Tradeoffs in Monetary Policy

1. Phillips Curve

In 1958, W. A. Phillips came up with an empirical negative relation between the rate of inflation and the level of unemployment, quickly christened the Phillips curve (Phillips, 1958). Phillips himself did not present the curve as a policy tool, but a mere two years later Paul Samuelson and Robert Solow published a celebrated article in the *American Economic Review* (1960) in which they did. Given the long period for which the Phillips curve appeared to hold in Britain, Samuelson and Solow concluded that it could be treated as a long-run structural equation which provided the missing equation that the then conventional Keynesian system needed. They treated it as a menu from which the monetary authorities could choose. By tolerating higher inflation they could experience lower average unemployment and vice versa.

2. Friedman/Phelps

In 1966 and 1967, W. A. Phelps and I criticized that approach, arguing that the Phillips curve was a short-term relation.(Friedman, 1966, 1968; Phelps, 1967). In the long run, there was a natural rate of unemployment which could be combined with any level of inflation. The long-run Phillips curve was vertical. Inflation was a monetary phenomenon, not a real phenomenon.

The great inflation of the 1970s, labeled stagflation because both inflation and unemployment rose together, was a dramatic confirmation of the natural rate of unemployment view. That view became conventional wisdom in the monetary policy community.

3. The Taylor Curve

In 1979, John Taylor published an article that was to launch a fresh line of research. Its main objective was to estimate a simple general equilibrium model of the U.S. economy

incorporating rational expectations (Taylor, 1979). Taylor then sought to use his model to judge and develop monetary policy.

He concluded, "There is no long-run tradeoff between the level of output and the level of inflation in the model—the Phillips curve is vertical in the long run. However, there is a long-run tradeoff between fluctuations in output and fluctuations in inflation. In other words, there is a 'second order' Phillips curve which is not vertical in the long run"(Taylor, 1979, p. 1280).

This comparison of the Taylor curve tradeoff with the Phillips curve tradeoff is not valid. The Phillips curve was based on empirical evidence, which was interpreted as reflecting a cause-effect relation: an increase in inflation will lead to a decline in unemployment (or as Irving Fisher interpreted a similar relation in the 1920s: an increase in unemployment will lead to a reduction in inflation).

The counterpart of the Phillips curve in terms of variability of Inflation and output would be an analysis of the observed relation between the two as in the accompanying chart 1 based on annual data for the United States from 1879 to 2005. Clearly, the observed correlation between the variance of unemployment and the variance of inflation is generally positive, not negative. There is no sign of the kind of tradeoff offered by the Phillips curve.

The tradeoff in the Taylor curve is not an inference from experience. It is an implication of a policy choice. The central bank is assumed to have two objectives: an inflation target and an output target. It seeks to minimize a loss function that is a weighted average of two terms: one based on deviations from the inflation target, one based on deviations from the output target. A zero weight on the output term reduces the bank's objective to inflation alone. Similarly, a zero weight on the inflation term reduces the bank's objectives to output alone. As the weight varies between these two extremes the bank's objective shifts. Corresponding to each weight there is a

policy rule that is optimal for the Taylor economic model. This policy rule will in turn imply for that model a variance of inflation and a variance of output. Understandably the greater the weight on inflation, the lower the implied variance of inflation and the higher the implied variance of output. Increase the weight for output and the implied inflation variance goes up, the implied output variance goes down. Plot these points on a chart and they generate an efficiency frontier showing a tradeoff, but only for optimum monetary policy. Moreover, that curve will be different for every assumed economic model and at its best is based on a rough approximation of the way in which the economy works. Three or four estimated equations are crucial for the Taylor economic model but the economy as a whole is determined by millions of equations. At most, we could hope to get a rough picture of it.

4. The Taylor Rule

The instrument used by the Federal Reserve to control monetary policy is the federal funds rate—the overnight rate charged by banks to one another. The Open Market Committee of the Fed specifies a target federal funds rate and uses open market and other operations to keep the market rate equal to the target rate. Taylor accepts this setup and develops a Taylor rule for the target rate. The rule gives the target rate as the algebraic sum of three terms: (1) estimated long-run equilibrium real federal funds rate at the levels of inflation and output chosen by the Fed; (2) the deviation of inflation from its target rate multiplied by a coefficient; (3) the deviation of output from its target rate multiplied by a coefficient. The coefficients of the final two terms are in turn the product of two numbers: (1) the reaction of the target rate to the deviation of inflation or output from the target; (2) the fractional importance attributed to each of the objectives.

The rule thus embodies the idea of a policy tradeoff. Give 100 percent of the weight to preventing inflation and the recommended real interest rate will be affected only by inflation deviations and will not react to output deviations. Similarly, give 100 percent of the weight to the output term and the recommended real interest rate will react only to output deviations. Fractional weights will lead to intermediate results.

I believe that it is a mistake to treat the Fed as having two separate and independent objectives. The Fed exists to define a monetary system. In my opinion, it has one and only one function: to keep the price level steady. The price level and inflation are monetary phenomena. They are defined by what happens to the quantity of money relative to output. Output is a real magnitude, not a monetary magnitude. Treating the Fed as having two separate objectives is an open invitation to engage in fine-tuning, something that has almost always proved a mistaken practice.

My own preference for an instrument has always been a nominal monetary aggregate. Taylor estimates in his article the effect of a policy of a constant percentage increase in the quantity of money. He finds it "interesting that this simple rule gives an output variance (for his economic model) considerably below the actual U.S. performance" (1979, p. 1282). I do not find that surprising at all. If, as I believe to be the case, inappropriate fluctuations in the quantity of money produce inappropriate fluctuations in output, keeping money growth constant would eliminate such inappropriate fluctuations in output.

On this interpretation, the Taylor rule is an attempt to specify the federal funds rate that will come closest to achieving the theoretically appropriate rate of monetary growth to achieve a constant price level or a constant rate of inflation. On these lines, the inclusion of the deviations in output from a target rate is not justified by a secondary objective of the Fed. It is rather to be

justified by the inadequacy of inflationary deviations alone to generate the appropriate fluctuations in money. Suppose the federal funds target rate is equal to a Taylor rule that gives 100 percent weight to inflation deviations. That may not be the right rate to achieve the desired inflation target because other variables such as output or monetary growth are not at their equilibrium levels. On this view, additional terms in the Taylor rule would reflect variables relevant to choosing the right target funds rate to achieve the desired inflation target.

5. Monetary Variability

I add two charts to bring out the role of monetary variability—the one item that central banks can control. I have used M2 as the monetary aggregate, though it may be that the base or some intermediate total would be a better instrument.

Chart 2 is a scatter diagram of lthe variability of M2 and the variability of real GDP –total output. The measure of variability is a the log of a moving standard deviation of successive 10 year periods. There is clearly a strong positive correlation extending over the whole of the period.

Chart 3 shows the same data as time series. It brings out the sharp break between the period up to the end of the 1970s and the rest of the period.

The collapse of the variability of output is clearly an effect of the collapse of monetary variability. In my opinion, the same results could have been obtained at any earlier time and can continue to be achieved in the future. What is involved is not a tradeoff but direct cause-effect.

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Chart 1:
Variability of inflation vs variability of real income

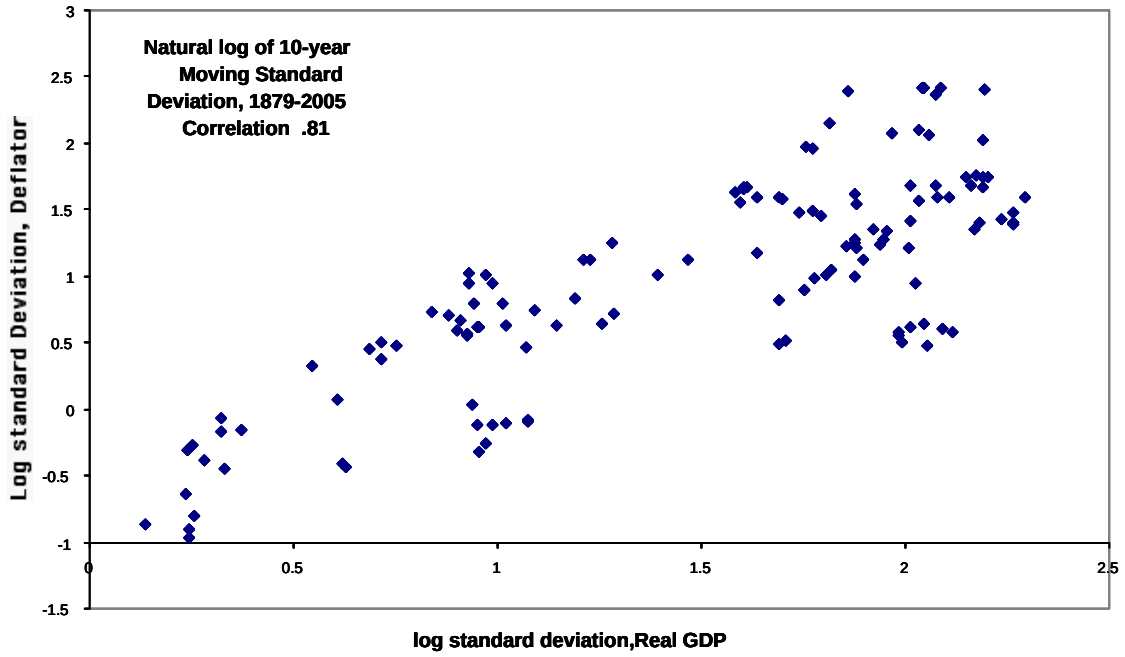

Chart 2. Variability of monetary growh and variability of output growth
Correlation = .79

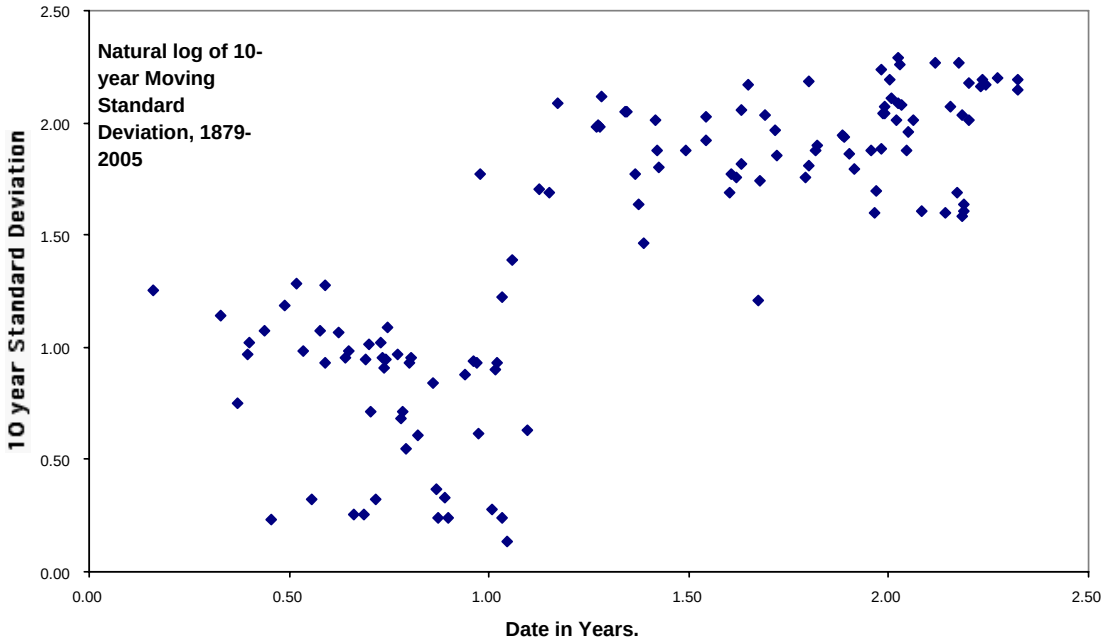

Chart 3.. Standard Deviation of money growth and real output growrh