

SCHOOLS BRIEF

Tales of the expected

This brief continues our series on modern classics of economics. The first of our chosen studies is one of the earliest, most influential and controversial papers on rational expectations—an apparently simple idea that has transformed macroeconomics

RATIONAL EXPECTATIONS, THE OPTIMAL MONETARY INSTRUMENT AND THE OPTIMAL MONEY SUPPLY RULE. By Thomas Sargent and Neil Wallace. *Journal of Political Economy*, April 1975.

ECONOMISTS have long understood that expectations—the guesses people make about the future—play a central role in driving the economy. The clearest example is the one that economists have been most interested in: expectations about wages and prices. If firms and workers think prices will rise during the coming year, workers will demand, and firms will pay, higher wages.

Maynard Keynes saw the importance of expectations, especially in the labour market. So did many economists before him. But economics lacked a plausible theory of how expectations are formed. Keynes brushed the problem aside by taking them as given. He treated expectations as “exogenous”—determined outside the economic system he was trying to explain.

When Keynes's followers came to build the future into their economic models, they were obliged to say a little more. They argued that people make guesses about the future by looking exclusively backwards.

The main approach was **adaptive expectations**. On this view, economic agents guess at inflation in the coming year by implicitly putting weights on inflation rates in previous years; last year's rate would be given a big weight, inflation in earlier years smaller weights. It was no coincidence that, for the purpose of building models, this idea could be expressed mathematically in a convenient way.

A special case of adaptive expectations would be a rule that said inflation next year will be the same as this year. (Such a rule gives this year's inflation a weight of one, and inflation in all earlier years a weight of zero.) Apply this rule to an economy with accelerating inflation, and

the result is as in chart 1. Expected inflation trails behind actual inflation. The forecasting errors follow a clear pattern: they are persistently negative and increasing.

Any backward-looking way of forming expectations implies that people will make non-random errors in predicting the future. For instance, suppose the price of oil suddenly rises. As higher costs feed through, other prices will rise as well. So a sudden jump in the oil price generally leads to higher inflation. The same goes for a big increase in wages, or a surge in monetary growth. The adaptive-expectations approach ignores such events; when inflation later rises, it says, people are surprised.

The crucial insight from the literature on **rational expectations** (RE) is this: people learn from their mistakes. If errors follow a pattern, they hold information that can be used to make a more accurate forecast. Rational people will get and use that information—hence “rational” expectations. The resulting

predictions might still be wrong. What matters is that the errors will be random, as in chart 2; they will contain no extractable information. The idea of rational expectations is often parodied as the claim that people have perfect foresight. Not so: people with rational expectations do still make mistakes, but not the same ones each time.

From Muth to Minnesota

The first paper on rational expectations was published by Mr John Muth in 1961 and attracted almost no attention. In the late 1960s, as the previous brief explained, the attack of Messrs Milton Friedman and Edmund Phelps on the old idea of the Phillips curve brought expectations back to the centre of the economic debate. Nonetheless, Mr Muth's work lay neglected for a few more years. Then, in 1973, Mr Robert Lucas of the University of Chicago published “Some International Evidence on Output-Inflation Trade-offs”.

Mr Lucas had set himself the task of showing how a Phillips curve—the idea that high inflation and low unemployment go hand in hand—can appear even in an economy where markets clear (in other words, where any unemployment is “voluntary”). To do this, the paper concentrated on the distinction between changes in prices overall and changes in the pattern of relative prices; it showed that if firms mistake a rise in overall prices for a rise in the price of the good they produce, they will increase their output. To get this result, Mr Lucas had assumed,

almost in passing, that expectations are rational.

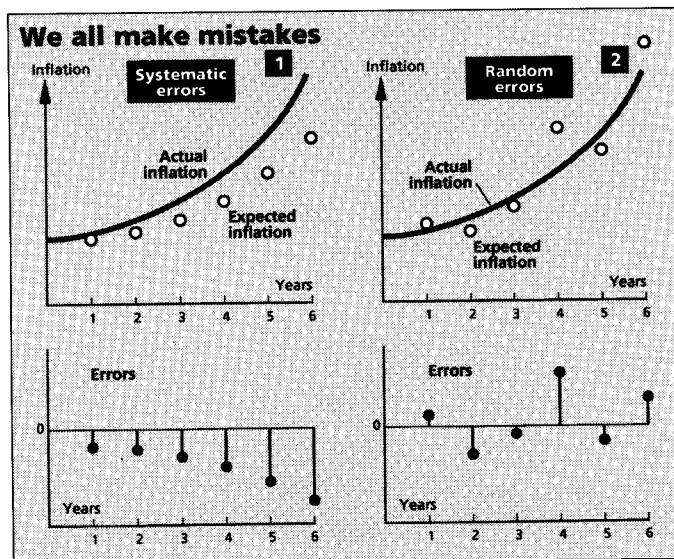
With Mr Lucas's paper, **New Classical** economics was born. But it took another article, in 1975, to drive home the extraordinary implication of the seemingly innocent RE theory. Messrs Thomas Sargent and Neil Wallace, both then at the University of Minnesota, astonished economists by offering what looked like a watertight argument to show that announced changes in monetary policy will have no effect on output and employment.

The idea is beguilingly straightforward. Remember that Messrs Friedman and Phelps had argued that expected changes in inflation have no effect on output and employment. Inflation increases employment by depressing the real wage, and this can happen only if the inflation is unanticipated.

Messrs Sargent and Wallace simply added rational expectations to the recipe. If a government announces that it will let the money supply grow faster from now on, people will immediately expect inflation to rise—and the Friedman-Phelps prediction is the result. The change in policy will not affect the “real” economy of jobs and output, only the “nominal” economy of prices. Hence the new idea was, into the bargain, a restatement of what economists call the **classical dichotomy**—the partition of the economy into separate real and nominal branches.

The Friedman-Phelps theory agreed that people can be surprised by changes in inflation. When this happens, a short-term trade-off between inflation and employment will appear. The Sargent-Wallace paper ruled this out for the case of an announced (or otherwise detected) change in monetary policy. There can be no inflation-employment trade-off, except perhaps in the shortest of short terms.

If true, **policy irrelevance**, as the Sargent-Wallace claim is called, would be both good news and bad news. Good news, because governments would be able to cut inflation costlessly. They could announce a plan to control the money supply more tightly; firms and workers would expect inflation to fall, and adjust wages and prices accordingly. There would be no need to suffer the unemployment that would be caused by an unanticipated tightening of monetary



policy. When it comes to fighting inflation, in other words, the Sargent-Wallace results make monetary policy more "relevant" than ever.

But there is bad news, too, because guidance for policymakers—such as "increase the money supply if the economy is about to slide into recession"—would be self-defeating. Such a policy would raise inflation but it would not save jobs.

Rationality on stilts

The paper by Messrs Sargent and Wallace confronted economics with a puzzle that caused something close to panic. In rational expectations, it seemed, economists had a plausible idea (people learn from their mistakes) with highly implausible implications (anticipated monetary policy has no "real" effects). Every self-respecting macroeconomist was drawn to debate the merits of rational expectations. Where does this debate now stand?

The evidence, as so often in economics, has proved inconclusive. The Thatcher government's early approach to economic policy was a test of sorts. In 1980 the government set money-supply targets for the years ahead and announced them as part of its "medium-term financial strategy". In spirit this approach owed a lot to the RE revolution, and to the stress it placed on the idea of **credibility**: a government's promise to reduce inflation, if believed, can be kept without forcing the economy into recession. But, as it turned out, Britain did suffer a recession—and a deep one—as a result of the government's efforts to get inflation down.

Remember, on the other hand, that the RE approach won converts partly because the earlier view had also been refuted. The trade-off between inflation and unemployment vanished in the 1970s, and the idea of backward-looking expectations went with it.

Also, RE theorists have an answer to the British counter-example. They can argue that the change in monetary policy affected output and employment because the government's announcements were not believed.

Fair enough—except that this begs the question of whether announced changes in policy can ever be as credible as the theory would then seem to require.

A theorist's revenge

THE basic idea of rational expectations may be simple; inserting it into a workable economic model is anything but. Macroeconomic models are highly interconnected, and therefore complicated. But that is not all. Consider inflation again. Prices in 1990 depend partly on expected inflation in 1991 (because that prediction affects, among other things, current pay settlements). In the same way, 1991's inflation will depend on expected inflation in 1992, 1992's inflation on expected inflation in 1993—and so on, to infinity.

To come up with internally consistent short-term forecasts of inflation or any other variable-to-be-explained, macroeconomic models that incorporate rational expectations have to be solved from here to the crack of doom. There are shortcuts, but the mathematics and the computing are formidable. For pure theorists this is an invitation, not a deterrent. For the applied economists who build big econometric models, it is a counsel of perfection. Their response to the RE revolution, by and large, has been to ignore it.

Which is a nuisance, because in 1976 Mr Lucas, in another path-breaking paper, explained why models that ignore the RE approach cannot be trusted to answer what-if questions. Models are driven by estimates of "structural parameters"—numbers that explain how variables such as inflation depend on others such as taxes and oil prices. The trouble is that these parameters can change when expectations change—ie, when policy changes. Every new policy invalidates the model.

Modellers still ask their computers what will happen if, say, America increases its money supply. The change in policy is plugged in and the model produces what economists call a **simulation**. Answers differ widely from model to model, but people continue (rationally?) to pay attention. The table shows simulations from DRI, Wharton Econometrics and the OECD—three of the most respected suppliers of forecasts. There is little hope of installing RE in these big models—not, at any rate, in a form that would satisfy RE theorists. The number-crunchers hope that the "Lucas critique", though right in principle, may not matter much in practice.

Effects of American monetary expansion*

Model	GNP†		Prices (%)		Net exports†	
	1 year	3 years	1 year	3 years	1 year	3 years
DRI	9.4	39.0	0.0	1.0	4.0	11.8
OECD	17.4	6.7	0.1	1.1	-1.0	2.3
WHARTON	6.0	13.6	0.0	0.2	-1.1	-1.8

Source: Brookings Inst. *M1 4% above baseline. †billions of 1972 dollars.

Even if a government embarks on an announced policy and sticks to it (which Mrs Thatcher's government did not), people will be understandably suspicious. They will continuously alter their judgment of the government's intentions, and thus their expectations of inflation and other aspects of the economy.

If so, it would be better to think of expectations as a range of outcomes with probabilities attached (a 20% chance that inflation will rise, a 10% chance that it will stay the same, a 70% chance that it will fall), rather than as a single outcome (inflation will fall). Building models with single-valued rational

expectations is hard enough (see box); incorporating many-valued expectations is much harder. This is one avenue for future research.

The RE idea has been challenged on theoretical, as well as empirical, grounds. Some economists have argued that, despite the New Classical insistence that macroeconomics should have sound microeconomic foundations, the RE approach has dodged the crucial question: how are expectations formed?

On one view, rational expectations implies that people use economic models to make sophisticated calculations about the future; on another, that peo-

ple absorb this information from experts by watching television and reading newspapers. The first interpretation cannot be right. The second is more appealing; unfortunately, it is also inconsistent, because the RE theorists think the "experts" in the City and on Wall Street who produce most economic forecasts are doing it all wrong.

On yet another interpretation, the RE idea is not, after all, a description of behaviour, but merely a rule of good conduct for economic modellers. It is simply untidy, on this view, to have a model that requires people to have expectations that are themselves inconsistent with the model's forecasts. This defence makes no claims for the "realism" of rational expectations or, it must follow, for the realism of any models in which the idea is embedded. The response of most economists and all non-economists to that is: then why bother? The pursuit of theory as an end in itself is a good way to kill economics.

Don't look back

Despite all the difficulties, one clear conclusion has emerged. The claim that anticipated policy is irrelevant to the real economy, along with most of the other distinctive verdicts of the New Classical school, does not stand or fall on the assumption of rational expectations.

As the next brief will show, it is possible to put rational expectations into a macroeconomic model and still obtain results that Keynes would have liked: monetary policy affects the real economy and, at least in the short term, governments face a trade-off between inflation and unemployment. It turns out that the plausible insight of rational expectations need not yield implausible conclusions after all.

Despite the fuss, the quarrel over policy between the New Classical and New Keynesian camps hinges not on the assumption of rational expectations, but on another idea—that markets always clear. This is the issue that now divides macroeconomists. The New Keynesians see rational expectations as a better working assumption than backward-looking theories; developing the idea is high on their research agenda. In this sense, at least, Messrs Sargent and Wallace have won the argument.