

# Does the Market Self-Correct? Asymmetrical Adjustment and the Structure of Economic Error

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## Abstract

Fernandez and Rodrik (1991) argue that agent errors in the political market will be overpessimistically biased and persistent. As a result, policy is inefficient. We show how their argument can be extended to the economic market. In the economic arena, while both errors of overoptimism and errors of overpessimism are possible in the face of uncertainty, the presence of option value from deferring a decision to exchange causes trader errors to be overpessimistically biased. This is problematic because unlike errors of overoptimism, errors of overpessimism are not ‘automatically’ revealed to the agents who make them. Furthermore, owing to the “bad news principle of irreversible investment,” these errors are likely to persist. We show that although persistent errors of overpessimism are likely to plague decisions in the political sphere, entrepreneurial activity in the market corrects them and prevents their persistence. (*JEL* D51, D81, D84)

## 1 Introduction

Given its considerable importance for understanding economic processes and the behavior of market economies, the subject of agent error in economic decision-making has received relatively little attention. While largely neglected in the context of the market, this issue has some received attention in the political arena. In their important work, Fernandez and Rodrik (1991) argue that given uncertainty regarding the distribution of gains and losses of government policy, agents may be overpessimistic regarding policy changes. The resulting bias towards the status quo means that efficiency-enhancing policies fail to be adopted. One can draw an analogous argument for the market in which efficiency-enhancing transactions fail to be exploited due to uncertainty regarding the credibility of others in exchange.

The story of producer error correction is a simple and familiar one: If the producer establishes a price for his product higher than the equilibrium price, the resulting surplus requires him to lower his price in order rid himself of undesired inventory. This lower price has the dual effect of reducing quantity supplied and increasing quantity demanded, bringing the market into equilibrium. If, on the other hand, the producer sets his price too low, the bidding activities of demanding consumers drives the price up, ensuring that no shortage results. The increase in price achieves equilibrium as the quantity supplied rises and the quantity demanded falls. The market is thus self-correcting in the face of 'both sides' of pricing error.

While this oft-repeated story clearly conveys the process of price equilibration, it surely leaves much to be explained regarding the question of how traders 'get things right' on the market. In a world characterized by uncertainty and imperfect information, before the familiar story recounted above can come into operation, agents must first establish whether

or not a particular potential trading partner is in fact suitable for exchange. Since most commercial interaction is between strangers and the powers of the state's ability to enforce agreements and achieve restitution for wronged parties is necessarily limited, assessing potential partners for exchange is both more important and more difficult than it might seem at first glance.

Specifically, agents are looking for some signal regarding the trustworthiness or credibility of those they are looking to interact with. Signals sent by traders to communicate credibility include everything from their style of dress to their affiliation with institutions and businesses. To the extent that agents are able to use information sent through signals to establish the trustworthiness of others, the mutually beneficial gains from exchange are exhausted. To the extent that agents misread signals regarding credibility sent by others, however, gains from trade go unrealized. This misreading may be the result of any number of factors, the most obvious of which are the imperfect ability of signal senders to effectively convey their trustworthiness to others and the imperfect ability of signal receivers to judge the sender's credibility. Using the terminology slightly differently from the way it has been employed by others, we can summarize this dual-sided imperfect ability regarding signals by saying that traders face a signal extraction problem. From here on out, when we refer to the 'signal extraction problem' we are referring to signal senders' imperfect ability to convey their trustworthiness to others and signal receivers' imperfect ability to interpret the signals regarding trustworthiness that they receive from others.

Agent errors can come in one of two forms: *errors of overoptimism* and *errors of overpessimism*. While both types of error are possible, the presence of option value from deferring a decision to exchange causes trader errors to be overpessimistically biased. By their nature, errors of overoptimism are 'automatically' revealed to the erring agent who

learns his mistake and corrects it in the future, bringing the arena of exchange back into equilibrium. The overoptimistic side of the market may be said to be self-correcting in much the fashion described in our price story above.

For errors of overpessimism, on the other hand, there is no ‘automatic’ revelation process so agents committing this mistake do not learn that they have done so. Indeed, as the “bad news principle of irreversible investment” suggests, errors of overpessimism are likely to be persistent. This magnitude of this problem is significant as the majority of mistakes made on the market are of this uncorrected type—errors of overpessimism. This creates a result in the economic market similar that postulated by Fernandez and Rodrik (1991) in the political market.<sup>1</sup>

Agent errors pose no particular problem so long as they are reliably corrected without undue delay. Do we have good reason to expect this to be the case? While the literature has achieved consensus regarding the trivial proposition that “no point with systematic arbitrage opportunities can be an equilibrium,” as Franklin Fisher has pointed out, “what is required is a demonstration that arbitrage actually leads to such points—and does so quickly” (Fisher 1981: 279). In an effort towards this end, Fisher’s (1981) insightful work on stability contends that “new, previously unforeseen opportunities” keep the market in disequilibrium. How then are these errors corrected, if at all?

It is our contention that the market, unlike the political sphere, has a mechanism whereby errors of overpessimism are corrected. The entrepreneur, in continually seeking and exploiting hitherto unknown profit opportunities continually reveals errors of

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<sup>1</sup> Note how our analysis differs from that put forth by Sah and Stiglitz (1986). They claim that polyarchies (several decision makers) is inherently unstable and prone to Type II errors while hierarchies (one decision maker) is stable and prone to Type I errors. In contrast, our claim is that due to errors of overpessimism, polyarchies are stable and prone to Type I errors.

overpessimism to other economic agents. Thus while errors of overpessimism are likely to plague the political arena, they are effectively corrected in the market.

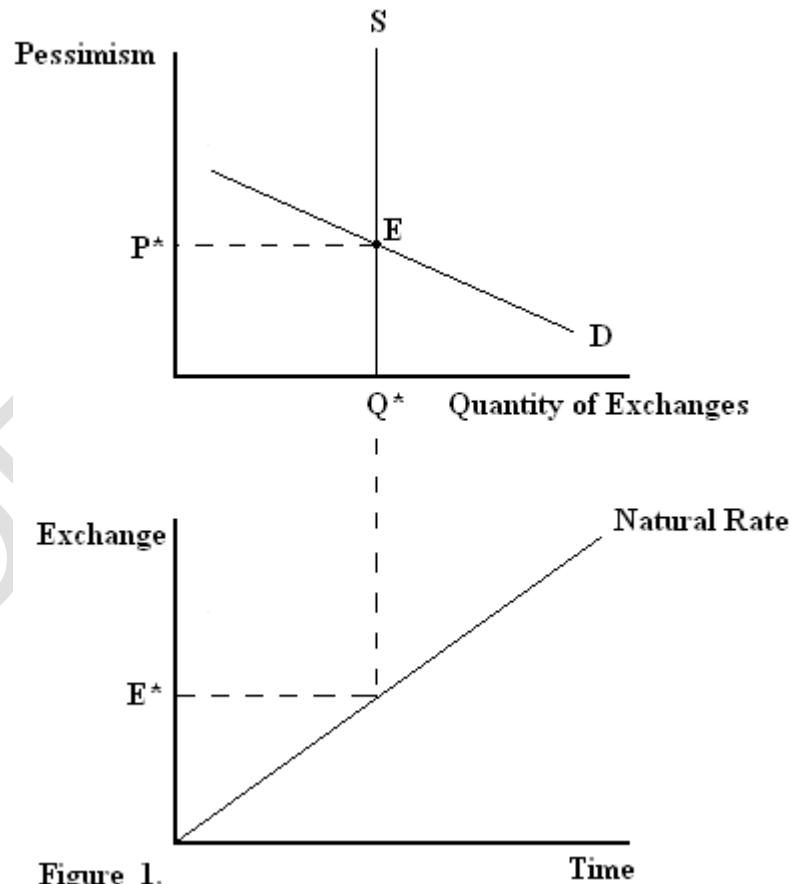
The remainder of this paper proceeds as follows: Sections 2, 3 and 4 provide a theoretical rendering of the problem of bias toward overpessimism in the economic market. Section 5 provides a discussion of the entrepreneur and his role in correcting these errors. Section 6 concludes.

## **2 Ideal Conditions and Exchange Equilibrium**

We can conceive of traders as lying somewhere along a spectrum of optimism/pessimism with regard to exchange opportunities. This level of optimism/pessimism relates to their beliefs about the trustworthiness of strangers in exchange, which is a function of the signals regarding credibility that they receive from others. Under ideal conditions, in which signal senders are able convey their credibility with perfect clarity and signal receivers are able to interpret signals sent with perfect accuracy, traders deciding over exchange will have the 'right amount' of optimism/pessimism. This level of pessimism is consistent with the exhaustion of all desirable exchange opportunities. At this level of pessimism, no traders who commit to exchanges are cheated and no traders who could have exchanged without being cheated do not exchange.

This level of pessimism therefore constitutes the equilibrium level of pessimism, and the quantity of exchanges transacted at the equilibrium level of pessimism constitutes the equilibrium quantity of exchanges. Corresponding to the pessimism/quantity of exchange relationship, we can conceive of a natural rate of exchange—that rate of exchange prevailing in an economy for a given number of exchange opportunities, which under conditions of technological progress and discovery result in expanding market size and falling transactions costs over time. The equilibrium quantity of exchanges and its relationship to the natural rate of exchange under the ideal conditions described above is depicted below in Figure 1.

In the top graph of Figure 1, on the abscissa is the level of pessimism and on the



**Figure 1.**

ordinate is the quantity of exchanges. The 'supply' of exchanges is given by the perfectly pessimism-inelastic curve S, which represents the given stock of exchanges available in the

economy at any given time. The demand curve for exchanges,  $D$ , is negatively sloped as the quantity of exchanges demanded by potential traders increases as their pessimism decreases (or stated alternatively, as their optimism increases).

$P^*$  represents the equilibrium level of pessimism and  $Q^*$  represents the equilibrium quantity of exchanges transacted, where point  $E$  is the equilibrium point in the arena of exchange. Tracing  $Q^*$  downward to the bottom graph reveals the corresponding level of exchange,  $E^*$ , in terms of the natural rate given by the positively sloped line labeled 'natural rate.' These two graphs will be important to us in understanding the consequences of trader error in the analysis that follows.

### **3 The Self-Correcting Side of the Market: Errors of Overoptimism**

Relaxing the assumptions of perfect signal sender ability to convey credibility and perfect signal receiver ability to interpret these signals introduces the possibility of trader error. In the face of uncertainty, traders must rely upon fallible judgments of others' trustworthiness in deciding over exchange. Owing to both the imperfection of the sender's ability to always effectively convey the appropriate information, and the imperfection of the receiver's ability to always accurately interpret signals, a signal extraction problem is present and errors of judgment concerning the credibility of parties involved are inevitable. The resulting errors may take one of two forms.

Errors of overoptimism involve being cheated and result from mistakenly interpreting some signal as indicative of the sender's trustworthiness when in fact the trader is not trustworthy. In this sense, traders committing such an error are overly optimistic—their level of pessimism is below the equilibrium level at which all trades transacted occur

without cheating. At this lower than equilibrium level of pessimism ‘too many’ exchanges are conducted.

Fortunately, errors of overoptimism are not difficult to correct because they are ‘automatically revealed’ by their very nature. With some exceptions, it is not difficult for traders who are cheated to determine that this was the case and revise their behavior for the future. Traders committing errors of overoptimism learn of their mistake by being cheated in exchange. Thus, over time, such errors tend to be corrected as traders who find themselves cheated adjust their level of pessimism upward, leading ultimately to a reduction in level of exchange. Pessimism is therefore flexible upward. Errors of overoptimism and their relationship to the natural rate of exchange are depicted below in Figure 2.

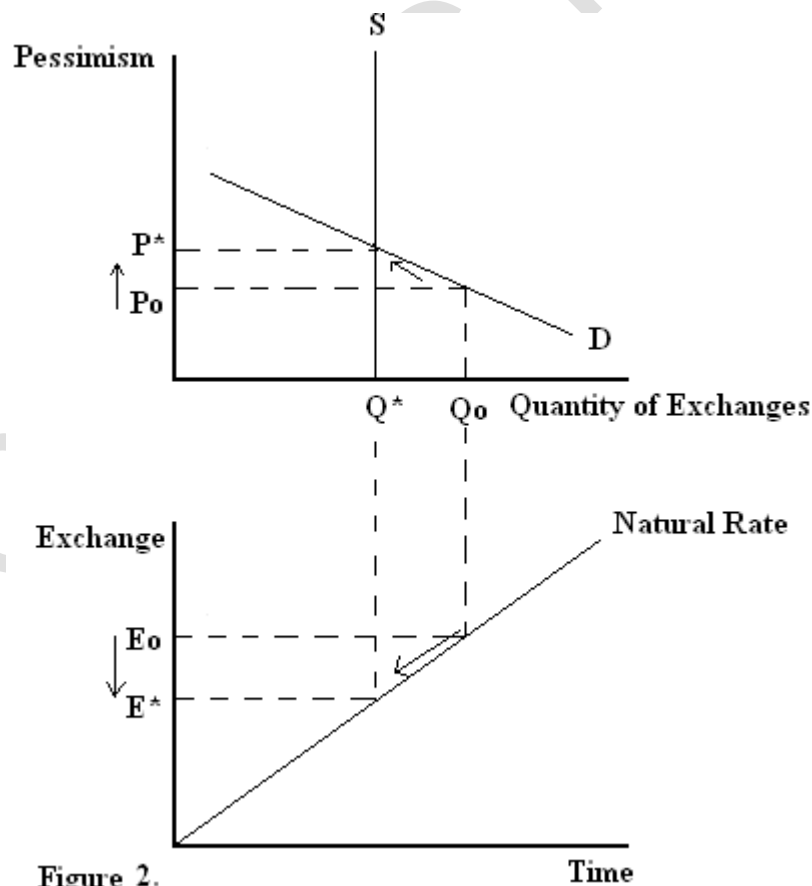


Figure 2.

Time



At  $P_o$ , a level of pessimism below the equilibrium level  $P^*$ , the quantity of exchanges is too large by  $Q_o - Q^*$  and the level of exchange is too high by  $E_o - E^*$ . Because these errors are relatively easily detected, they are also relatively easily corrected. Thus, as the arrows in Figure 2 indicate, traders revise their level of pessimism upward from  $P_o - P^*$  shrinking the quantity of exchanges back to the equilibrium level  $Q^*$  and the level of exchange back to  $E^*$ . No permanent problem results.

## 4 The Non-Correcting Side of the Market: Errors of Overpessimism

### 4.1 Distributional Bias

As we have seen, errors of overoptimism present no particular problem for market adjustment because they are readily detected and correctable. If the majority of trader errors are errors of overoptimism, we have no particular reason to worry. This statement of course begs the question, 'do we have good reason to expect that most trader errors are errors of overoptimism?' Seeing as we have only begun our undertaking and have yet to even consider errors of overpessimism, as the reader can guess, the answer is evidently no. In fact, as we will argue below, we have good reason to expect the preponderance of trader errors to be errors of overpessimism.

Errors of overpessimism involve foregone profit opportunities resulting from a failure to exchange based on mistakenly interpreting some signal as indicative of untrustworthiness, when in fact the sender is trustworthy. As we implied above, this section

contends that the distribution of trader errors will be biased towards errors of overpessimism. This asymmetry of trader errors is best understood in the context of option value (Weisbrod 1964; Arrow and Fisher 1974; Henry 1974a, 1974b). Confronted with uncertainty generated by the imperfect signaling of senders and receivers' imperfect ability to interpret these signals correctly, traders must decide whether to "commit" to a present opportunity for exchange or defer such commitment to potential exchange at some future date.

Obviously, once a trader has committed to an exchange, his decision is irreversible. He cannot undo a past transaction if he does not like the outcome of his prior decision. Deferring commitment, in contrast, leaves open the option of exchanging his goods or money in the future. This future exchange could be entirely new—i.e., involve a different trading partner and different goods—or it could involve simply committing to the same exchange previously considered. With some exceptions, traders who defer in the present do not lose the chance to transact a similar exchange in the future by waiting. For instance, imagine that you are considering purchasing a new car. If you visit a car dealership today but decide not to buy right now because you are unsure about the honesty of the dealer, in most cases, this decision to defer purchase does not eliminate the potential to purchase the identical (or very similar) car for the same (or similar) price at some point in the future.

The option value created by deferring exchange stems from the benefits of waiting to commit to a transaction. With the passing of time, better information about the profitability of the previously considered exchange becomes available as traders learn more about the underlying credibility of outsiders. For instance, returning to our example from above, deferring purchase from the car dealer now gives you the opportunity to learn more about his reputation. Additionally, with the passing of time, information about the

profitability of previously unconsidered potential exchanges may become available as well. For these reasons, option value is always positive.

Because option value is largely a function the benefit it confers upon traders in the form of their ability to avoid present mistakes by deferring commitment to the future, option value is increasing in uncertainty. Where agents are better at effectively signaling their credibility and/or better at interpreting the signals concerning credibility of others, uncertainty will be relatively lower and thus so will the option value that stems from deferring exchange. Conversely, where agents are worse at effectively signaling their trustworthiness and/or worse at interpreting the signals of others, uncertainty will be relatively higher and thus so will the option value of waiting to commit.

Of course there is a cost to deferring a commitment to exchange as well—the expected value from presently committing to exchange. But in order for traders to commit to present exchanges, the expected value of a present exchange must not merely be greater than zero. Because option value is always positive, even significantly high rates of return from presently committing may be insufficient to generate present exchanges. For present exchange to occur, its expected value must be greater than the discounted expected value of the options foregone.

As noted above, where traders are relatively worse at communicating their credibility and/or relatively worse at judging the credibility of others, option value is relatively higher meaning that fewer present commitments to exchange will surpass this critical threshold. In short, presently committing to exchange is relatively more costly. Because errors of overoptimism can only result from presently committing, errors of overoptimism are relatively more costly. The fact that errors of overoptimism are relatively more costly, of course, means that errors of overpessimism are relatively less costly. This cost discrepancy

in turn implies that errors of overpessimism will be relatively more abundant than errors of overoptimism. That is, the distribution of trader errors will be biased towards errors of overpessimism.

From the trader's perspective the problem thus appears this way: Confronted with a signal extraction problem, our trader knows that he will make some kind of mistake in interpreting the signals of outsiders with which he could potentially exchange. He could make either an error of overoptimism or an error of overpessimism. Owing to the existence of option value, errors of overoptimism tend to be more costly than errors of overpessimism. Since our trader knows that he will make one of these types of errors and the former are more costly, he finds it optimal to err on the side of overpessimism. Given the choice between an overly pessimistic mistake and an overly optimistic one, it is in our trader's interest to choose overpessimism, as this error hurts him the least. In this sense, because his decision to err on the side of overpessimism represents an optimal response to the situation he finds himself in, in deciding not to exchange our trader is not making any error at all. Of the choices he is faced with in the context of noisy signals or imperfect judgment, he chooses the 'right' amount of pessimism.

As our trader recognizes, however, in erring on the side of overpessimism he is foregoing some profitable exchanges that he would transact were he able to decipher the true underlying types of potential outside trading partners in the absence of signal interpretation fallibility/signal noise. In other words, were it not for the signal extraction problem, our trader would choose less pessimism than he currently does. In this sense, his decision to refrain from exchanging with outsiders is overly pessimistic; and it is in this sense that we mean he has committed an 'error.'

Stated this way, it should be clear that the overpessimistic bias of traders confronted with the signal extraction problem is entirely rational. The signal extraction problem does not cause actors to behave suboptimally given the choices they are confronted with. Rather, the optimal response of rational traders operating in this environment is precisely what leads to a lower rate of exchange than would have prevailed were it not for the signal extraction problem.

#### **4.2 The Persistence of Overpessimistic Error**

Thus far, we have established that while highly correctable, errors of overoptimism are relatively less likely than errors of overpessimism. The overpessimistic bias presents no particular cause for concern in and of itself, however, for we have yet to discuss the correctability of such errors. If, like errors of overoptimism, errors of overpessimism are likely to be corrected, market adjustment will occur in much the same fashion as described in Section 2 for errors of overoptimism, only the arrows will move in the opposite direction. If, on the other hand, errors of overpessimism are unlikely to be corrected, the prospect for market adjustment is particularly bleak as not only will one particular type of error in the market go uncorrected but, in particular, that error which occurs most often in the market will go uncorrected.

As this section demonstrates, the distribution of errors created by the signal extraction problem is not only asymmetrical, but tends to persist as well. The “bad news principle of irreversible investment” can help us understand why (Bernanke 1983; see also Dixit 1992). Because the option value of deferring commitment at present is zero where the expected value of present transactions exceeds the discounted value of the options foregone, traders deciding whether or not to defer commitment consider only the ‘bad news’ or ‘losing’ future states potentially resulting from committing at present. As we noted above,

by deferring exchange now, traders gain better information and avoid potentially making mistakes in their judgment about the credibility of outsiders caused by committing to present exchange.

The lastingness of potential gains from undertaking a particular exchange that we noted earlier means that traders deciding over commitment or deferral will be primarily influenced by the potential losses they may incur by presently exchanging. If the profit opportunities from exchange are not going anywhere, traders will wait for better information to arrive and make decisions based on their expectations about the likelihood of being defrauded alone. In this sense, traders have a ‘one-tailed decision rule.’ Decisions regarding exchange with outsiders are primarily “sensitive to downside uncertainty” (Bernanke 1983). ‘Upside potential’ plays virtually no role. The existence of potentially ‘winning’ future states does not offset the existence of potentially ‘losing’ future states in traders’ evaluations.

This analysis is important in explaining the persistence of errors of overpessimism for two reasons. First, it explains why errors of overpessimism—which as we saw above are the majority errors made in the face a signal extraction problem—are unlikely to be corrected. As noted previously, over time, errors of overoptimism are corrected as traders who find themselves cheated adjust their level of exchange downward. However, traders who make errors of overpessimism have no such revelation process. They are not ‘automatically’ confronted with their mistakes, as are traders who make errors of overoptimism. To become aware of their error, overpessimistic traders must observe the ‘success’ of traders who did commit.

As the “bad news principle of irreversible investment” showed us, however, any ‘good news’ overpessimistic traders might glean by observing others’ success will have little impact on their decisions to commit. Because trader decisions about exchange with

outsiders are largely invariant to potentially ‘winning’ future states, observing that other traders ‘won’ is essentially irrelevant. In short, traders committing errors of overpessimism do not learn from their mistakes in the way that we have seen traders committing errors of overoptimism do. Consequently, errors of overpessimism are likely to remain uncorrected.

Second, because exchange opportunities do not disappear with the passage of time, by deferring commitment now, traders preserve all (or most) of the upside of waiting longer without incurring any (or very little) of the downside. This means that many overpessimistic traders faced with the signal extraction problem stand to gain by continuing to wait to exchange. Overpessimistic traders thus have an incentive to remain overly pessimistic.

Both of these reasons imply that pessimism is rigid downward. Overpessimistic disequilibrium and its relationship to the natural rate of exchange is depicted below in Figure 3.

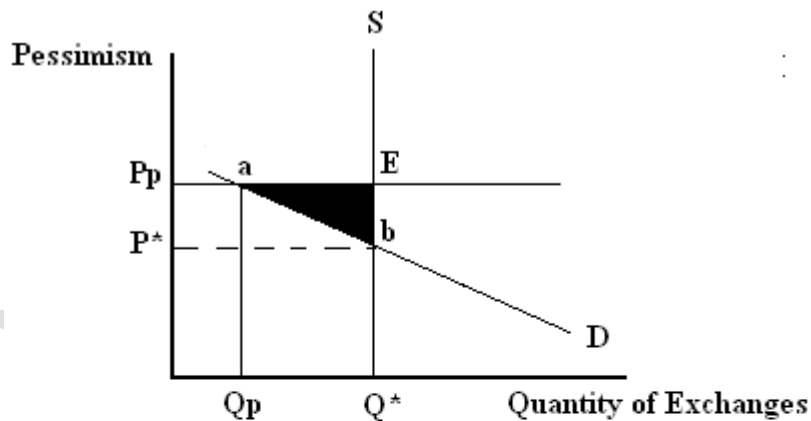


Figure 3.

Time

At  $P_p$ , the level of pessimism is too high by  $P_p - P^*$ , yielding the quantity of exchange  $Q_p$  that is too low by  $Q^* - Q_p$ . The corresponding level of exchange,  $E_p$ , is thus also too low by  $E^* - E_p$ . When we analyzed this story in reverse for errors of overoptimism we noted that, owing to their ease of detectability, these errors were corrected bringing the arena of exchange back into equilibrium at point E. As we have seen above, however, owing to the “bad news principle of irreversible investment,” errors of overoptimism tend to go uncorrected. In fact, as we showed, traders have an incentive to remain overly pessimistic.

This means the disequilibrium level of pessimism,  $P_p$ , will not be adjusted downward as needed to bring the arena of exchange back into equilibrium. Instead, the level of pessimism will persist at  $P_p$ . As a result, a lasting deadweight loss given by the shaded triangle,  $abE$ , is generated leading to a lasting inefficiently low level of exchange,  $E_p$ . In short, mutually beneficial exchanges are permanently going unrealized. The arena of exchange is trapped at an inefficiently low level of trade. As we mentioned previously, the magnitude of this problem is heightened by the fact that the majority of trader errors are those that lead to this problem—errors of overpessimism.

An important note here regarding the applicability of rational expectations to our analysis is long overdue. The rational expectations hypothesis states that agent errors will be unbiased and will not persist over time, as rational agents learn from their mistakes and use this information to inform their future behavior. Our foregoing analysis, however, gives us good reason to doubt the applicability of the rational expectations hypothesis. If errors of overpessimism are less costly than errors of overoptimism, then traders, on average, will not have the right level of pessimism.

Rather, as we have suggested, traders, on average, will be overly pessimistic regarding exchange. Furthermore, it is not true that agents will learn from their errors of



overpessimism. This results from the fact that, as we indicated above, unlike with errors of overoptimism for which there exists an ‘automatic revelation’ process, agents committing errors of overpessimism are not confronted with their mistake. This is precisely the problem with errors of overpessimism. By their very nature, agents do not know that they have committed them. As such, traders cannot learn from mistakes of overpessimism to correct their expectations for future transactions.

## **5 The Entrepreneur and the Correction of Errors of Overpessimism**

The theoretical rendering provided above led to the conclusion that there is a bias towards errors of overpessimism and further that these errors persist. This result is analogous to that reached by Fernandez and Rodrik (1991) who conclude that, given uncertainty about gains and losses of government policies, agents are overpessimistically biased in the political arena, favoring the status quo. Here, however, we argue that the market, unlike the political arena, has an inherent mechanism which corrects errors of overpessimism. This mechanism is the entrepreneur. Standard economic theory to a large extent excludes the notion of entrepreneurship and therefore misses the critical role that entrepreneurs play in correcting errors of overpessimism. Furthermore, within the literature that does discuss the notion of entrepreneurship, its impact on errors of overpessimism has yet to be explored.

The entrepreneur has been characterized as an innovator (Schumpeter 1950, 1961), an arbitrageur (Kirzner 1973), one who bets on ideas (Brenner 1985, Mokyr 1990) and as a forecaster and capitalist (Rothbard 1963). Each of these interconnected elements undoubtedly plays an important role in entrepreneurship. For the purposes of our analysis,

however, we are most interested in highlighting the arbitrageur function of entrepreneurial activity.

In emphasizing this facet of entrepreneurship we should be explicit about the model of entrepreneurship we are using. Our discussion of the entrepreneur builds upon the model developed by Kirzner (1973). Besides constituting perhaps the most well elaborated exposition of entrepreneurial activity, we believe that this approach is best suited to our purposes because of its focus on the arbitrage-capturing component of entrepreneurship.

Fundamental to this approach is the argument that 'entrepreneurs' do not describe a distinct group of individuals. Rather, entrepreneurship is taken to be an omnipresent aspect of human action (Mises 1949; Kirzner 1973). Economic decision makers do not simply react to given data and allocate their scarce means to realize given ends. The entrepreneurial element in human action entails the discovery of new data and information, discovering anew not only the appropriate means, but also the ends that are to be pursued (Kirzner 1973: 30-87). Moreover, the ability to spot changes in information is not limited to a select group of agents; all agents possess the capacity to do so. Every economic actor must estimate the uncertain outcome of his forthcoming action. This is not to deny that some agents are more alert to opportunities than others, but rather to emphasize the omnipresent feature of 'entrepreneurial alertness.'

This understanding of entrepreneurship makes immediately obvious the fact that it is precisely the existence of trader errors that engenders the process of entrepreneurial adjustment and progress. The entrepreneur, in recognizing opportunities that others have not, coupled with his attempt to earn profits and avoid losses, drives the market process and the correction of errors. Today's inefficiencies represent tomorrow's profit opportunity for

the entrepreneur who is able to realize gains from exchange that had previously gone unexploited.

This statement, of course, implies that entrepreneurs often view the profitability of the same potential exchange differently. Note that this does not conflict with the claim that all agents, when erring, tend to err on the side of overpessimism. Although all individuals are equally likely to disproportionately err on the side of overpessimism when they err, errors of overpessimism are not symmetric across all agents for any given potential exchange. In other words, overpessimism is *asymmetric*—one agent's error of overpessimism need not be the same as another's.

To understand this, imagine two entrepreneurs, A and B, both of whom commit errors of overpessimism with the same probability where this probability is greater than .5. Thus A and B disproportionately err on the side of overpessimism with equal likelihood. This fact does not, however, preclude A and B from having different degrees of optimism/pessimism for any given potential exchange. Thus where A is overpessimistic about a certain exchange, B may see an opportunity for pure profit. As B acts to exploit the perceived profit opportunity, A's error of overpessimism is exposed and corrected. In the absence of the entrepreneur, the error would persist uncorrected, creating a suboptimal situation in which gains from trade go unrealized. The entrepreneurial mechanism, however, serves to correct these errors and asymmetrically overpessimistic entrepreneurs serve as checks on one another. Although all agents are equally predisposed to make errors of overpessimism, different agents have different evaluations of the same exchange opportunities and it only takes one entrepreneur to correct an error.

The activity of entrepreneurs also serves to shrink the option value related to postponing exchange until further information comes to light. Recall that option value is

always positive and stems from the fact that in many cases agents who defer in the present do not lose the chance to transact a particular exchange in the future. In light of asymmetric overpessimism, however, the entrepreneur pushes the option value toward zero. The incentive to postpone current exchange is weakened because other entrepreneurs, who interpret the profitability of the exchange with greater clarity, will take advantage of the opportunity. Given that the exchange opportunity may not be available in the future, the option value of deferring in the present shrinks.

The speed of overpessimistic error correction will vary depending on a number of factors including the thickness of the market and the institutional mix within which the entrepreneur must operate. Given constant uncertainty and new knowledge, there will always be errors to correct—the market will never reach equilibrium. However, the thicker the market is, the more entrepreneurs there are acting, and thus the quicker errors will be exposed and corrected. Likewise, an institutional environment that is conducive to entrepreneurial activities will lead to a faster adjustment process than one that stifles entrepreneurship.<sup>2</sup>

## 6 Conclusion

Under ideal conditions of perfect agent ability to send signals regarding their trustworthiness in exchange and perfect receiver ability to interpret these signals, no signal extraction problem exists and traders hold the equilibrium level of pessimism. At this level of pessimism, no trader who exchanges is cheated and no trader who could exchange without being cheated does not do so. In short, all desirable exchange opportunities are exhausted

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<sup>2</sup> For a thorough discussion of the institutional features conducive to entrepreneurial growth and inhibition see, Gwartney et al (1999).

and the equilibrium quantity of exchanges prevails. As a result of this equilibrium, the efficient level of exchange is realized.

Relaxing the assumptions of perfect signal sender and receiver abilities introduces what we have called a ‘signal extraction problem’ and the possibility of trader error. We have argued that the market suffers from an adjustment asymmetry, as the overoptimistic side is self-correcting while the overpessimistic side is not.

Trader errors may take on of two forms. Errors of overoptimism are the result of interpreting some sender’s signal as indicative of credibility when in fact this is not the case. Traders committing such errors are automatically confronted with and learn from their mistake by being cheated. Confronted with their error, they adjust their level of pessimism downward to the equilibrium level, reducing the quantity of exchanges back to the equilibrium quantity and depressing the level exchange back to the efficient level. Because pessimism is flexible upward, the overoptimistic side of the market is self-correcting and tends to equilibrate.

Errors of overpessimism, in contrast, involve misinterpreting the signals of some sender as indicative of untrustworthiness when in fact this is not the case. Owing to the existence of option value, errors of overpessimism tend to be less costly than errors of overoptimism, resulting in an overpessimistically biased distribution of trader errors. Unlike errors of overoptimism, errors of overpessimism are unlikely to be corrected. This persistence of overpessimistic error is the result of the “bad news principle of irreversible investment,” which dictates that trader decisions about exchange will be largely invariant to upside potential. Furthermore, because traders stand to gain in the form of more information about potential partners by waiting to commit to an exchange, traders have an incentive to remain overly pessimistic. For these reasons, pessimism is rigid downward and

as a result the overpessimistic side of the market does not self-correct resulting in disequilibrium. This result is analogous to that offered by Fernandez and Rodrik (1991) who inform us that agent errors in the political market are overpessimistically biased leading to a bias towards the status quo and policy inefficiency.

Unlike the political market, however, the economic market has an inherent mechanism to correct otherwise persistent errors of overpessimism. Although all entrepreneurs are equally likely to disproportionately err on the side of overpessimism, their degree of optimism/pessimism with respect to any particular exchange opportunity is asymmetrically distributed; thus entrepreneurs are asymmetrically overpessimistic, leading some to observe profit opportunities that others miss. In profiting from these opportunities the entrepreneur exposes and corrects errors of overpessimism. Additionally, the activities of the entrepreneur shrink the option value related to postponing exchange. Irremediable uncertainty and the discovery of new knowledge means the market will never reach equilibrium. In correcting errors, however, entrepreneurial activity creates a force constantly pushing towards a state in which all mutually beneficial gains from trade have been realized. The speed of this adjustment process depends upon, among other things, the thickness of the market as well as the institutional framework in which the entrepreneur acts.

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