his goals is to elucidate what he calls "mutual cooperation." One of the outstanding features of the market economy, as we know it from experience, is the way in which individuals seem to cooperate in the satisfaction of each other's wants, even though most of them do not know precisely how their actions contribute to such satisfaction. What Mises seems to have in mind when he speaks of the market process is this kind of cooperation or coordination.

With the exception of monopoly, actions related to errors, and the satisfaction of the preferences of factor suppliers, as described in Chapter Three, every action in the market economy (i.e., under the condition of a complete set of private property rights) is intended to satisfy consumer wants. However, the competition among individuals that is intended to satisfy consumer wants is not limited to actions that would tend toward

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[7]This discussion may shed some light on why Israel Kirzner, a student of Mises, has developed a definition of entrepreneurship that is so different from that of the praxeological entrepreneurship described in this book. Kirzner (1973) must have recognized that the promoting and speculating entrepreneurs described by Mises are hardly different from robots. So he focused, as this book has, on Mises's concept of *homo agens* (*ibid*.: 33) as distinct from what he calls the "Robbinsian economizer," who has given ends and means. He writes that the *homo agens* concept is broader than that of an the economizer. This is so, he maintained, because, in economic interaction, it includes a subconscious alertness to price discrepancies. What is understandably missing in Kirzner's conception of entrepreneurship is an appreciation of the counterfactual function performed by the image of robot maximizers. To understand *homo agens* in the market economy, one must make a counterfactual at two points in the procedure of economics: (1) at the point where one builds a definition of entrepreneurship and (2) at the point where one give examples of entrepreneurship. Kirzner's conception of entrepreneurship is discussed further in Gunning 1997b.

some endpoint. It consists partly of discovering wants and of producing new products to satisfy them, partly of discovering methods of satisfying wants that are unknown to others, partly of improving on the methods that others now use, partly of discovering the plans of rivals and suppliers of complementary goods and factors, partly of developing innovative ways to deal with uncertainty and partly of discovering more desirable or less costly conditions associated with exchange. These actions are also part of the cooperation and coordination that lead to a greater satisfaction of consumers' wants than otherwise. But they cannot be part of a tendency toward equilibrium. Accordingly, they cannot be part of the market process, as Mises describes it. Thus, mutual cooperation is broader than Mises's cooperative market process because the latter omits important classes of cooperative economic interaction.[8]

[8]It may appear at first that Kirzner circumvents this problem in his discussion of "market equilibrium tendencies." According to his description of the tendency toward equilibrium that is inherent in the market process perspective, entrepreneurs anticipate and take into account "future conditions, not as they might have been independently of the market process itself, but as they may turn out to be as a result of all the surprises and creativities of which the market process consists" (1992: 35). The problem with this formulation is that we cannot even form a vague image of what it would mean for entrepreneurship to take these factors into account. Let us focus on the term "creativities." Kirzner appears to be saying that individuals have the task in the equilibration process of taking into account the inventions and innovations that other individuals will cause to occur. Clearly, however, as one individual takes into account in his actions the creations of others, the others must come to take into account the creations of the one. And so on for everyone in the market economy. Moreover, even if this taking account occurs, it would take time, human beings are specialists, and they have independent wills. Specialist A cannot predict how specialist B will respond to or anticipate A's action with very much accuracy. Moreover, even if B can "accurately" anticipate A's action and makes this anticipation a basis for his action, A can anticipate B's action and choose not to perform the action that B anticipated. In addition, he can act deceptively. For these reasons, equilibration is not a meaningful phenomenon in a market economy with praxeological entrepreneurship. Kirzner's verbal conventions do not alter this fact. Of course, it is correct to say that individuals typically have incentives to try to anticipate the actions of others, including their creations. But the term "equilibration" is not only unnecessary to represent this idea, it is misleading.

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