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SOME RANDOM THOUGHTS ON CENTRAL BANKING: THE ART AND SCIENCE OF MONETARY POLICY IN TRANSITION

It is a genuine pleasure to be here this afternoon to participate in the University's Distinguished Lecture Series on Banking and Monetary Policy. My associates in this Series certainly provide any measure of humility I might need. As a former Dean and now as a participant in the monetary policy process, I am painfully aware of the explosion of economic knowledge over the last several years, although I have to admit there is a considerable portion of it that I have difficulty reading; some that I have read, but have difficulty understanding; and much of which I haven't even attempted. The real confidence I have is the feeling that I approach my topic from a position of studied ignorance and it's been more than a bit presumptuous of me to accept this assignment. In addition, my academic interests over the years were focused primarily on the capital market area, and my strong biases will undoubtedly show through this afternoon.

After having served 10 years as a Director and Chairman of the Federal Reserve Bank of Philadelphia and being reasonably familiar with the System, I'd like to share the general observation that there is considerably more to the job of being President of a Federal Reserve Bank than formulation of monetary policy. I find myself literally drowned in the flow of paper, problems, and ideas. In my varied role, I range from the conscience of the community to Rotary Club entertainer, while also dealing with 1,400 individuals all with human cares and concerns. As a

corporation executive, I face nearly 500 stockholders with their individual problems. Sometimes my problems are humorous and sometimes frightening. For example, I was recently called upon in the middle of the night to arrange bail, because a stranger heard the Bank is a public institution with a legal staff.

My first reaction to the System was that its complex makeup bears a great deal of resemblance to a University structure. Consequently, I felt right at home. The seven member Board of Governors in Washington acts much like a central administrative authority in a University, and the 12 banks and their 24 branches are scattered much like individual schools, each with its own strivings for independence and autonomy. The Open Market Committee is, of course, a major vehicle for developing monetary policy. The seven Governors and 12 Presidents are talented individuals--extremely well qualified--and they generate both ideas and sometimes confusion. In many respects it seems a little like being back at faculty meetings. Some come in with predetermined positions; some come ready to vote depending on the persuasiveness of the arguments presented. Like all committees the differences often dissolve at the voting stage. The differences that you will observe from time to time, however, may not mean what they seem--members vote against a recommended action because a move did not go far enough, not that they were opposed to the nature of the action.

After my hectic first six months on the inside, I appreciate this opportunity to step back and take a look at the economic framework and

linkages through which stabilization policy, particularly monetary policy operates. Specifically I'd like to sketch some random thoughts on central banking. Obviously, I'm the first to recognize that these conclusions may be significantly different in another six months.

Overall, though, central banking is exciting. Operationally, we must keep abreast of changing times. In fact, we must do more than keep abreast, we must anticipate and initiate change. This applies both in our daily operations and in our policy activities. For example, a program of computer entry for Treasury securities is eliminating an enormous volume of paper storage and handling to permit more efficient Fiscal Agent and bank service operations. In a broader context, we are in the process of establishing regional check processing centers--possibly including one here in Columbus--that will allow one-day clearing of almost all checks written in the United States. These changes in the payments mechanism are one more step in the evolution toward electronic money flows--science fiction is becoming reality. In a different area, decisions made in regulating and supervising member banks have a major influence on market structure and the future character of the banking business.

But my major concern this afternoon is with monetary policy. A simple statement of the complex problem I want to consider is: How can the central bank decide what policy actions to take? One of the complexities involved in this question is a pluralism in our concept of the national economic policy goals of a central bank. On the one hand, the central bank

is thought of as a conservator of orderly markets--meaning financial markets in which prices and quantities are tolerably stable and dependable in the short-run. On the other hand, the central bank is thought of as the implementor of broader national economic policies seeking price stability, economic growth, full employment, balance of payments equilibrium, etc. These two major roles rarely conflict in the long run, but much of the art of central banking lies in arranging a comfortable combination of the two in the short run. As you are painfully aware, the desired levels of these broader economic variables are not always mutually consistent, and trying to bring them into a common focus can produce a bad case of schizophrenia. A second related complexity involves the mix of judgment and rule, or art and science, or horse sense and quantification, or perhaps just pure luck used in policy decision making. As the science of economics has progressed, so the art and science of central banking have changed. These two themes--the plural objectives of central banking and the transition and the current status of central bank decision making--are the focus of my remarks today.

The multiple role of central banking in the United States can be traced historically from the century preceding creation of the Federal Reserve System through the evolution of the Federal Reserve to its current position. During the 19th century, the gold standard mechanism represented an automatic instrument, which may be thought of as the historical counterpart of modern Federal Reserve Open Market operations. Gold

flows had a dominant influence on the stock of high-powered money and thereby influenced national economic conditions, but the flows were conditioned by market forces and the happenstance of mineral discoveries rather than by any focus on national goals. Moreover, it was left to the several states to address the problem of creating and maintaining orderly financial markets. After the demise of the 1st and 2nd banks of the United States, and even after the National Banking Act, the only available tool was the Treasury's manipulation of its cash balance, which was largely ineffective in preserving orderly financial markets during periods of cash shortages and stringency.

After the panic of 1907, concern for financial and economic stability led to establishment of the Federal Reserve. The System was designed to prevent financial panics and economic instability by establishing a discount mechanism that would provide an elastic supply of currency in response to seasonal or erratic needs. That is, the founding of the Federal Reserve gave the country a dependable lender-of-last-resort, prepared to lend at the discount rate. The level at which this rate was set was the Fed's principal policy instrument. During the early years of the Federal Reserve and the latter years of the gold standard, the price at which the Fed would lend--the discount rate--was based primarily on international considerations, especially on the flow of gold into and out of the country. However, the collapse of the gold standard system during and after World War I soon made gold flows irrelevant as a guide to policy action. The

theory behind this approach proved faulty on other scores, as you well know.

By 1923, the Federal Reserve recognized the necessity for replacement of this gold standard approach to policy determination, by then the tools included both the level of the discount rate and newly developed Open Market operations. As evidenced in the System's Tenth Annual Report, the new basis was that policy be set with the aim of influencing national economic conditions. Admittedly, Fed policy statements were strongly influenced by the "Real Bills Doctrine" during this period, but the point I wish to make is that policy was to be set on the basis of economic conditions. It was presumed the result would be best if the Fed monitored information from all sectors of the economy and then responded on the basis of the collective judgment of the policy makers.

The possibility of conflict between preserving order in particular financial markets (the original aim of the Federal Reserve) and pursuing other national economic goals--in particular, an adequate rate of growth of output--became a painful reality in the latter years of the 1920's. The System was caught on the horns of the dilemma of restraint to dampen speculation in the stock market and stimulus to counteract sluggish business conditions. The outcome for the stock market and for the economy needs no comment. One result of the experience was the later legislation adding margin requirements to the tool kit of the System. In passing, let me add that other regulatory changes have occurred that affect less visible,

but still important, goals of the System. For example, Regulation Q and the extension of reserve requirements to a broader class of liabilities have equity implications for banks and other financial institutions. As a result of the accumulation of regulatory devices since 1913, the Federal Reserve is now in a slightly better position to pursue multiple objectives because it can match tools and goals slightly better than it could by relying on any single mechanism. However, some of the additional regulations may in fact be neutralizing, leading to demands for their elimination and a return to simplicity.

The depression era, between 1931 and 1941, was one that at least superficially would seem to have caused the System little difficulty in jointly pursuing the objectives of orderly markets and other national economic goals. Perhaps we can be criticized for our lack of aggressiveness in this period. However, by 1937 it appeared--probably mistakenly--that disorder had a new guise, in the form of sloppy markets--specifically, too many excess reserves in the banking system. Raising reserve requirements was the obvious way to remove the problem, and this was probably a contributing factor in the ensuing recession of 1937-1938.

During and after World War II, the Treasury's concern for floating debt at low cost was the basis for a ten-year period when the Federal Reserve temporarily forsook any continuing concern for other national goals and concentrated almost exclusively on maintaining stable prices and yields on U. S. Government Securities. With the exception of minor adjustments

in the support prices at which the System operated in the market, it was not until the "Accord" in 1951 that the Federal Reserve once more could actively pursue other national economic goals--as by then set forth in the Employment Act of 1946--with only an over-the-shoulder glance to assure itself that there were no disorderly market conditions to be corrected.

Since 1952, the Federal Reserve has continued to pursue a shifting combination of goals by a qualitative, judgmental decision process that has brought movements toward ease or restraint as dictated by whatever goals were being pursued. Now, twenty years after the "Accord", the debate over an appropriate decision-making process still continues, both within the central bank and between central bankers and academicians. However, the debate has taken on a new aspect within the last decade, and I would now like to explore this new aspect in some detail.

Until the 1960's, the central bank had to use a marginalist decision process such as I have just alluded to, a process of "leading against the wind." That is, if conditions called for stimulus, the System would ease incrementally, wait, and see whether conditions were responding; if conditions were not judged to be responding adequately, it could then ease some more, if the behavior of related variables allowed further ease. But experience was beginning to point up the problem that the winds might be blowing in several different directions more or less simultaneously. Now, however, as a result of an outpouring of imaginative quantitative macro economic research, the System is being urged to adopt a fundamentally

different approach to decision making. Instead of moving incrementally "against the wind"--and tornadoes require rapid shifts in position--until the wind dies down and goals are achieved (or overshot), the System is urged to estimate the size of policy action required to get the economy back on 'track' and to move straightaway to take that action. Instead of deciding the direction in which incremental policy steps should be taken, the System is urged to decide on the direction and quantity of action to achieve national economic goals.

This urging is not the same as that of the proponents of a simple "rule". A "rule" is the antithesis of discretionary policy and requires a conviction that the economy would be more stable if policy were stable than if discretionary policy attempted to offset instability in other sectors. The more recent development does not envision abandoning discretionary policy, but substitutes a quantitative decision rule for the traditional marginal adjustment process.

This distinction, between a marginal policy decision rule and a quantitative policy decision rule, is perhaps less clear-cut than my simplified statement of it implies, primarily because the adjustment of financial and real business conditions to policy actions is not instantaneous, nor does it operate through mechanical linkages. This is one reason why policy sometimes seems to have a tendency to "overshoot" cyclical turning points; by the time the turning point is recognized, a change in direction of policy is overdue--perhaps long overdue. Estimates of the length

of lag in the impact of monetary policy are crucial if timing of policy is to be improved. The econometric models that have been developed to provide such estimates for a marginal decision process may be the same models one would use to estimate the quantity of policy actions needed under a quantitative decision rule. In addition, given that the effects of policy lag behind policy actions, there can be no guarantee that a marginal policy decision process will adjust in large enough increments to catch up with or modify rapidly changing economic conditions. For example, in a situation of rapid economic expansion, marginal upward adjustments in the rate of growth of money and credit may be smaller than required to accommodate the expansion and prematurely constrain the growth of income and output. Some quantitative estimate of policy action is required to avoid this problem; therefore, an intelligent marginal decision process must rely on econometric models.

However, a useful distinction can still be made between a marginal decision process that employs human judgment, informed by models, and a quantitative decision process that employs models, perhaps informed by some human judgment. The thrust of much of the criticism of central banking--especially in the United States--suggests that the central bank should adopt some quantitative indicator--such as a measure of interest rates, bank reserves, or some other aggregate--and that policy action be designed to achieve the value of the adopted indicator because an econometric model shows that a particular goal variable can thereby be achieved--

frequently, the rate of growth of output. This does not seem to me to be an appropriate policy decision process--not because it is impossible to implement, but because it is inappropriate, for reasons I will spell out in some detail.

How could the central bank implement an explicit quantitative decision rule? The modern theory of "policy science" provides a useful guide that, with some heroic computational work, might be illustrated in the following steps:

First, so we are told, we must specify our goals.

Second, we must estimate our model.

Third, we must solve the model for the values of instruments required to achieve our goals, subject to constraints on the values of instruments and certain other economic variables such as an orderly market range for rates of change in interest rates.

My point is that in attempting to follow this prescription, we encounter critical unresolved problems in the process. What goals should we seek? What instruments should we employ? What models should we use? What constraints should we impose? These problems form the basis of the reasons why I feel we cannot adopt a mechanical quantitative policy making process. Let's consider them one-at-a-time.

Goal Specification. Our first problem is that some goals conflict and some are complementary. Occasionally it may be possible to achieve conflicting goals by using policy instruments with differential impacts--

margin requirements might have been a valuable weapon in the late 1920's--but, in general, monetary policy is a single policy weapon that cannot achieve conflicting goals. Hard choices or painful compromises must be made among conflicting goals requiring sensitivity to the national mood. Trade-offs among conflicting goals change over time. For example, as economic conditions change, financial market participants may react differently to policy actions in the short-run; as fiscal or exchange rate policies change, the economy will respond differently to monetary policy actions.

There would be an enormous research and computational burden involved in estimating, and re-estimating every few weeks, the trade-offs among goals, among constraints and goals, among instruments, and I suppose, among models. In addition, quantification and modeling inevitably require simplification of relationships and uniform treatment of diverse events and conditions. We do not know precisely who is helped and hurt by policy actions; what real and financial markets will respond, with what lag, to policy action. Given what we do know, as represented by our data collecting and econometric abilities, we cannot foresee events in sufficient detail to ignore impressions and judgments, unstructured reports and "feel" of current events for me to trust a quantitative decision process, simple or complex, exclusively. However, I do not wish to overemphasize this aspect of the complexity. Within the Federal Reserve System, extensive policy simulation with econometric models takes place, and more will take place as time goes on. In addition, the wealth of competing models, goals, instruments, and constraints suggests the

fertility of this whole field for research by academic economists as well as by the central banking staff. I would hope that some of those in the audience will continue to join us in investigating how policy decisions should be made.

Model Estimation. The first problem here is that there are competing models from which we are unable to choose. There is probably broad agreement in theory about the policy process: The instruments of policy--Open Market operations, discount rate changes, etc.--influence a broad range of intermediate financial variables--interest rates, money supply, other credit aggregates--and these in turn are related to the ultimate goals of policy--unemployment, prices, etc. However, no model can be declared objectively "right", because reality is incapable of perfect modeling, at least to date. Each model, in effect, calls for a different setting of policy instruments in order to achieve any given goal. Given the current state of statistical testing, it is impossible unambiguously to choose the best model--that is, best in terms of its ability to foresee the future--from among a number of competing models. Thus, honorable men disagree, simply on the basis of their predilection about the a priori structure of models, in their choice of a model appropriate to the central bank decision process. Therefore, we find some critics urging us to use M_1 as a basis for our decisions; others prefer M_2; others prefer interest rates; but none has a monopoly on the truth, and none has the sole responsibility of making the policy decision.

A second problem here is that we know that the linkage between instrument and goal is variable over time. In econometric language, the models include error terms. By definition, one cannot predict the error

in the forecast of the next observation. By experience, we know that there are errors in forecasting, so we must make rational decisions--or at least decisions--under conditions of uncertainty. Decision making under conditions of uncertainty requires the policymaker to look at more than one variable--for example, both aggregates and interest rates--in order to build into a judgmental decision making process some feedback that provides information about the current reliability of model forecasts.

In a somewhat different vein, variability in the linkage between instrument and goal arises because models have built-in obsolescence. The structure of the economy and the preferences and behavior of individuals, change over time--not just in an erratic spread around some central tendency, but with a drift from old patterns to new. Models estimated on the basis of historical evidence cannot capture these influences. For example, inflation of the magnitude of the past five years is outside the realm of experience represented by most models of the U. S. economy. (Hopefully, the new input or experience won't be applicable in the future.) The same is true of wage and price controls. Various statistical "ad hoceries" can be employed to try to adjust model forecasts for these major gaps, but essentially, human judgment must be relied upon to make policy decisions in an altered environment.

Beyond these problems of choosing among competing goals and among competing models with uncertain linkages between instrument and goal, there are two further aspects of central bank decision making to be faced. The first recognizes a fundamental fact of the institutional design of our

central bank. The fact is that, in typical American fashion, the Federal Reserve System embodies people of diverse views and diverse values. Even though each of us involved in policy decision making may choose goals, and a model, and an instrument, and constraints, we inevitably disagree and, therefore, must compromise our differences. Just as I do not wish to overemphasize the research and computational problems involved in quantifying policy choices--lest future researchers be discouraged--so, too, I do not want to underemphasize this point, for whatever gains may be realized in measuring, modeling, simulating, and forecasting, this fact--that decisions are made by a group--will prevent--and rightly so--the implementation of a quantitative decision rule. (You can see that I'm basically opposed to technological change and the introduction of modern techniques if they threaten my position--a familiar theme?)

Finally, even if all participants in central bank decision making could agree on goals, models, and constraints and could in some agreed upon way take account of the uncertainties of policy impact, there is a final matter that requires the exercise of human judgment, essentially in a subjective non-quantifiable framework.

Monetary policy implementation is a continuous process in time. This is no different from the operation of the gold standard in the 19th century, when gold was mined and shipped, and therefore injected as high-powered money continuously throughout any given year. Market intelligence and arbitragers were able to smooth out the effects of most

irregularities in these flows, although the loss of ships at sea was sometimes a shock to the system.

Similarly the Federal Reserve operates in the market for securities and bank reserves almost continuously, attempting to offset the seasonal and irregular shocks to the financial system that, prior to 1913, might have generated stringencies and panics. Because of this responsibility for orderly markets, the Fed must exercise judgment in manipulating financial markets in pursuit of other national economic goals, since these policy actions have the potential for being a major irregular shock to financial markets. It may be impossible to quantify the relation between policy action and market reaction, at least in the short run. Most existing econometric models are not sufficiently disaggregated on the financial side even to begin to estimate the relevant relations. I seriously doubt that there are stable relations to be estimated anyway, for short-run financial market psychology--not just in the money market but in the bond and stock and foreign exchange markets--is an elusive factor. It may be true in the long run that this factor has no significance for real economic activity so long as orderly markets are maintained. Nevertheless, sharp swings in market opinion have powerful real consequences on the fortunes of participants and on the long-run efficiency of the financial sector. Central bankers who exercise responsibility for orderly markets must make judgments about the ability of financial markets to accept policy actions in an orderly way.

No matter how thoroughly convinced one may be about the desirability of achieving any particular rate of growth of some monetary aggregate,

or level of interest rates, or other intermediate or ultimate target of policy, the central bank must move continuously, and in small or large steps as the conditions of markets here and abroad permit. To do otherwise would be irresponsible. To do this wisely is often described as the "art" of central banking, and requires judgment. Yet an overall "grandmotherly" concern for orderly markets sacrifices control of national economic goals; an overly stern disinterest in orderly markets may be destructive of the valuable resource of a highly developed financial system.

The horns of a dilemma--a common problem that central bankers have had to face over a long period of time.