
PRICE ADJUSTMENT AND THE MARKET PROCESS: DEALING WITH DISEQUILIBRIUM

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ABSTRACT

This paper discusses competitive price adjustment in the context of a model which retains the Marshallian supply and demand framework while emphasizing the function of entrepreneurship. It considers how entrepreneurial gains are made in both surplus and shortage markets and by competitors on both sides of the market as price is driven to the market-clearing level. Put differently and more simply, it considers how participants on both sides of the market are able to gain through their ability to deal with disequilibrium. The reasoning is intuitive, the presentation verbal and diagrammatic, not mathematical. But the analysis is more formal and, it is hoped, more instructive than the sort of discussion one typically finds in undergraduate economics textbooks.

If competitive markets are to be explained in terms of Marshallian supply and demand diagrams, surely we are entitled to a theoretical process--a story which might account for the economists' confidence in the special relevance of the intersection point in that supply and demand diagram.

Israel M. Kirzner (1997, 66)

Determining precisely what people do who are not in equilibrium is not one of the notable achievements of economics.

Theodore W. Schultz (1975, 829)

INTRODUCTION

Introductory-level economics textbooks tell an equilibrium "story" of sorts, but not in formal terms. Michael Parkin's *Economics* offers one of the better discussions. A shortage, Parkin explains, forces the price up:

Suppose the price of a tape is \$2. Consumers plan to buy 6 million tapes a week, and producers plan to sell 3 million tapes a week.... Some producers, noticing lines of unsatisfied consumers, move their prices up. Some producers increase their output. As producers push their prices up, the price rises toward its equilibrium.

Michael Parkin (1998, 79)

A surplus, on the other hand, forces the price down:

Suppose the price of a tape is \$4. Producers plan to sell 5 million tapes a week, and consumers plan to buy 3 million tapes a week.... Some producers, unable to sell the quantities of tapes they planned to sell, cut their prices. In addition, some producers scale back production. As producers cut prices, the price falls toward its equilibrium.

Michael Parkin (1998, 79)

While this sort of discussion is intuitively appealing, at least on the surface, on deeper examination it begs fundamental questions regarding the competitive model. If market participants are assumed to take prices as given, and determine how much to buy and sell accordingly, then whose decision is it to change prices? Do some have information not available to others? If information does not flow freely, does this market "imperfection" impede the progress toward equilibrium?

These are hardly new questions¹, yet they remain largely unexplored in most undergraduate textbooks -- even in more advanced price theory texts. Indeed, intermediate microeconomics texts often develop the concept of market equilibrium almost entirely mathematically, in effect treating markets as being at all times in the purely static state described by solutions to simultaneous equation systems solved for " p " and " q ". Neither approach, the informal nor the mathematical, does justice

to the process of equilibrium -- particularly in the context of entrepreneurial behavior and the gains to those who bring markets to equilibrium.

Theodore Schultz (1975) has argued that while some theorists have commented incisively on the absence of the entrepreneur in general equilibrium theory, few seem to have fully explored the idea that significant benefits come to those who are able successfully to bring markets into (or at least closer to) equilibrium. Speaking of one such theorist in particular (Israel Kirzner, the prominent Austrian theorist quoted above) Schultz contends that

He sees clearly the omission of the entrepreneur in received equilibrium theory, but he persists in holding fast to the zero profit concept in that theory and, as a consequence, fails to see the economic rewards that accrue to those who bring about equilibrium.

Theodore Schultz (1975, 833)

This paper discusses competitive price adjustment in the context of a model which retains the Marshallian supply and demand framework while emphasizing the function of entrepreneurship. We consider how entrepreneurial gains are made in both surplus and shortage markets and by competitors on both sides of the market. The reasoning is intuitive, the presentation verbal and diagrammatic, not mathematical. But the analysis is more formal and, it is hoped, more instructive than the sort of discussion one typically finds in undergraduate economics textbooks. In short, we hope to provide what Kirzner himself calls for above: a story that elucidates the process of equilibrium in the context of Marshallian supply and demand diagrams.² We feel that such an analysis would fill a void in the current literature of economic education.

A SIMPLE MODEL OF PRICE ADJUSTMENT

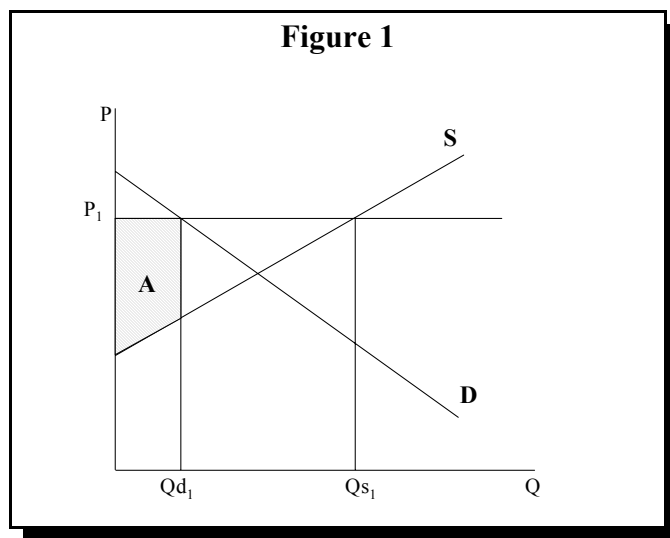
Equilibrium represents a simultaneous solution of the optimization problems of both demanders and suppliers, a perfect and complete coordination of their plans. When the market is out of equilibrium, not all participants are successfully executing their plans. If the market is in surplus not all sellers are able to sell as much as they planned (though all demanders can purchase their planned quantities), and if the market is in shortage not all demanders are able to purchase as much as planned (though all suppliers are successful at selling their planned quantities). Put differently, suppliers are off their supply curves in surplus markets and demanders

are off their demand curves when the market is in shortage. Disappointed expectations presumably lead to the formulation of new plans which will in turn push the market closer to equilibrium; this is one of the qualities of entrepreneurial activity, or actions which follow from alertness to opportunities to gain or to avoid loss. But is the competitive model able to explain how such adjustments occur?

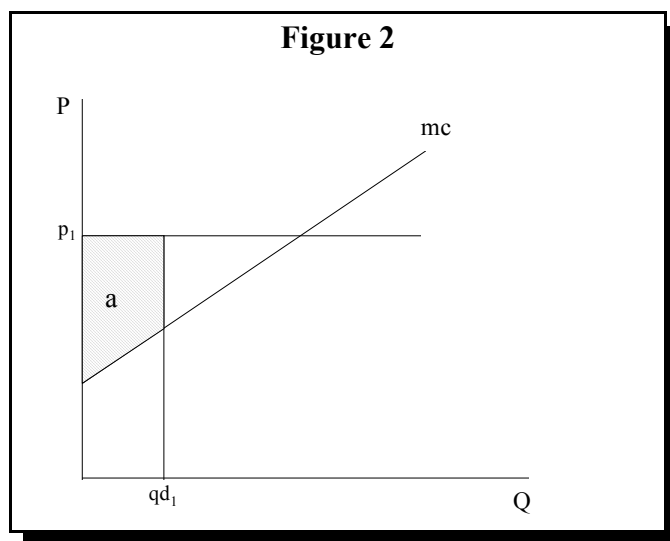
The market demand curve indicates what demanders will do collectively when all suppliers raise their prices. The demand curve faced by an individual seller raising price independently is much more elastic than market demand. In the extreme case of perfect competition the demand is perfectly elastic, and any seller who raises price independently loses all sales. How, then, is price to rise in a shortage? Simultaneously by all suppliers? How could they know when and how much to raise price? Similarly, the market supply curve indicates what suppliers will do collectively in response to a higher or lower price. The supply curve faced by one demander acting independently would be much more elastic than market supply. In the extreme case of perfect competition it would be horizontal, and the demander who reduced the offer price in a surplus market would be unable to purchase the good at all. Here again, one wonders how the market is supposed to adjust.

The model presented here describes the process by which prices move toward equilibrium in competitive markets. The analysis assumes unchanging market data (tastes and preferences, resource endowments, technology, etc.) which are not fully known by market participants. Entrepreneurs are "discovering" information that already exists in dispersed form in the market, but not revealed in its totality to any single market participant.³ The competitive market process induces individual demanders and suppliers to reveal their own demand and supply curves, and consequently the respective market curves. This does not happen instantaneously. One can imagine a demander incrementally searching for a price which is acceptable to a supplier and sufficient to acquire the quantity desired, but without offering the maximum demand price. Likewise, suppliers might incrementally search for a price which is acceptable to demanders and sufficient to assure planned sales, but not offer the minimum supply price. Neither demanders nor suppliers will have a very accurate picture of the market as a whole, but competition amongst them will reveal at least a part of the picture to each.

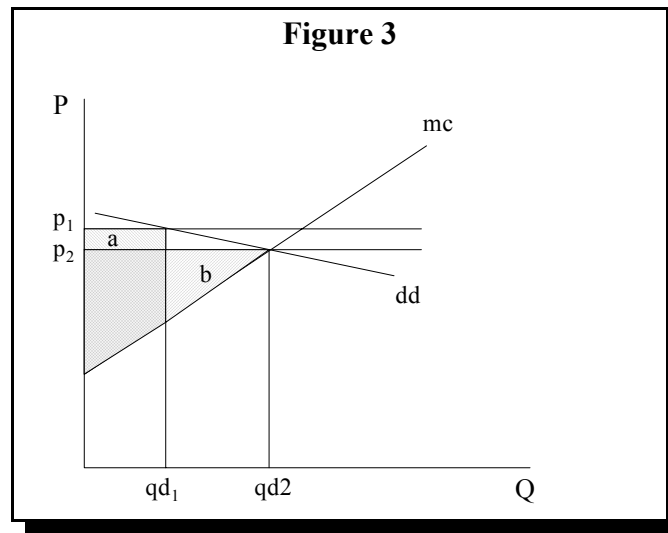
Figure 1 depicts a market in which a surplus exists at price P_1 . Market demand is only Q_{d_1} , while suppliers are willing to supply Q_{s_1} at that price. Collectively, suppliers realize producer surplus equal to area A .



Individual suppliers in this market find themselves off their supply curves, as represented in Figure 2. The supplier is selling only qd_1 at price p_1 , and realizing producer surplus equal to the shaded area a .



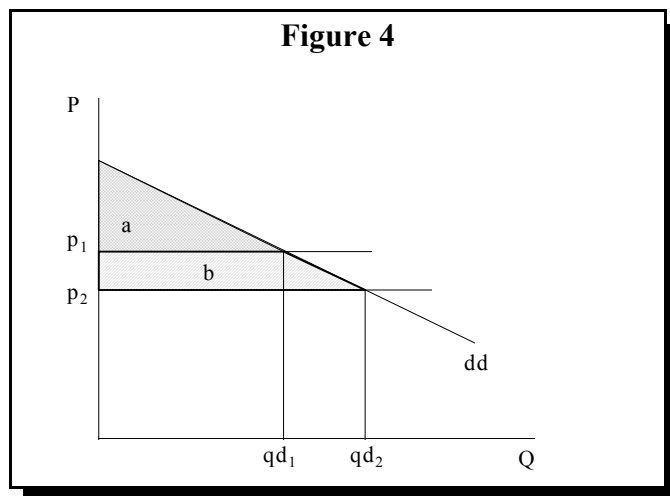
The supplier is willing to accept a lower price if this results in additional producer surplus. The demand curve faced by a single supplier acting independently-- dd in Figure 3--is much more elastic than the market demand curve. Thus an entrepreneurial seller who first recognizes the condition of the market will be able to sell a much larger quantity by lowering the price a bit.



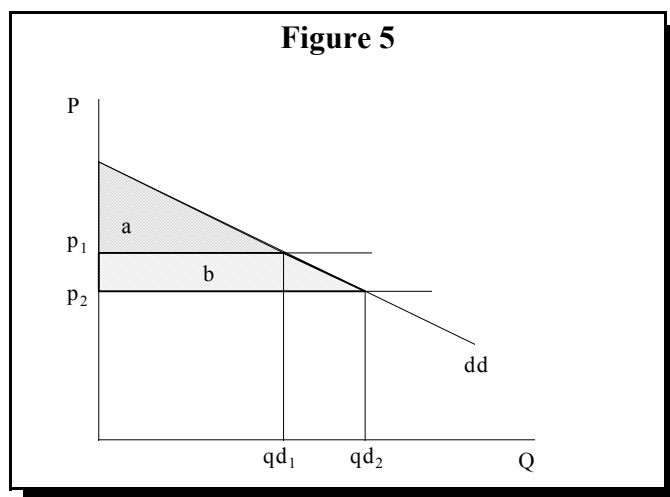
We may assume that the supplier represented in Figure 3 is able to sell as much as desired at the lower price, i.e., is no longer off the supply curve. Does this action produce a net gain in producer surplus? For a slight decrease in price, the answer is "yes." Figure 3 depicts the generalized choice situation facing the supplier. A decrease in price moves the supplier from qd_1 to qd_2 . The supplier loses producer surplus equal to area a , but gains producer surplus equal to area b . If b is greater than a , the supplier realizes a net gain in producer surplus, and therefore is willing to offer the good for sale at the lower price.

Other suppliers remain off their marginal cost curves temporarily. It is important to note, however, that by acting--in this case by lowering price--the entrepreneurial supplier reveals information about the market. By successfully lowering price, shown in Figure 4 as movement from point a to point b , the entrepreneur communicates to others that the market is in surplus. As other sellers follow the entrepreneurial lead and lower their prices, the supplier who initiated the price change will be driven off the marginal cost curve once again (point c in Figure 4), as customers discover equally low (or lower) prices elsewhere. In other words,

the supplier faces demand dd_2 . From here, the supplier may move again to gain producer surplus by further price cutting (thus increasing quantity demanded along dd_2). Continual competitive price cutting drives the price further toward equilibrium, at which point the supplier faces demand dd_e .



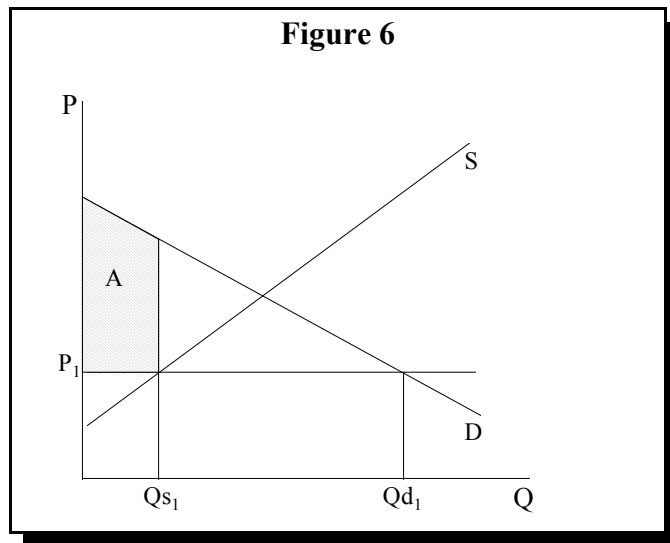
As price falls demanders will want to purchase a larger quantity; in fact, an entrepreneur on the demand side of the market who perceives the market to be in surplus may initiate a competitive price change in order to realize additional consumer surplus. Figure 5 depicts the demander's generalized choice situation.



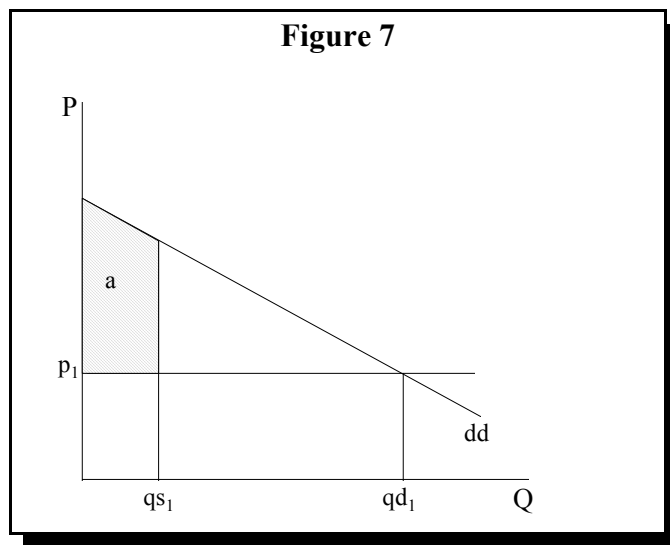
Each demander is able to purchase the amount desired, i.e., all are on their demand curves at price p_l . Consumer surplus is equal to the shaded area a . However, each demander can act to increase consumer surplus by recognizing that the prevailing price (the price used to make utility calculations) is not an equilibrium price. Since the market is in surplus, buyers can move to a superior position, at a lower price, where consumer surplus is unambiguously greater with the addition of area b . Note that the movement of additional demanders to the superior position does not prevent the first demander from continuing in that position.

Once price has been lowered to the market clearing level, each supplier should be able to sell the quantity indicated by profit-maximizing calculations using that (equilibrium) price. There will be no disappointed expectations on the supply side of the market. The same may be said of the demand side of the market although in this case demanders have been able successfully to execute their utility-maximizing plans at all prices at and above equilibrium. Once equilibrium or a coordinated state has been "discovered," all participants' expectations will be fulfilled, and all plans successfully executed. Of course this state might never be accomplished in fact, given the dynamic nature of the market. But this is what a competitive market tends toward.

Figure 6 illustrates a market in shortage at price P_l . The market demand is Q_{d_l} , while suppliers are willing to supply only Q_{s_l} that price. Collectively demanders are realizing consumer surplus equal to area A .



In Figure 7, each individual demander is purchasing only qs_1 at price p_1 and each is realizing consumer surplus equal to the shaded area a . Buyers are willing to offer a higher price if this results in additional consumer surplus.

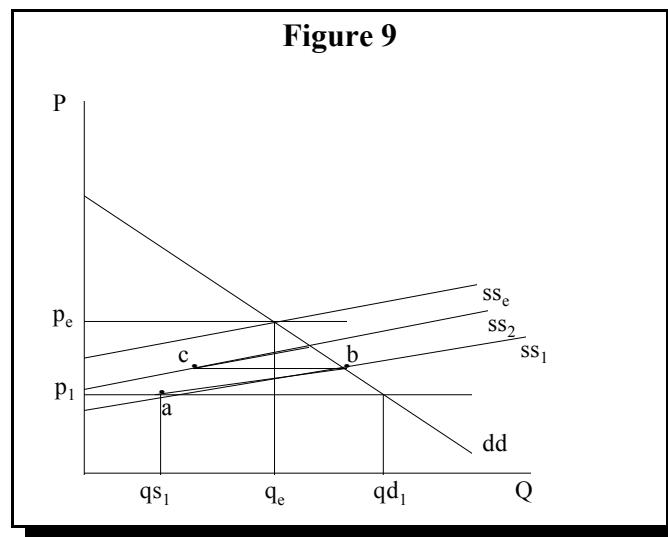
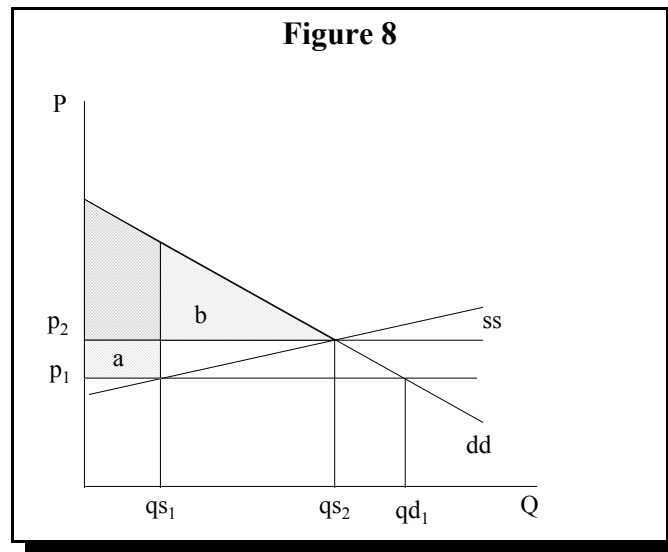


The supply curve faced by a single buyer acting independently (ss in Figure 8) is much more elastic than the market supply curve. Thus an entrepreneurial buyer who recognizes the condition of the market will be able to obtain a much larger quantity by offering a higher price. The buyer represented in Figure 8 is assumed to be able to buy as much as desired at the higher price. Does this action produce a net gain in consumer surplus? Figure 8 depicts the demander's generalized choice situation.

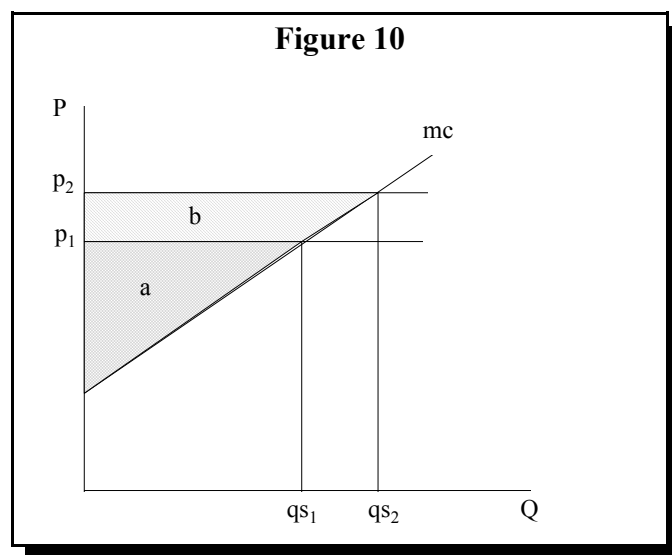
A price increase moves the demander from qs_1 to qs_2 . The demander loses consumer surplus equal to area a , but gains consumer surplus equal to b . If b is greater than a , the demander realizes a net gain in consumer surplus, and therefore is willing to offer the higher price for the good.

Other demanders remain off their demand curves temporarily. But once they follow the entrepreneurial lead, the demander who initiated the price increase will be driven off the demand curve once again (Point C in Figure 9), as suppliers find other buyers offering the same (or higher) prices. That is, the buyer now faces supply ss_2 . From here, one may move again to gain consumer surplus by further price increases (thus increasing quantity supplied along ss_2). Continuous

competitive price increases drive the market towards equilibrium, at which point the buyer faces supply ss_e .



As price rises, suppliers will want to supply a larger quantity. Indeed, an entrepreneur on the supply side of the market who perceives that the market is in shortage may initiate a price increase in order to realize additional producer surplus. Figure 10 depicts the supplier's generalized choice situation.



Each supplier is able to sell the amount desired, i.e., all are on their MC curves at price p_1 . Producer surplus is equal to the shaded area a . However, each supplier can act to increase producer surplus by recognizing that the prevailing price (the price used to make profit maximization calculations) is not an equilibrium price. Since the market is in shortage, suppliers can move to a superior position, at a higher price, where producer surplus is unambiguously greater with the addition of area b .

When the price reaches equilibrium there will be no disappointed expectations on the demand side of the market. The same may be said of the supply side of the market although in this case suppliers have been able to execute successfully their plans at all prices.

To summarize, the essence of disequilibrium is disappointed expectations and plans not successfully executed. In the surplus market, suppliers' expectations are unfulfilled; in the case of a shortage, demanders' expectations are unfulfilled. But entrepreneurship may be exercised on either side of the market in either disequilibrium condition. Even though all demanders' expectations are fulfilled and

plans successfully executed in a surplus market, an entrepreneur on the demand side of the market can still make gains by offering a lower price. Similarly, all suppliers' expectations are fulfilled and plans successfully executed in a shortage market, but a supply-side entrepreneur can still make gains by raising price.

In order to realize entrepreneurial gains, either in producer surplus or consumer surplus, it is of course necessary to act. But acting entails revealing what one knows about the condition of the market. Certainly the supply-side entrepreneur would be happy to go on selling the good at a price just below the surplus price at which the other sellers are "stuck" for the moment. The entrepreneurial supplier might even attempt to conceal the fact of offering a lower price in the hope that no one else will perceive, at least for a time, what the condition of the market really is. Thus the entrepreneurial act is *inherently* competitive. Market participants act knowing their gains depend upon moving more swiftly or more correctly than other entrepreneurs. Being the first to act is crucial to realizing gains in producer surplus.

Whether demanders or suppliers initiate price changes, individuals acting entrepreneurially eventually do reveal new information, their own perceptions of the condition of the market, whether they want this to happen or not. Other participants may choose to respond to this information or ignore it. If it is correct information and other participants respond in kind, the market price moves incrementally toward the equilibrium level. The scenario is closed when no further gains in producer or consumer surplus can be earned. Then all expectations are fulfilled and all plans successfully executed. The market is in equilibrium.

CONCLUDING REMARKS

Admittedly, this analysis leaves important methodological questions unanswered, particularly from a subjectivist perspective. Subjectivism implies that choices made by even the most rational actors can never be fully predicted, because no two minds are the same. The bits and pieces of information available to different persons-- and more importantly their subjective understandings of them-- differ. While each person's plans are presumably coherent in the context of the individual's own action, and may even lead to an "individual" equilibrium, a "collective" equilibrium is not necessarily implied. Expounding on this point of view, Karen Vaughn rightly emphasizes the inseparability of time and knowledge:

The passage of time (and presumably action in time), means that people will learn more about both their ends and means, and more about the plans that other people are undertaking. This will imply that initial plans will be revised, often many times in the light of new knowledge. Revision of plans, then, is the norm rather than the exception in human action. In such a world, it would be extremely unlikely that all plans would ever be "coordinated."

(Vaughn, 1994,154)

Can market equilibrium be expected to obtain if participants' plans are continually changing to fit today's subjective reality? Surely it would be wrong to deny the subjective element in human understanding and action. But it would be a mistake also to view human understanding as a fantasy-flight, unconstrained by anything more objective than the mind's capacity for hallucination. The model developed above rests on the tacit premise that individuals' subjective understandings *converge*, in part through entrepreneurial discovery, on objective market realities. This convergence implies progress toward mutually consistent perceptions and expectations among the various market participants and the possibility, at least, of *movement towards* market equilibrium.

Theoretical difficulties aside, it remains empirically true that markets in reality show a reliable *tendency* to move toward equilibrium—a tendency which F.A. Hayek thought to be ultimately an empirical proposition.⁴ Perhaps more to the point, however, is Hayek's incisive distinction between "prediction" and "orientation:"

The service of a theory which does not tell us what particular events to expect at a definite moment, but only what kinds of events we are to expect within a certain range, or on complexities of a certain type, would perhaps be better described by the term orientation than by speaking of prediction. Although such a theory does not tell us precisely what to expect, it will still make the world around us a more familiar world...because we can at least exclude certain eventualities. It makes it a more orderly world in which the events make sense because we can at least say in general terms how they hang together and are able to form a coherent picture of them...[t]hough we are not in a position to specify precisely what to expect....

(Hayek, 1967, 18).

Borrowing Hayek's terminology, we may say in conclusion that the simple theory of price adjustment offered above is "oriented" toward equilibrium, and that it "excludes certain eventualities" (e.g., price increases in the face of a market surplus) within the context of certain constraining assumptions (that market data such as tastes and preferences, resource endowments, technology, etc., are stable over the period of analysis), but "does not tell us what particular events to expect at a definite moment".

We need not endorse the idea of a final, static equilibrium as more than what Vaughn has referred to as a "metaphor" of neoclassical economics (Vaughn, 1994,166). It remains a useful metaphor nonetheless, and our purpose here will have been served here if we have fleshed out the *process* that moves the market towards equilibrium, in terms at once more formal than the typical undergraduate-level discussion, yet more meaningful than the more advanced mathematical derivation in which the very concept of an equilibrating process is abandoned.

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ENDNOTES

- ¹ Kenneth Arrow (1959) observed that "Each individual participant in the market is supposed to take prices as given and determine his choices as to purchases and sales accordingly; there is no one left over whose job it is to make a decision on price." (P. 43)
- ² As such, our analysis does not go into game theoretic approaches, or other approaches that take one outside the traditional Marshallian supply and demand framework. Neither does it deny their validity or usefulness, of course.
- ³ Kirzner (1997) draws critical distinctions among three types of learning: the deliberate generation of information, entrepreneurial discovery, and accidental or purely serendipitous acquisition of knowledge. As we shall see, it is entrepreneurial discovery that is crucial to the process of equilibrium developed here (p. 72).
- ⁴ Hayek (1972) characterizes the question as that of "the empirical probability that people will learn (that is, that their subjective data will come to correspond with each other and with the objective facts)" (pp. 49-50).

