

The challenge to economic stabilization policy

Rational expectations

Prepared for Federal Reserve System Advanced Development Conference, Boxborough, Massachusetts, September 18, 1980.

Economics has been described as the science of the allocation of scarce resources amongst alternative uses. In studying this allocation process, economists have often found it useful to impose the assumption of "rationality" upon economic decision-makers. Thus, in analyzing consumer behaviour it is generally assumed that consumers respond to changes in income and the relative prices of goods by purchasing that bundle of goods that maximizes their well being, subject to a so-called budget constraint. Likewise, the study of the behaviour of business firms is largely based on the assumption that firms adjust output and factors of production—labour and capital—in response to changes in output and factor prices in order to maximize profits. The common thread running through these approaches is the assumption that economic agents respond in a "rational" and, therefore, predictable manner to changes in the economic environment.

The application of rational expectations to the study of aggregate relationships in the economy merely represents an effort to extend the methodology of the theory of the consumer and of the firm—or microeconomics—to macroeconomics. The main thrust of rational expectations research, beginning with Robert Lucas' seminal paper in the early seventies, has been directed against stabilization policy, the crown jewel of Keynesian and, to a lesser extent, monetarist, doctrine. At the moment there is no clear-cut winner in the debate over the efficacy of stabilization policy. But rational expectations research has raised the important question whether frequent policy changes seeking to stabilize output growth have instead served as a destabilizing force in the economy. This question is now being studied by increasing numbers of scholars in academe and the government.

After describing the principal feature that distinguishes rational expectations from established doctrine, this paper sketches the simple analytics behind the rational expectations position and the policy implications that arise from assuming rationality. Then the counter-attack against the rational expectations challenge is examined. In the final section, the rational expectations response to this counter-attack is presented.

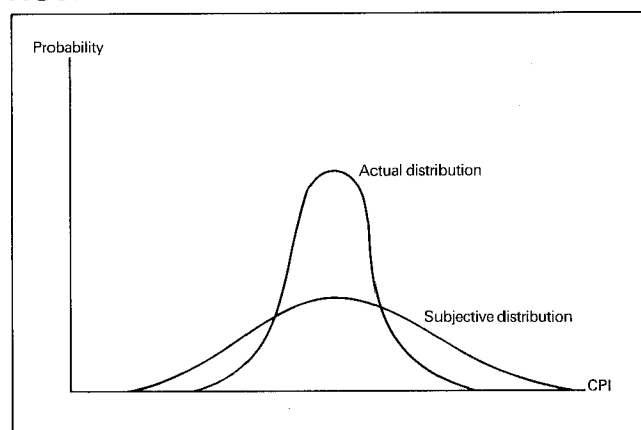
WHAT DISTINGUISHES RATIONAL EXPECTATIONS FROM OTHER MACRO APPROACHES

The key feature of the rational expectations approach to macroeconomics is the assumption that economic agents do not make *systematic* mistakes in forming expectations about future events. Technically, it is assumed that the subjective probability distribution of an economic agent for any given event is equal to the actual probability distribution plus a random error term. The variance of this error term depends on how much information is available to the agent. When less information is available, the variance will tend to be larger.

This key idea is illustrated in Figure 1 below. Shown is the actual probability distribution of outcomes for an economic event, in this case the rate of increase in the CPI next year.

Also shown is the subjective probability distribution for a representative economic agent. Notice that this distribution reflects much uncertainty on behalf of the economic agent because it is so "flat" and spread out. This is because the agent does not have a lot of information. But notice also that the distribution is centered on, or has the same "mean" as, the actual distribution. This is because the agent, though relatively uninformed, utilizes efficiently that information that he does have. This is the essence of rational expectations.

FIGURE 1



As is clear from the illustration, rationality does not require that agents have perfect foresight. On the contrary, they need not possess a lot of information on the structure of the economy. And they can make a lot of mistakes too. But if they are rational, they cannot be *systematically wrong*. In terms of the illustration, the subjective probability distribution of the representative economic agent must only be centered around the actual distribution—i.e. the distribution that is consistent with all publicly available information.

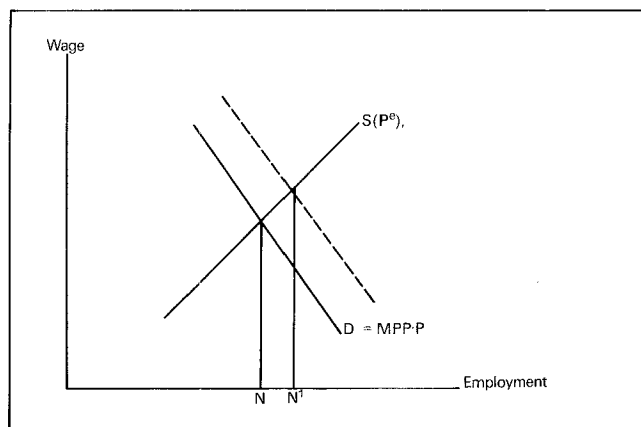
A MAJOR POLICY IMPLICATION

The simple assumption that people can't be systematically fooled has a very powerful policy implication, namely that stabilization, or "activist", policy actions that are anticipated by economic agents will tend to be ineffective. Keynesian doctrine takes the position that during periods of sluggish economic activity stimulative policies¹ ought to be implemented in order to move the economy back toward full employment. And when the economy is growing too rapidly, policies ought to be tightened. Though rational expectationists do not deny that such policy actions, even if anticipated, can affect real output and unemployment, they would argue that these effects are likely to be different from those expected on the basis of past experience and much smaller than expected.

¹The word "policy" is used here and hereafter simply to indicate a monetary or fiscal action, such as the lowering of interest rates or the cutting of taxes. These actions can be part of a coherent policy and, technically, do not necessarily represent a "policy change". We shall use "policy change", however, in the loose sense to describe these actions.

Another simple illustration can help to clarify this point. In Figure 2 the labour market is depicted by supply and demand curves for labour. The supply of labour is shown to be an increasing function of the wage rate and the demand for labour a declining function. The height of the supply curve depends on price expectations: when price expectations are higher, the supply curve will be higher (workers will demand higher wages). The height of the demand curve depends on the value of output of workers – i.e. the marginal revenue product of workers, which is equal to the marginal physical product (MPP) times the price (P) of output. The level of employment is determined by the intersection of the two curves, in this case at “N”, where the marginal revenue product of labour is just equal to the wage.

FIGURE 2



Now suppose the monetary authority increases the rate of growth of money. Prices will begin to rise and the marginal revenue product of each worker will increase. This is shown in the figure by the upward shift in the demand for labour curve (to the dashed curve). If workers believe that this increase in the demand for their services reflects a shift in the demand for goods they are producing as opposed to a general increase in the level of all prices, they will respond by offering more labour, and employment and output will rise (in this case to “N’”). But notice that for employment to rise in this case, workers had to be fooled – i.e. they had to believe that the increase in demand was not related to an overall rise in all prices, but to a rise in the relative price of goods they produce. As a result of this error – and it is an error in expectations of future prices – workers ended up working for lower “real” wages than they expected.

If workers recognize that the rise in demand for their services is merely related to an overall increase in prices, they likely will respond differently. They will seek higher wages to offset the rise in the cost of living. In terms of the figure, the labour supply curve will shift up. In fact, if the rise in inflationary expectations is equal to the actual rise in prices, the upward shift would be equal to that of the rise in the demand curve. In that case there would be no employment gain, only higher prices.

The reaction of workers to the policy stimulus is thus of critical importance in determining whether the stimulus principally will produce higher employment (with employed workers labouring for a lower real wage), or higher prices. If expectations are formed rationally and *if the policy change was anticipated*, the stimulus would have little effect on output. This is because workers *on average* would guess the magnitude of the price rise associated with the stimulus and would seek to protect themselves against this rise by bargaining for higher

wages. Established doctrine, in contrast, has often contended that these guesses of the inflation impact of the anticipated stimulative policies would *on average* be wrong. And they not only would be wrong on average, they would be *systematically* too low. Workers for a time would then work for lower real wages, which in turn would provide business with profit incentives to hire more workers.

Thus the response of the economy to anticipated policy changes can depend to an important extent on whether economic agents can be systematically fooled. Traditional doctrine, in arguing that such changes in policy will have predictable and meaningful effects on real variables, has taken the view that economic agents are not smart enough to figure out the implications of anticipated policy changes. Rational expectations, on the other hand, take the position that, though agents will often be wrong in assessing the impacts of an anticipated policy change, their errors will cancel out over time. According to this view, the real effects of anticipated policy changes will, on average, be largely offset by agents acting in their own best interest.

Countercyclical policies systematically applied over many business cycles by the authorities will come to be anticipated by economic agents. The rational expectations view is that such policies will largely affect prices and will, on average, have little effect on output. Countercyclical policy actions, rational expectationists believe, should be avoided. Instead, well-defined and predictable policies should be established by the authorities. The Federal Reserve should announce a policy path for some instrument under its control, say money, and stick to it. Similarly, the fiscal authority should announce a policy for taxation and expenditures and then carry that policy out.

CHALLENGES TO RATIONAL EXPECTATIONS

Opponents of rational expectations have many reasons for objecting to these policy implications. Four major criticisms of rational expectations are discussed below.

Rational expectations cannot explain the business cycle

The idea of rationality at the macro level, particularly in labour markets, was rejected until the early 1970s as being inconsistent with the evidence that a positive correlation seemed to exist between inflation (stimulative policies) and output. If people cannot be systematically fooled, then how can such a correlation exist? Lucas, however, demonstrated that such a correlation could exist even if economic agents were rational. This correlation, Lucas showed, could result from the expectational errors described in the previous section, not from agents being irrational or stupid. According to Lucas, the faulty price signals received by economic agents who have been fooled by policy changes could cause output and employment to deviate from their trend paths.

Much of the debate over rational expectations, and indeed most of the empirical work seeking to “test” rational expectations, involves the question whether such expectational errors can account for the swings in unemployment and output regularly observed in the economy. The tests usually take the form of examining the coefficients of an equation of the form:

$$y_t = y_t^* + \sum_i b_i (m_{t-i} - m^{e_{t-i}})$$

where y is output (or unemployment), y^* is the trend level

of output (or unemployment), m is some measure of the money stock, and m^e is the expected level of money (prices and price expectations are often used instead of money). This equation tries to test whether fluctuations around the trend level of output can be explained by expectational errors – i.e. by deviations of m from m^e . When m exceeds m^e , policy is more stimulative than expected and output rises, and vice versa.

Unfortunately, the problem is far more complicated than it appears and convergence toward a consensus judgement on this important issue has not developed. The doubting reader is referred to a burgeoning body of empirical research by such scholars as Thomas Sargent, Christopher Sims, Robert Barro, Frederic Mishkin and others.

Rational expectations assumes that economic agents have to know too much

This criticism is based on the erroneous belief that economic agents must have a lot of information to be rational. The first illustration (see Figure 1) demonstrated that agents do not have to possess a lot of information; they only need to efficiently utilize that information that is available. Put another way, the subjective probability distribution of a representative economic agent need only be unbiased, given publicly available information, for rationality to hold. It is not necessary for the variance of that distribution to be small.

Relative price changes in a rational world with durable goods in various stages of completion can cause changes in output

Suppose the Fed purposefully pushes interest rates to levels below Regulation Q ceilings and that this action is widely anticipated by agents. Maintaining rates below Q ceilings increases the inflow of funds into commercial banks and thrift institutions, thereby lowering real consumer financing costs of durable goods. This lowers the total cost (purchase price plus financing) of consumer durables. But by diverting funds away from businesses, the total cost of capital goods will tend to rise after account is taken of the higher finance charges.

In a perfectly efficient world with zero transactions costs and perfect substitutability between factors producing durable goods for consumers and for businesses, such a change in relative prices would not alter total output. As prices of consumer durables are bid up, factors of production would be transferred from producing business capital goods to producing consumer durables. Production of consumer durables would rise and that of business capital goods would decline by a like amount.

But suppose it is costly to cancel partially completed investment projects. Then as workers are bid away from capital goods projects, businesses will be willing to employ more high-cost marginal workers to replace departing workers to ensure that partially completed projects are finished. Thus, output in capital goods would fall initially by less than the rise in output of consumer goods. Even though nobody was fooled by the drop in rates, output rose temporarily as a result of the more “stimulative” policy by the Fed.

Anticipated policy changes can produce real effects through the existence of worker contracts, even in a rational world

If workers, seeking to eliminate the risk associated with unanticipated fluctuations in wages, enter into contracts establishing a fixed rate of wage increase over a specific period, a stimulative monetary or fiscal policy can produce

an increase in output even if the policy is announced in advance and believed (though not if it is announced before contract terms are agreed upon). As prices rise as a result of the more stimulative policy, business firms will find the value of products produced by workers exceeding the wage cost of production. This is because the wage, or the rate of increase in wages, is fixed by contract. This creates profit opportunities for businesses to hire more workers and increase output.

In terms of Figure 2, the marginal revenue product curve moves up in response to the more stimulative policy, but the labour supply curve is fixed at some preagreed-upon level. Of course, increased indexing of contracts would reduce this real effect of policy changes because indexing would automatically push the labour supply curve up in response to a general increase in prices.

THE RATIONAL EXPECTATIONS RESPONSE TO THE CRITICISMS

The first two criticisms dispute the claim that economic agents are rational, at least at the macro level. The latter two point out that even if agents are rational, anticipated policy changes can have real effects on output.

How would a rational expectationist respond to these criticisms? The first two seem the weakest. Rationality does not require that people need to know a lot. It requires only that agents efficiently utilize whatever information is available, and does not require that they “know” the structure of the economy. The criticism that expectational errors cannot explain fluctuations in output is still an unsettled matter. Some of the empirical research on this issue – especially that by Sargent and Barro – offers marginal support for the rationality assumption and its policy implications. But even die-hard rational expectationists would admit that research on this difficult question is not conclusive.

The third and fourth criticisms involving contracts and multiple production-period durable goods certainly have merit in demonstrating that anticipated policy changes can have temporary real effects on the economy, even if agents are rational. But rational expectationists really have not argued that anticipated policy changes are strictly neutral. They argue, instead, that the effects of an anticipated policy change on real variables are smaller than traditional doctrine would indicate and less predictable.

If it is granted that the world is rational, should stabilization policy be based on the existence of things like inventories of partially completed durable goods? Aren't the channels through which anticipated policy changes effect the economy much more complicated than once thought in such a world? Won't the outcome of an anticipated policy change be less predictable and less powerful than thought? Rational expectationists would answer in the affirmative.

The case against depending on the real effects arising from rigidities in the economy resulting from contracts and other voluntary risk-reducing actions by agents, rational expectationists would argue, is equally compelling. These real effects result principally from *fooling* economic agents, and this raises the question whether such temporary gains in employment and output are not bought at a very high long-term cost in terms of the government's credibility.

This criticism can be extended to unanticipated policy changes. Such changes not only compromise the credibility of the government, but introduce “noise” into the information being transmitted to economic agents. Since “clean” information is essential to the efficient

operation of a market economy, such unpredictable changes in policy will tend to divert resources away from normal production and toward efforts designed to hedge economic agents against unexpected policy shocks.

Given the unpredictable nature of the response of the economy to anticipated policy changes, the dubious morality of fooling economic agents, and the diversion of

resources from productive uses arising from unanticipated changes, the best course for policy to follow, according to the rational expectations view, would be to announce a policy in advance and then stick to it. This approach would provide a stable framework for private decision-making and would thereby enhance the stability and enlarge the level of output.