

Expectations: Results from a Program in Subjectivist Economics

Roger Koppl
Department of Economics and Finance
Fairleigh Dickinson University
Madison, NJ 07940
Koppl@alpha.fdu.edu

December 1999

NOTE: This is a draft. Errors and omissions are par for the course. Please quote only the sensible bits.

ABSTRACT

In economics and finance today there is no theory of expectations that is both subjectivist and falsifiable. A theory is falsifiable if one can devise tests that might show the theory is false. If the theory passes the test, then it is “not falsified.” It may be true. A theory is subjectivist if the actions implied by the theory make sense from the subjective position of the actor. Would a real person really do that? If so, the theory is subjectively plausible. It may be true. The paper develops a theory of expectations that is both falsifiable and subjectivist.

The theory is falsifiable. Therefore it can be tested empirically. I report on several attempted falsifications. So far the theory holds up. These attempted falsifications are also applications of the theory. The theory implies that the efficiency of financial markets is a function of the larger institutional regime within which markets operate. In particular “Big Players” may induce herding in asset markets.

Expectations and Economic Theory

Economics currently lacks a theory of economic expectations that is both falsifiable and subjectivist. A theory is falsifiable if one can devise tests that might show the theory is false. If the theory passes the test, then it is “not falsified.” It may be true. A theory is subjectivist if the actions implied by the theory make sense from the subjective position of the actor. Would a real person really do that? If so, the theory is subjectively plausible. It may be true.

Economics currently lacks a subjectivist and falsifiable theory of expectations. Such a theory, however, can be constructed. The theory developed in this book is an example. It emerged from problems internal to the Austrian school of economics. But it has novel empirical implications. Later in the book I report on statistical tests of these implications. So far they hold up. Thus, the theory is a contribution to economics in general, not only Austrian economics. It builds on Hayek’s notion of unintended consequences.

Economics studies the unintended consequences of human action. A social order produced as an unintended consequence of human action is a “spontaneous order.” Each action generating a spontaneous order is animated by the activity of a free human mind. The unpredictability of mental activity would seem to frustrate action aiming beyond the current moment. But action is often oriented to a relatively distant future. How is it possible to orient oneself *successfully* to a distant future when no central direction pre-coordinates our plans? This question poses the central problem of economics. Expectations form an essential aspect of this problem. How is it that we can formulate reliable expectations of a distant future? And why is it that our expectations sometimes fail us completely as in times of economic crisis?

While our expectations are generally disappointed in some degree, they are reliable enough to form the basis of our plans for a relatively distant future. They generally guide us well.

Sometimes, however, they go wildly wrong.

Economics has no satisfying theory of expectations. The standard approaches are rational expectations, adaptive expectations, and static expectations. They do not come to the heart of the problem. None of them explains how economic expectations emerge from spontaneous mental activity. The standard approaches all build on an artificial picture of human action. With rational expectations, individuals are super-efficient maximizers. In the other two cases, individuals are unreasonably insensitive to changes in the economic environment. They can be fooled again and again in exactly the same way. In all three cases, the limits of the approach stem from the use of an artificial picture of human action.

We can hide from the problem of expectations by accepting an artificial picture of human action, or we can face the problem squarely. If we face the problem squarely, we must view each action as emerging from spontaneous mental activity. Ludwig Lachmann labeled such an approach, “the subjectivism of active minds” (1990, p. 37). “The mental activity of ordering and formulating ends allocating means to them, making and revising plans, determining when action has been successful, all these are its forms of expression” (Lachmann, 1990, p. 37).

A satisfactory theory of economic expectations must be based on the subjectivism of active minds. Otherwise it is based on an artificial picture of human action. It thus evades the central problem of economics. A satisfactory theory of economic expectations must also be falsifiable. It must be predictive. A nonfalsifiable theory of expectations might provide a useful

grammar to discuss some economic problems. It might provide a useful taxonomy for the historian. But without falsifiable content, it cannot be scientific. Nor can it tell us anything really new about the world.

It might seem that a theory of economic expectations based on the subjectivism of active minds could not be predictive. Active minds are not predictable. I believe such a theory can be constructed, however. The theory of expectations I develop in this book builds from the subjectivism of active minds to a set of testable propositions.

Recent work by Arthur and other complexity theorists builds from the assumption of heterogeneous agents and bounded rationality. It seems probable that my theory complements much of this work. But the complexity approach has not yet developed a clear set of testable implications. Nor has does it build from the subjectivism of active minds. Other writers, including Austrians and Post Keynesians, have built from the subjectivism of active minds. They have generally failed, however, to draw empirical implications from their theories. Even when such implications can be drawn, they have generally failed to conduct potentially falsifying tests. Thus while the argument of this book emerges rather directly from the Austrian tradition, I believe it adds something new to that tradition and to economics more generally.

The Role of Expectations in Economics as a Social Science¹

¹ This section reproduces portions of Koppl 1998

Ludwig Lachmann first stated the problem of expectations I have taken up. In his essay on “The Role of Expectation in Economics as a Social Science” (1943). Lachmann drew our attention to the need for a theory of expectations in which each person’s actions are animated by the spontaneous activity of a free human mind. I will call the problem of building a radically subjectivist theory of expectations the “Lachmann problem.”

It is not obvious how such a thing is to be done. How can I let the agents of my model be free and still predict anything – even within the model! If we take seriously the subjectivism of active minds, we seem to fall into the horrible pit of open possibility with no ladder upon which to get out. This, we have been told, is nihilism.

I think there is a way out. We can combine the radical subjectivist attention to human thoughts with a more “objective” understanding of the evolution of rule-governed action. Doing so may permit us to correlate observable market conditions with certain properties of economic expectations. It may help us to learn when expectations will be more prescient and when less. It may help us learn when markets are driven mostly by fundamentals and when they are more subject to fad and fashion. To anticipate, my proposal for solving the Lachmann problem puts Alfred Schutz and F.A. Hayek together. (Alfred Schutz was a sociologist notable for his use of Edmund Husserl’s phenomenology. F. A. Hayek, of course, was one of the leading figures of Austrian economics.)

The integration of Schutz and Hayek, I will argue, may let us solve the Lachmann problem. To make my case I will need to distinguish between two meanings of “expectations.” On the one hand, economic “expectations” are what the word most naturally suggests, namely, ideas about the future. These are the “expectations” radical subjectivists have generally been

talking about. On the other hand, the “expectations” of many economic models are really dispositions or propensities to act in certain ways. I “expect” inflation if I raise my output price. I will call expectations in the first sense “psychological expectations.” I will call expectations in the second sense “dispositional expectations.” If the argument of this book is about right, integrating Schutz and Hayek to solve the Lachmann problem means explaining both psychological and dispositional expectations and correlating the two explanations.

In his 1943 essay “The Role of Expectations in Economics as a Social Science” ([1943] 1977), Lachmann mapped out a position from which he never deviated. It is this same position, for instance, that he adopted in an important essay for the *Journal of Economic Literature*, “From Mises to Shackle: An Essay on Austrian Economics and the Kaleidic Society” (Lachmann 1976). Lachmann called for a theory of expectations that goes beyond the efforts proposed by mainstream economists.

The “modern theory” of the 1930s had brought the “introduction of expectations” into economics (p. 65). Some, Keynes among them, had treated expectations as “data.” Others had proposed to treat them as “variables it is our task to explain” (Schumpeter 1939, vol. I: p. 55 as quoted in Lachmann 1943, p. 66). Lachmann rejected both ways of treating expectations.

We cannot regard expectations as mere “data” given to us. We must ask “why they are what they are” (p. 65). We are, indeed, “compelled” to seek out a “causal explanation” of economic expectations (p. 65). Expectations, after all, are on a “somewhat different plane” (66) from the distribution of mineral deposits or the public’s preferences between movie

directors. The distribution of expectations, unlike that of mineral deposits, is “largely the result of the experience of economic processes” (p. 66).

But neither can we regard expectations as variables to be inferred from the “business situation.” Different interpreting minds will draw different inferences from the same “objective” data. Thus, “there will be as many ‘business situations’ as there are different interpretations of the same facts, and they will all exist alongside each other” (67).

Here we come to the dark heart of Lachmann’s ideas on expectations. Expectations are not constant, or even changing, data impinging, as it were, from outside the economic process. They are interpretations. But interpretations differ in ways that defy prediction: “The absence of a uniform relationship between a set of observable events which might be described as a *situation* on the one hand, and expectations on the other hand, is thus seen to be the crux of the matter” (67). We are thus obliged to view expectations as “economically indeterminate” (67). For Lachmann, “it cannot be emphasized too strongly” that attempts to test empirical hypotheses with historical data will be “quite useless” if they are “confined to the study of [the] relations between objective facts and expectations” (68). The best we can do is to render expectations “intelligible” by seeing in them a plan based on an interpretation of the facts of experience (68-73). (I will come to a somewhat more optimistic conclusion.)

For Lachmann, “it is by reducing ‘action’ to ‘plan’ that we ‘understand’ the actions of individuals” (69). He infers from this that “it is the *subjective* nature of beliefs which imparts indeterminateness to expectations” but “it is their *mental* nature which renders them capable of explanation” (73). He draws the further conclusion that economists must (in 1943) expand beyond “the subjectivism of wants” to embrace “the subjectivism of interpretation” (73). I take

this to be the same position expressed in 1976 as the invitation to “extend” subjectivism from Mises to Shackle, for the subjectivism of “tastes” to the subjectivism of “expectations” (1976, p. 58). The theory of expectations whose absence Lachmann calls our attention to must embrace the “subjectivism of interpretation” (1943, p. 69). He later used the equivalent term invoked above, the “subjectivism of active minds.”

Lachmann has put a hard task indeed to economics. Expectations are to be neither data nor variables. They are to be endogenous, but not functionally related to observable facts. Rather than functional relations, we are to see in expectations subjective interpretations of facts whose meaning for future action is always more or less obscure.

A theory that satisfies Lachmann’s call for a subjectivism of interpretations must satisfy three criteria. First, it must give expectations a place within economic theory. Second, the theory must be subjective in a strong sense: Expectations are produced by active minds, each of which is more or less unique. Finally, expectations must be endogenous to the market process.

The hard thing is to satisfy the second and third criteria simultaneously. Expectations may be right or wrong. Market efficiency depends crucially on the accuracy of economic expectations. If one doubts that markets tend to coordinate action, one may be inclined to think that expectations are formed through and essentially psychological process as in Keynes’s Chapter 12. Greater faith in the market may incline one to think that expectations are indeed “rational” in a sense close to that of Lucas and Muth. But as I indicated earlier, both the New Classical and Old Keynesian approaches to expectations require one to choose in advance one’s modeling strategy. One must decide *a priori* whether to represent expectations as “rational” and co-ordinative or as “psychological” and disequilibrating. The trick, I think, is to

represent endogenously formed expectations in a way that skirts the unsatisfactory choice between *faith* and *doubt* in the co-ordinative prowess of markets. If we are stuck with an *a priori* choice between faith and doubt, an essential question of our discipline is not empirical or logical, but purely ideological. If the Lachmann problem can be solved, perhaps we can avoid this ideologically charged choice.

Outline of the Theory

As I indicated above, I distinguish two kinds of expectations. Psychological expectations are individual thoughts about the future. Dispositional expectations are propensities to act. I rely mostly on Alfred Schutz for my treatment of psychological expectations. I rely mostly on F.A. Hayek for my treatment of dispositional expectations.

Schutz and the Lachmann problem

Schutz made a detailed study of how meanings is produced and distributed in society. He showed that we think in stereotypes. He called them “typifications.” These typifications are always somewhat empty characatures of the reality they represent. Some of them, however, are closer to reality than others. Some of our typifications of other people are very detailed. They contained many psychological particulars. Your typification of a loved one contains a rich

psychological portrait of a unique individual. It is very “concrete.” Other typifications are quite empty. Your typification of a “bus driver” does not represent any particular person. It contains a very thin psychological portrait. It is highly “anonymous.”

Schutz showed that our expectations about anonymous types are more reliable than our expectations about concrete types. This remark requires some important qualifications. I will make my qualifications in the next chapter. But the claim made is about right for purposes of a theory of economic expectations. You can reliably expect a bus driver to show up at the bus stop at the customary time and follow the customary route. You cannot reliably predict what unique individuals will do. No one expected Caesar to cross the Rubicon.

Economic actors can better predict the actions of anonymous than non-anonymous personal types. Something similar may be said of economic theorists. Social scientists may be able to predict confidently the results of processes whose descriptions are given using only personal types of high anonymity. But when the description of a social process requires the use of some personal type(s) of low anonymity, the predictions of social science are more or less unreliable. This point is illustrated by three propositions discussed by Fritz Machlup (1936) in a paper intended to convey some of Schutz’s ideas to an audience of economists. (The quoted passage has been discussed in Langlois 1986 and Langlois and Koppl 1991.)

Statement (1): “If, because of an abundant crop, the output of wheat is much increased, the price of wheat will fall.”

Statement (2): “If, because of increased wage-rates and decreased interest rates, capital becomes relatively cheaper than labor, new labor-saving devices will be invented.”

Statement (3): “If, because of heavy withdrawals of foreign deposits, the banks are in danger of insolvency, the Central Bank Authorities will extend the necessary credit.”

(Machlup 1936, p. 64)

The first statement is more reliable than the second and the second is more reliable than the third. Why? As we go down from the first statement, we reach ideal types of lower anonymity. Machlup explained that:

the causal relations such as stated in (2) and (3) are derived from types of human conduct of a lesser generality or anonymity. To make a statement about the actions of bank authorities (such as (3)) calls for reasoning in a stratum of behavior conceptions of much less anonymous types of actors. We have to know or imagine the acting persons much more intimately.

(Machlup 1936, p. 68)

That greater intimacy implies a greater chance that the actor will surprise us by acting out of character. (Later in this chapter I will discuss the role of the “system constraint” in determining when to use anonymous types.) We cannot be sure the central bank authorities will extend the necessary credit. It is a good guess they will; but they may surprise us with an act of monetary restraint. We can be much more confident in the coming reduction of wheat prices. We can rely on an anonymous typification of the wheat farmer. We need non-anonymous typifications of the central bank’s high officials.

Schutz’s concept of anonymity helps us to understand how social order is achieved in spite of the subjectivism of active minds. We can cooperate with anonymous others precisely because of their anonymity. Typifications of high anonymity are thin descriptions of robotic creatures. We know that each real person is unique. But we rely on stereotyped pictures of

anonymous others. To the extent that we can rely on anonymous typifications of others, we can ignore the idiosyncrasies of our fellow actors.

This difference between concrete and anonymous typifications of other people matters. It helps us to solve the Lachmann problem.

The Lachmann problem is the need to have a theory of expectations that builds on the idea that each person's actions are animated by the spontaneous activity of a free human mind. The personal and interpretive quality of (psychological) expectations spells trouble for any theory of expectations. We seem to require a detailed psychological portrait of each economic actor if we are to say anything at all about the market process. Moreover, each actor seems to require the same sort of psychological detail in his mental portrait of each of his fellow actors.

Schutz's discussion of anonymity shows that we do not always need to rely on a psychologically rich picture of economic actors. Both economic actors and economists may sometimes forgo thick description in favor of thin description. When the observer or his subject requires reference to concrete typifications, we may not be able to say much about expectations. In that case the results of the market process will be hard to predict.

In other words, the Lachmann problem is more acute in some contexts, less acute in others. When it is most acute, the market process will be hard to fathom and economic theory of limited predictive value. When the Lachmann problem is least acute, the market process will be more transparent and economic theory will have greater predictive value.

Hayek and the Lachmann problem

I have argued that sometimes, thin description is good enough. The trick is to know when. On this point Schutz is silent. I think it is fair to say that “radical subjectivism” has so far failed to tell us much about when economic actors might get along with anonymous types.

Perhaps we should not be surprised if radical subjectivism has not told us when thin description is enough. A radically subjectivist account would have to run in terms of the thoughts of economic actors. What we want to know is when those thoughts employ non-anonymous types. But a radically subjectivist account would have to begin with the thoughts of the agent. It is hard to see how a pure subjectivist could get beyond the circular claim that agents use thin description when they use thin description. What we seem to require is a set of “objective” conditions under which the “subjective thoughts of agents may be represented as employing only anonymous types.”² Similarly, we need a set of objective conditions under which our own thinking as scientific observers may employ only anonymous types.

Consider again Machlup’s three statements. Statement (1) said that if, “because of an abundant crop, the output of wheat is much increased, the price of wheat will fall.” What is it that lets our reasoning be guided by anonymous types in this case? Why is a thin description enough? As Langlois and I have argued, it is the “system constraint” (Langlois and Koppl 1991, p. 92). The system constraint is the constraint imposed on individual action by the larger

² I have been ignoring the difference between the thoughts of agents and our representations of those thoughts. This difference can matter. As far as I can tell, however, it does not matter for the points being made in this chapter. I will return to this subject in chapter XYZ.

institutional system within which the action takes place. Imagine we have one or a few idiosyncratic wheat farmers or wheat traders. They may act foolishly or arbitrarily. But these few oddballs cannot reverse the tide of events. And if they try, they risk losses and banishment from the market. The large number of competitors involved and the discipline of profit and loss ensure that we may safely ignore any idiosyncrasies of behavior in the wheat market. Thin description will do for economic observers.

Now consider the positions of participants in the wheat market. If they are operating under a tight system constraint, their actions will be driven into approximate conformity with the underlying situational logic. Those whose actions stray too far from this logic will suffer losses that, if uncorrected, will drive them from the market. A tight system constraint produces a relatively high correspondence between action and circumstance. Under such conditions, we may represent the thoughts of agents as expressing the same correspondence; agents act as if they had prescient expectations. The condition that lets us represent agents in this as-if way is the tight system constraint. But this is also the condition that lets observers rely exclusively on anonymous types. When the system constraint is tight, economic actors forgo thick description in favor of thin description.

Butos and I have developed some of these points in a paper on Hayek's theories of mind and social evolution (Butos and Koppl 1993). (See also Butos and Koppl 1997, 1999). We argue that the market's evolutionary selection mechanism sometimes keeps anticipations in line, but sometimes does not. We identify two conditions that promote prescient expectations. The first is that the rules of the game of market competition are stable. The second is that competition is atomistic.

The rules of the game are stable when changes in them are small and infrequent. The rules that count here are both formal and informal. Indeed, the only formal rules that count are those that are enforced at least some of the time. Human habits are constantly changing piecemeal. Thus, perfect stability is impossible. But we can often say that the rules of the game are more stable in this market, less stable in that one.

Competition is atomistic when it is rivalrous. When each supplier considers his own actions to have an insignificant impact on the overall market, when there is little “rival consciousness” (Machlup 1952), then competition is atomistic in the relevant sense.

Under the conditions of stability and atomism, Botos and I have argued, evolutionary selection mechanisms of the sort Hayek analyzed will produce relatively high levels of economic efficiency. Stable evolutionary environments produce prescient expectations in the social world, goodness of fit in the biological world.

The evolutionary and Hayekian considerations of the present section may not seem to fit well with the phenomenological and Schutzian considerations of the previous section. Botos and I adopted the Hayekian view of expectations as (mostly) dispositions to act. The Schutzian framework takes expectations to be thoughts. It is not immediately obvious that these are consistent perspectives. Some definitions may help to clarify the issues.

Fitting psychological and dispositional expectations together

Let the term “dispositional expectations” refer to the Hayekian view and the term “psychological expectations” refer to the phenomenological or hermeneutical view of expectations. Psychological expectations refer to people’s thoughts. Dispositional expectations refer to people’s actions.

The “expectations” of economic theory are often dispositional expectations. We say that creditors “expect” zero inflation if they do not insist on an inflation premium. This “expectation” may be nothing more than the conformity to old habits and ways of doing business. Conceivably, some creditors might even have a psychological expectation of inflation. If they don’t understand the effect of inflation on purchasing power, they won’t ask for an inflation premium. The case imagined is not purely hypothetical. Recently, an important Italian labor leader expressed concern over the government’s low inflation target. Such low inflation, he objected, would reduce the purchasing power of workers’ wages.

One must be able to give a reasonable account of the psychological expectations animating the actions of economic agents. This is a kind of test. If your model requires that we imagine agents acting on unreasonable psychological expectations, the model is unreasonable. If the psychological expectations at work are reasonable, the model passes the test.

Dispositional expectations and psychological expectations are distinct objects. On narrow logical grounds, any combination of them is possible. But it seems reasonable to suppose the two typically fit together. A theory of dispositional expectations without a correlated theory of psychological expectations is tenuous. We may wonder if any plausible

psychological expectations could correlate with the posited dispositions. Rational expectations, for example, are an assumption about dispositional expectations. Traders act on average as if they had the true model in mind. The assumption is reasonable in some circumstances. But rational expectations are not a reasonable assumption when the implied psychological expectations entail, say, superhuman powers of calculation.

A theory of psychological expectations without a correlated theory of dispositional expectations is also dubious, and for a parallel reason. Without the latter we cannot be sure the posited psychological expectations would really come to prevail. Expectations are, as Lachmann insisted, endogenous to the market process. If we do not correlate our understanding of psychological expectations with a story of the emergence of dispositional expectations, we have to doubt that the imagined psychological expectations would really survive the test of market competition. An example may clarify some of the issues. My example will also bring us to some falsifiable implications of my theory of expectations.

Big Players

Consider the operation of a modern asset market. Traders must anticipate future values at least passably well if they are not to be forced out of the game by losses. Profits will encourage those with unusually good foresight to keep at it. An evolutionary selection mechanism works to keep anticipations more or less in line with underlying asset values. If the filter works well, prices will stay close to fundamental values. If the filter works badly, prices

may wander freely from fundamental values. Whether the filter works well or not is an empirical question.

Efficient market theories predict that market prices will reflect all available information. (Different kinds of efficiency correspond to different assumptions about what information is “available.”) An important implication of such theories (together with a few subsidiary assumptions) is that the past changes in an asset’s return give no evidence about the direction of future changes. In consequence, (and ignoring some complications occasioned by payouts) the expected value of an asset’s return in any period is simply its return in the previous period. This property of the return series defines a “martingale.” (A random walk is a special case of a martingale in which the higher moments are not expected to change over time. Statistical dependence in higher moments, as with GARCH models, does not violate the efficient markets hypothesis. See LeRoy for a review of basic issues.)

The statistical evidence for the efficiency of asset markets is strong enough to have persuaded many serious and competent judges. Others doubt. There are many apparent counterexamples. Some evidence suggests that observable market conditions help determine how efficient asset markets are. I review that evidence below and discuss it at greater length in later chapters. The degree of efficiency may be an endogenous variable.

According to the theory of “Big Players” discussed in chapters C and D, the order-giving properties of the filter of profit and loss are corrupted when “Big Players” derange markets. Yeager and I define a Big Player as “anyone who habitually exercises discretionary power to influence the market while himself remaining wholly or largely immune from the discipline of profit and loss” (Koppl and Yeager 1993, p. 368). An interventionist finance

minister is our paradigm of a Big Player. But a Big Player may be any actor who combines three things, namely, the power to influence some market, a degree of immunity from competition, and use of discretion in the exercise of his power. Big Players corrupt economic expectations. In financial markets they encourage herding.

The point of the Big Players theory can be put in Schutzian terms. It is a matter of psychological expectations. Big Players divert each trader's attention from underlying conditions of supply and demand towards the personality of the Big Player. It is hard to know what a Big Player will do. Market participants must base their expectations on a picture of the market in which a highly non-anonymous ideal type is prominent. But this picture is always more or less dubious. Thus, the overall reliability and prescience of economic expectations is reduced. In financial markets, traders come have less confidence in their own expectations and relatively more confidence in the opinions of others. The importance of the non-anonymous type and the ignorance and uncertainty traders feel regarding the Big Player encourage them to follow the trend. Big Players encourage herding in financial markets.

The point of the Big Players theory may also be put in Hayekian evolutionary terms. The presence of Big Players destabilizes the evolutionary environment. Some actors in the market will have dispositions to act in ways that roughly correspond to the best available guess about the future. These are "fit dispositions." Others will have dispositions to act in ways that are more distant from the underlying economic realities. These are "unfit dispositions." Big Players make fit dispositions less likely to bring profits, more likely to bring losses. They make unfit dispositions less likely to bring losses, more likely to bring profits. Big Players make luck count for more, skill count for less. The dispositions guiding action will be less fit when Big

Players derange markets. The overall reliability of dispositional expectations will be lower in the presence of Big Players. In financial markets, the disposition to follow trends is less likely to bring losses. The disposition to respond to fundamentals is more likely to produce losses. Traders who survive market competition under Big Players will have a higher average propensity to herd. Big Players encourage herding in financial markets.

Big Players also encourage “contra-herding.” Contra-herding is the tendency for one day’s movement in an asset’s price to be reversed the next day. When Big Players operate, it is hard to understand the meaning of a price change. Some will see a trend. Other will expect a “correction.” Some will follow the trend. Others will be contrarians. Herding and contra-herding will produce bulls and bears who will struggle of the price of the asset.

In the Big Players theory psychological and dispositional expectations fit together. This complementarity is a strength of the theory. Other theories lack this complementarity. Keynes’s treatment of long-run expectations, for example, is about psychological expectations. It is not clear, in his analysis, what institutional properties of financial markets encourage the perversities he identifies, and what properties discourage them. (Keynes refers only to liquidity.) Models with rational expectations refer, presumably, to dispositional expectations. They seem to imply that psychological expectations are perfectly plastic, taking on whatever form is needed to generate the predicted behavior. As Thomas Sargent has noted, rational expectations seem to imply that economic actors know with certainty the very structural parameters of the economy that econometricians can only estimate with uncertainty (Sargent 1993, p. 21). The examples of Keynes and rational expectations help to show that we should

prefer economic arguments that combine and correlate plausible treatments of both psychological and dispositional expectations.

Statistical evidence

Koppl and Yeager (1993) study an important episode in Russian monetary history. Koppl and Nardone (1997) and Broussard and Koppl (1999) apply different statistical techniques to Koppl and Yeager's data. Koppl and Mramor (1999) study a recent episode in Slovenian monetary history. I study the behavior of two different futures contracts. Finally, Koppl and Beckett (1999) study U.S. money demand from 1950 to 1990.

Koppl and Yeager (1993) identify an important episode in Russian monetary history. Leland Yeager discovered the episode in question. Yeager gathered the exchange rates analyzed by Koppl and Yeager, Koppl and Nardone, and Broussard and Koppl. From 1856 to 1893 Russia had a paper currency, the "credit ruble." The ruble was typically subject to frequent interventions from the office of the treasury minister. It was a dirty float. Bunge was an exception. During his tenure as finance minister, the ruble was left to float freely. Bunge was a strict non-interventionist in the foreign-exchange market. His successor, Ivan Vyshnegradsky was an unusually vigorous interventionist. The period of these two finance ministers gives us an unusually clear case of a move from less to more Big Player influence.

Yeager and I analyzed the data using Mandelbrot's R/S analysis. R/S analysis can be used to test for herding (Kaen and Koevos 1986, Ahmed et al. 1996). An increase in the

“Hurst coefficient” indicates an increase in herding. The test indicates an increase in herding in the international market for rubles during Vyshnegradsky’s tenure as finance minister.

Broussard and I fit a GARCH model to Yeager’s ruble data. We show that GARCH effects are stronger under Vyshnegradsky than under Bunge. We argue that this result is evidence of both herding and contra-herding in the ruble. Recall that contra-herding is the tendency for one day’s movement in an asset’s price to be reversed the next day. Imagine an asset’s price rises for some reason. If no Big Player troubles the market, the price hike may be interpreted as fully reflecting some recent news. If a Big Player is influencing the market, traders will be uncertain. Bulls and bears will react differently to the same event. If the bulls outweigh the bears, the next day’s price movement will be in the same direction and may be of about the same size. If the bears outweigh the bulls, the next day’s price movement will be in the opposite direction and may be of about the same size. Whether the bulls or the bears prevail, the next day’s price may move by about the same amount. This implies statistical dependence in the second moment of the return series. GARCH effects grow stronger when Big Players induce herding and contra-herding.

Nardone and I find further evidence for herding and contra-herding. Following Crack and Ledoit (1996), we plot each day’s return against the return of the previous day. Doing so gives you the “compass rose” pattern. The compass rose results from discreteness in the data. We devised a way identify patterns in the compass rose other than those imposed by discreteness. We plot the number of points clustered about each ray against the angle of that ray. This gives us the “theta histogram.” A Monte Carlo technique lets us construct the theta histogram that would exist if returns were statistically independent. The resulting “hypothetical

histogram” may be compared to the “empirical histogram.” Statistical tests show that the null hypothesis of statistical independence cannot be rejected for the Bunge period. Statistical dependence is clearly present in the Vyshnegradsky period. This difference between the Bunge and Vyshnegradsky periods is evidence that Big Players encourage herding and contra-herding.

Mramor and I analyze a recent episode in Slovenian monetary history. In 1994 the Bank of Slovenia, the central bank, was forced to defend the value of its currency by issuing a large volume of bonds. We show that this action was interpreted as a basic change in central bank policy. The bank had followed a hands-off policy up to then. Beginning in 1994, the Bank of Slovenia became a Big Player. We applied R/S analysis to stock-market data. Our results indicate an increase in herding on the Ljubljana Stock Exchange.

Ahmed, Rosser, White and I (1997) have studied the behavior of closed-end countries funds in the late 1980s. We find strong evidence of herding and bubbles in this market. We conjecture that Nomura Securities U.S. may have acted as a Big Player in this market. In the long run, only government actors or governmentally protected actors can be Big Players. But private Big Players may emerge in the short run. Nomura securities may be an example.

I applied R/S analysis to data from the Chicago Board of Exchange. I compared the amount of herding in soybean futures to that in Treasury bond futures.³ Since Treasury bonds are more subject to Big Player influence, they should be more subject to herding. This is the result I get.

³ I thank Jeremy Shearmur for suggesting a test along these lines.

Finally, Beckett and I study U.S. money demand from 1950 to 1990. We argue that the money supply process was more subject to Big Player discretion after 1970 than before. We show that this difference implies more herding in money demand after 1970 than before. Herding can occur in the market for cash balances. A significant portion of money demand comes from firms. Firms often hire specialists in cash management. Cash managers may engage in herding if they follow the same set of professional advisors. Big Players encourage cash managers to follow the advice of outside experts.

An increase in herding in money demand will change the behavior of the residuals of an appropriately specified money demand equation. R/S analysis of the residuals should show an increase in the Hurst coefficient when herding increases. We show that precisely such an increase occurs after 1970. One reason for the recent instability of U.S. money demand is the recent instability of U.S. money supply.

Conclusion

The applied studies I have outlined tend to support the Big Players theory. That support counts in favor of the larger project in expectations I am attempting to develop. If my arguments hold water, they have implications for finance. Here are two.

First, efficiency is a sometime thing and a relative thing. Both orthodox and heterodox approaches to finance have tended to treat efficiency and bubbles in categorical terms. Either markets are efficient and produce no bubbles, or they are inefficient and produce bubbles and noise trading. My results suggest that the underlying institutional environment will determine the degree of efficiency in financial markets.

Second, finance theorists need to expand their tool kit. The orthodox tool kit is filled with many statistical instruments. But it has no room for hermeneutical tools. But if psychological expectations matter, then we need to raise hermeneutical or subjectivist questions. Would a real person really do that? Koppl 1996 shows that when Big Players act, it is inappropriate to use the rational-expectations modeling technique.

Further work is needed. We need more researchers attempting to produce theories that are both falsifiable and subjectivist. If more work of this sort were done, we might be able to construct a more nuanced and human picture of financial markets.

BIBLIOGRAPHY

- Ahmed E., J.B. Rosser, R. Koppl, and M. V. White. 1997. "Complex Bubble Persistence in Closed-End Country Funds," *Journal of Economic Behavior and Organization*, 32(1): 19-37.
- Broussard, J. and R. Koppl. 1999. "Big Players and the Russian Ruble: Explaining Volatility Dynamics," *Managerial Finance*, 25(1): 49-63.
- Crack, Timothy F. and Olivier Ledoit. 1996. "Robust Structure Without Predictability: The 'Compass Rose' Pattern of the Stock Market", *Journal of Finance* 51: 751-762.
- Koppl, Roger. 1996. "It is High Time we take our Ignorance more Seriously," *International Review of Financial Analysis*, 5(3): 259-72.
- Koppl R. and C. Beckett. 1999. "Big Players and Money Demand," manuscript.
- Koppl R. and D. Mramor. 1999. "Big Players in Slovenia," manuscript.
- Koppl R. and C. Nardone. 1997. "The Angular Distribution of Asset Returns in Delay Space," manuscript.
- Koppl, R. and L. Yeager. 1996. "Big Players and Herding in Asset Markets: The Case of the Russian Ruble," *Explorations in Economic History*, 33(3): 367-383.