

Research Department
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Expectations and Economic Behavior

Economists have long understood that people do not simply live from day to day but also plan for the future. Decisions taken today depend not only upon current and past economic conditions but also upon those expected to prevail in the future. "Expectations" are thus crucial influences which must be taken into account in predicting future economic trends and in evaluating prospective policies.

Economic analysis is not simply concerned with determining what people's expectations presently are, but with what they would be if conditions were changed. For example, a tightening of monetary policy may have a negligible or substantial immediate impact upon inflation, depending upon whether the public expects the policy change to be temporary or permanent. The requirements of practical economic analysis thus include an economic theory of expectations, one which relates anticipations of the future to current and past conditions. Substantial progress has been made in understanding the influence of expectations upon economic behavior. In the process, some useful (and sometimes startling) facts have been discovered about the workings of free economic markets, and about the effects of certain economic policies. This article describes one application, to the stock market; a subsequent issue will explain the application of rational-expectations theory to the inflation/unemployment trade-off that was discussed in last week's *Weekly Letter*.

Theories: adaptive to rational

Economic theories used to be based on ad hoc assumptions about expectations. Often economists assumed that people's views about future prices and incomes were unaffected by current conditions — or they assumed that expectations varied directly

with today's income and prices. Unfortunately, a theory's prediction often depended crucially upon the assumption made about anticipations.

For example, under a regime of floating exchange rates, a temporary increase in a currency's supply — due, say, to a trade deficit — will tend to reduce its foreign-exchange value. But if investors expect the trade deficit to be temporary, so that the expected future exchange rate is unaffected, they will have an incentive to purchase the currency now in anticipation of subsequent profit, stabilizing its value in the process. They will not provide this support if they expect the trade deficit to persist. Thus the stability of currency values under floating exchange rates depends crucially upon how investors' expectations are determined. Debates about flexible exchange rates — which often are disputes about how rational and well-informed such investors would be — are naturally difficult to resolve in the absence of an economic theory of expectations.

Such ambiguities have led economists to adopt formal models of expectations, based upon the assumption that people use their knowledge of current and past economic conditions in predicting the future. For example, a simple but plausible way of forecasting next year's inflation rate is to use some average rate experienced over the past several years. This is known as "adaptive expectations," because individuals' anticipations adapt to their current and past experience. But how do people arrive at specific weights in making predictions — for example, do they attach greater importance to last year's inflation compared to that of the year before? Again, how do they change their "rules of thumb" when economic policies or other fundamental condi-

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tions are altered? A more sophisticated model, known as "rational expectations," provides some answers to these questions.

Rational expectations

Rational-expectations theory says that individuals' predictions of economic conditions are the most accurate that can be made on the basis of information available to them. The theory asserts that they do this, in effect, by using available information to determine the actual relations among economic variables — for example, that between money and prices — and by using these relations to forecast future developments. In other words, individuals' forecasts reflect the way economic conditions actually evolve.

This approach answers the question of how we determine the weights used to predict future inflation: these simply reflect the actual relation prevailing between past and future inflation. For example, where government monetary policies are steady and consistent, so that variations in inflation rates occur only because of crop failures or other temporary factors, individuals' forecasts of next year's inflation are likely to be little influenced by a recent acceleration of price increases. When policy is less steady, an acceleration of prices this year may signal more expansive monetary policy in the years ahead; if so, an increase in current inflation will lead people to raise their expectations of future price increases. As this example indicates, the weights people give to alternative types of information in making their forecasts will depend upon the economic policies currently in effect, and will change when these are altered. Also, well-informed individuals will usually use information in addition to past price changes — e.g., money-supply trends — when predicting future inflation.

The rational-expectations theory, it should be emphasized, does not assert that indi-

viduals' predictions are always correct. The unavoidable uncertainty surrounding the economy guarantees that even the most skillful and well-informed individuals will make errors. The theory does assert that people make intelligent forecasts — ones which are no less accurate than any others that could be made on the basis of available information. Most economic theory presumes that individuals are rational and well-informed, and rational-expectations theory merely asserts that this is true of their predictions as well.

In addition, the theory does not require that individuals possess a detailed and sophisticated knowledge of the economy, but only that they have access to such information. Indeed, a wealth of information is available from a number of private consulting firms and public agencies, who employ many economists and sophisticated econometric models to service their individual and corporate customers. Indeed, the success of such specialized forecasting services is evidence of the basic validity of the ideas underlying rational-expectations theory.

Again, the theory assumes that the public or its suppliers of information possess a fairly sophisticated knowledge of how the economy works. This assumption is most plausible where policies and other fundamental conditions have remained stable long enough for analysts to gain fairly complete knowledge about them. The theory is much less easily applied when individuals' forecasting procedures are adapting to changing fundamental economic conditions.

... and the stock market

The stock market provides a graphic example of how theories of expectations have improved our understanding of economic behavior. As with financial markets generally, the stock market is intrinsically forward-looking: stocks are bought and sold on the basis of investors' views of their future values. Wall Street also provides a highly

organized competitive market in which trading is relatively inexpensive and information is disseminated widely and rapidly. In such a "frictionless" market, the price of a company's stock represents investors' estimate of the present discounted value of the firm's expected future profits.

When a market is "frictionless" and investors' expectations are rational — reflect the way economic conditions actually evolve — the market is said to be *efficient*. Prices in such an efficient market, quite remarkably, fluctuate randomly. More precisely, price changes (about the average long-run trend) are *unpredictable*.

To see why, recall that the price of a stock reflects investors' best estimates of future firm profits, which in turn reflect their assessments of the future price of output and its cost of production. Now from time to time new information about company prospects will become available. Such information will often be tentative and of uncertain accuracy, and thus investors may not take it at face value, but to the extent that they are led to revise their anticipations of future firm profits, the price of the stock will change in response. The key point is that in an efficient market the price will always embody investors' current best forecasts — and these forecasts, and thus the stock price, will change only with new information which by definition is unpredictable.

To see this, imagine predicting the price of output on July 30, 1979. If I know that tomorrow my best estimate of this price will be higher than it is now, my current estimate cannot be the best I can make. Rather, my best estimate will fully reflect all presently available information, so that I have no reason to believe my prediction tomorrow will be different from today's. Since stock prices embody such "best guesses," they too must fluctuate unpredictably.

Numerous studies have confirmed that the

stock market is indeed efficient in this sense: stock prices do fluctuate randomly. This has several important consequences, particularly for investors' stock-market strategies. Some individuals simply buy stocks and hold them for retirement or other longer-term objectives. Others continually monitor stock prices and other economic indicators for evidence of "bandwagons," or other *predictable* fluctuations that offer opportunities for above-average profit. The latter individuals generally work harder at their investments than do the former, but do they fare any better?

Generally they do not, because stock-price variations about the long-run trend are unpredictable. Predictable fluctuations about this trend lead investors to bid prices, virtually immediately, to levels where such changes can no longer be anticipated. Thus those who simply purchase and hold stocks earn the average long-run market return on their investment. Those who seek to improve on this by detecting predictable trends about the average cannot *consistently* do better because such trends are illusory. Devices to detect such trends are likely to yield the same result as systems to beat the roulette wheel at Las Vegas: entertainment but no profit. Those who make prudent choices among the risks and growth prospects of alternative stocks thus need not incur the expense, time and (often) anxiety of following the market on a day-to-day basis in order to earn the best return.

Consequently, because stock prices already embody the best, rational predictions, even those with highly sophisticated forecasting techniques cannot consistently out-perform the market. This provides one example of how relatively simple and common-sense ideas about expectations have led to powerful and useful insights about economic behavior. A more controversial application will be discussed in a subsequent *Weekly Letter*.

Charles Pigott

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BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT
(Dollar amounts in millions)

| Selected Assets and Liabilities Large Commercial Banks | Amount Outstanding 5/30/79 | Change from 5/23/79 | Change from year ago @ | |
|---|----------------------------------|-------------------------------|---------------------------------------|---------|
| | | | Dollar | Percent |
| Loans (gross, adjusted) and investments* | 126,097 | 309 | + 17,083 | + 15.67 |
| Loans (gross, adjusted) — total# | 103,177 | 222 | + 15,936 | + 18.27 |
| Commercial and industrial | 30,110 | 13 | + 3,005 | + 11.09 |
| Real estate | 37,435 | 97 | + 8,105 | + 27.63 |
| Loans to individuals | 21,614 | 131 | NA | NA |
| Securities loans | 1,714 | 9 | NA | NA |
| U.S. Treasury securities* | 7,698 | — 20 | — 188 | — 2.38 |
| Other securities* | 15,222 | 107 | + 1,335 | + 9.61 |
| Demand deposits — total# | 42,186 | 1,856 | + 1,535 | + 3.78 |
| Demand deposits — adjusted | 29,722 | 274 | + 1,519 | + 5.39 |
| Savings deposits — total | 29,734 | — 27 | — 776 | — 2.54 |
| Time deposits — total# | 50,043 | — 406 | + 5,089 | + 11.32 |
| Individuals, part. & corp. | 40,744 | — 412 | + 5,609 | + 15.96 |
| (Large negotiable CD's) | 16,849 | — 513 | — 554 | — 3.18 |
| Weekly Averages of Daily Figures | Week ended 5/30/79 | Week ended 5/23/79 | Comparable year-ago period | |
| Member Bank Reserve Position | | | | |
| Excess Reserves (+)/Deficiency (—) | 2 | 31 | | 29 |
| Borrowings | 202 | 218 | | 254 |
| Net free reserves (+)/Net borrowed(—) | — 200 | — 187 | | — 226 |
| Federal Funds — Seven Large Banks | | | | |
| Net interbank transactions | + 373 | + 1,928 | | — 385 |
| [Purchases (+)/Sales (—)] | | | | |
| Net, U.S. Securities dealer transactions | + 278 | + 352 | | + 144 |
| [Loans (+)/Borrowings (—)] | | | | |

* Excludes trading account securities.

Includes items not shown separately.

@ Historical data are not strictly comparable due to changes in the reporting panel; however, adjustments have been applied to 1978 data to remove as much as possible the effects of the changes in coverage. In addition, for some items, historical data are not available due to definitional changes.

Editorial comments may be addressed to the editor (William Burke) or to the author . . . Free copies of this and other Federal Reserve publications can be obtained by calling or writing the Public Information Section, Federal Reserve Bank of San Francisco, P.O. Box 7702, San Francisco 94120. Phone (415) 544-2184.