

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

Division of International Finance

REVIEW OF FOREIGN DEVELOPMENTS

June 9, 1964

Economic Research and Statistics in Central Banks

13 pages

Arthur B. Hersey

This article was prepared primarily for internal circulation, and should not be cited or quoted. The views expressed do not necessarily represent the views of the Board of Governors of the Federal Reserve System.

Economic Research and Statistics in Central Banks*

I. The purposes of economic analysis. Reasons for having a specialized department. The abilities needed. Aims of this paper.

A central bank must constantly be deciding whether to act or refrain from acting, and if so how and in what degree. It acts in an environment that ordinarily changes only slowly in its main features. But the specific circumstances that determine the central bank's actions may alter rapidly from year to year or from month to month. The purposes of economic analysis in a central bank are to improve the basis for taking decisions, by:

1. Obtaining, and maintaining, an extensive and intensive knowledge of the changing situation in which the central bank has to act, and if possible to foresee at least in part the future development of the situation; and
2. Measuring the effects of the central bank's actions, and formulating guides as to what its next actions should be.

Every department of a central bank can contribute in one way or another, no matter how indirect, to accomplishing these purposes, and should plan its work in ways that will maximize this contribution. In particular, those who bring together and present accounting data, those who deal with other financial institutions in carrying out the central bank's transactions or in obtaining information, those who record decisions, and those who draft instructions and regulations and administer them are all generating some of the material for the kinds of economic analysis a central bank must make, and often they are doing important parts of that analysis.

A specialized economic research and statistics department is relatively free from day-to-day operating responsibilities (but should never be wholly out of touch with operations). Using habits of thought and techniques of analysis fostered initially by an education in economics and then by work within a well-functioning group, the members of an economic research and statistics department ought to be fitted to make a special contribution to the assessment of the economic and financial situation in which the central bank has to act, to the measurement of the effects of the central bank's actions, and to the formulation of guides to future actions.

*A lecture given at the SEANZA Central Banking Course, State Bank of Pakistan, February 1964. Views expressed are those of the author and are not to be taken as views of the Board of Governors of the Federal Reserve System.

To be well fitted to make this special contribution to the work of the central bank, members of the economic research and statistics department should be able to do these things:

1. To think in terms of concepts of economic theory realistically fitted to the facts that are dealt with;
2. To analyze accurately the available information, quantitative and nonquantitative, relevant to the central bank's problems; to discover and recognize underlying uniformities of behavior and basic relationships of economic cause and effect; and to find ways of presenting clearly the results of their analysis.
3. To formulate hypotheses for the explanation of past developments, to recognize needs for additional information and theories, and to visualize at least the broad shape of possible future problems of analysis or action; and
4. On the basis of this, to give useful advice on operating problems.

I do not think that the purpose of my remarks today should be to give you a description of the organization of the economic research and statistics department in any particular central bank -- or in central banks generally, if I knew enough to be able to do that. And I should not try to give you a history of the development of economic research and statistical work in central banks. What I shall try to do instead is to approach the subject analytically, to help you to think in general terms about the functions this department ought to perform. Also, I would like to convey to you if possible an appreciation of the scientific spirit of inquiry that, I believe, should animate the economic research and statistics department.

Different central banks have gone about the business of meeting their needs for information and analysis in different ways. The recognition that central banking is something very different from commercial banking is a fairly recent thing. It has developed only in the past half century. The development of specialized economic research and statistics departments in central banks is an even more recent phenomenon in most countries.

My own institution, the Federal Reserve Board, has led the way in this development, I am proud to say. I think it is fair to say that experience has shown that time and money spent by central banks to study, carefully and ahead of time, the problems they have to face has been time and money well spent. Where this has not been done, or when there have not been time and resources to do it well, mistakes have been made in policy. Mistakes in policy have sometimes been very costly for a nation: costly in terms of economic opportunities lost and of disruption of the

efficient functioning of the economic system. To cite one example: central banks, including my own, cannot deny some of the responsibility for developments that led to the great depression of the 1930's, or intensified it.

My colleagues on the staff of the Federal Reserve Board and I have the hope and the faith that the development of economic research work over the years will help a central bank to avoid serious mistakes in policy. If economic research is to do this, and if the economic research and statistics department of a central bank is to live and grow, its members must be steadily learning and relearning how to analyze changing situations, and then transmitting their insights to those who come after them.

II. Methods and aims.

In starting to think about the functions and objectives of an economic research department, we might ask ourselves two questions: (1) is economic research a function separable from work with statistics?, and (2) can the work of the department that is concerned with one of its two major objectives be separated from its work that is concerned with the other? The two major objectives I have in mind here are those I stated at the beginning: maintaining knowledge of the environment, and measuring effects of the central bank's actions.

Within any organization there must of course be division of labor and specialization. Everyone cannot be doing everything. But I am convinced that in a successful research department the professional people must have some understanding of what others are doing and how their own work fits in with the rest. This is necessary for esprit de corps, and it is necessary so that each person can do the best work he is capable of. But the fundamental reason why there has to be this sort of understanding, of how the individual's work fits in to the whole, is that the enterprise as a whole is an intellectual one -- or, one might say, a scientific one. The results of the work are determined -- or ought to be -- by the facts that are being dealt with, and by the logic and the intellectual integrity and the imaginative insight used in dealing with the facts. The success of an economic research department is to be measured by the way it deals with the facts, not by administrative efficiency, by quantity of output of statistics and studies, or anything else.

If one takes this approach in thinking about my first question -- "is economic research a function separable from work with statistics?" -- the answer must be that organizational arrangements are not the whole question, or even the main part of it. Gathering statistics is a big and important task in any country, and it may be that the central bank in a particular country will have a lot to do in this direction. Accordingly it may need to organize this work in a separate department. But whatever the organizational arrangements may be, the important things, as I see it, are the following.

First, the people guiding the statistical work ought to know what the users of statistics need: what kinds of data, what kinds of classifications, with how much detail and how much summarization, and so on. Second, the people in the research department proper ought to know about the problems that arise in gathering the statistics and that affect their accuracy, about the coverage aimed at and the coverage achieved, about the definitions used and how the definitions are understood by people on the outside who supply the information in the first place, and so on. Moreover -- and this is something I will have more to say about later -- the economic research people ought to know something about techniques that are often called "statistical," and they ought to use these statistical techniques in their analysis of the data and in presenting the results of their work.

My second question was: "Can the work of the economic research department that is concerned with maintaining knowledge of the environment be separated from the work that is concerned with measuring effects of the central banks' actions?" My answer, as you will perhaps guess, is that organizationally there may have to be some separation, but that intellectually the two are inseparable from each other.

III. Measuring and estimating the effects of central bank action.

The logical link between the two parts of the department's work of which I have just been speaking can be most clearly seen if we bear in mind that what has to be done is not merely to measure the effects of past actions but also to judge or estimate in advance the effects of actions being considered or proposed. To do this successfully requires a great deal of knowledge of the situation.

When I speak of "knowledge of the situation," I am talking about many things: the central banks' own asset and liability position; the position of the commercial banks; the flows of lending and borrowing, of saving and investment, that are going on in the economy; production and employment; prices; foreign trade; and so on. In measuring the effects of past actions of the central bank or in judging the effects of future actions, all these elements are relevant.

It is possible that, in some countries at some times, central banks have mistakenly thought they could get along with no more than one basic sort of analysis: the analysis of immediate effects of central bank actions on the commercial banks' position and on the money market.

The top policy makers of a central bank will often be men of experience, who have a good working knowledge of the fundamental facts about the economic position of their country and of the fundamental principles of interaction among monetary and credit developments, changes in costs, prices and incomes, the balance of payments, and production and employment. Perhaps there are statistical services and sources of current analysis of changing economic and financial conditions outside the central bank -- in private business and banking, or in the Government

administration -- on which the policymakers can draw to keep themselves up to date on economic and financial developments and problems. Thus it may sometimes seem to be the case that the central bank will have no need for the full range of analytical services that could be supplied by an economic research department within the central bank.

This, I believe, is a very short-sighted view. The central bank's objectives -- and hence its problems -- are not just the same as those of any other governmental, banking, or business entity in the country. A central bank that depended on other institutions for basic economic analysis would be in a weak position for determining independently the course of action best suited to achieve central bank objectives in a given set of circumstances. The central bank needs to assemble data itself -- even if only the same data that others use -- and it needs to analyze the data from the point of view of the problems of central banking.

This requires dealing with the whole range of information about banking, about other financial developments, and about the underlying economic situation -- and not merely about the immediate effects of central bank actions on the commercial banks' position and on the money market. There is no point at which a sharp dividing line can be drawn between information the central bank needs to analyze and what it can leave to others to study.

However, it is true that monetary analysis is something in which the research departments of central banks are likely to become more highly specialized than any one else is. I refer to (a) the technical analysis of how changes in the central bank's assets and in the Treasury's cash position and debt affect the liquidity of the commercial banks, and (b) the technical analysis of how changes in the central banks' assets, in the Treasury position, and in the commercial banks' assets and liabilities other than demand deposits affect the money supply. Clearly, monetary analysis has to be carried on continuously, and clearly it constitutes one of the essential links in arriving at a judgment of the effects of central bank action, past or future.

I suppose that monetary analysis has been, or will be, discussed in some of your other sessions. I will be glad to try to answer any questions you may have on this, but I would like to go on now to talk about the whole field of economic research and analysis of which monetary analysis is only one part.

A central bank may know precisely how its actions are affecting the liquidity of the commercial banks, and how its actions, together with the expansion of credit by the commercial banks, are affecting the money supply. But it still has to make up its mind whether the current rate of expansion in the money supply is or is not what it ought to be if the best interests of the country are to be served. Sometimes this basic judgment is easy to make. Sometimes it is not.

One way of approaching this problem of judgment is to compare the present situation with similar situations in the past. It is sometimes easier to make judgments in retrospect than about the current situation.

If it can be seen, now, that such a rate of monetary expansion in some similar earlier period was healthy -- or, alternatively, disastrous -- then by analogy the mind is led to a judgment that the same rate of expansion now would probably be healthy -- or disastrous.

But you can readily see that this puts a heavy burden of judgment on the policy maker. For how is he to be sure that the earlier situation of which he is thinking was indeed really similar to the present situation in all essential elements? And what if it is obvious that no situation really similar to the one now being faced has ever arisen in the past history of this central bank?

A good economic research department can be of great help to the policy makers who are faced with these problems of judgment. To do this it must have a thoroughgoing knowledge of the country's economic and financial position and an understanding of the forces that determine the performance of the economy.

IV. Studying the economy and its functioning.

Central banking is often said to be an art and not a science. That is correct, if one thinks of science only as a cut and dried set of rules to follow in order to get a desired result, or as something dealing only with data that can be measured with numbers. But any able physicist or chemist or biologist will tell you that science should be viewed as the dynamic activity of scientists in widening and deepening man's knowledge of his environment. In this sense, science is itself an art, requiring creative intelligence and the exercise of intuition and imagination. Work that is truly scientific in any field, including economics, can never rely wholly on cut and dried methods, or entirely on numbers, to gain a real understanding of this very complex world in which we live.

Research work in a central bank, animated by the scientific spirit, ought to do three things:

1. It should seek to gain wider knowledge of the country's economic and financial system, and its activity, viewed as something continuously changing through time. The questions here are "What?" and "When?"
2. It should look for deeper knowledge of the system, of the interconnection of one set of events with another. Here the question is "How?"
3. Finally, hardest of all to do is the kind of work that goes beyond knowledge to look for an understanding of "Why?"

A. Broadening knowledge. In seeking to extend accurate knowledge of the economy and of economic events following each other in time -- i.e.

in seeking answers to the questions "What?" and "When?" -- the economic research and statistics department of a central bank will concern itself with many matters. It will need to assemble, and in some cases be the original collector, of many kinds of statistical series.

For the study of changes in bank liquidity and the money supply it will need statistical series of bank assets and liabilities, of currency in circulation, of the balance of payments, and of Treasury finances. For fuller study of financial developments, it will need statistics of assets and liabilities of financial institutions other than the commercial banks; statistics of the financial assets and liabilities of business companies and of their flows of net income, retained income, and capital expenditures; statistics of financial assets and liabilities of individuals; and so on.

More urgent than the central bank's needs for some of these financial statistics are its needs for basic statistics about the labor force, employment, manufacturing and agricultural production, and productivity (i.e. output per man, or per manhour). Statistics of domestic wholesale and retail trade and of foreign trade are needed, too. Many of these various kinds of statistics should be on a monthly basis, while some need be only annual. Many of them need to be subclassified in considerable detail.

To lay the basis for analysis of the interconnections among the various events portrayed by these basic economic statistics, and between these events and those portrayed by the financial statistics, the central bank will also need statistics of wholesale and retail prices and of interest rates. In fact, these may be the statistics it needs more than anything else.

Finally, it may feel a need for the kind of summary statistics and estimates that are given by national economic accounts: national income, national expenditure, national production; with each estimated in current values and also in terms of real volume -- i.e. valued at the prices of some fixed base period. But comprehensive national economic accounts require a solid statistical groundwork, and moreover they involve much estimation and guesswork -- even when they are only on an annual basis, and much more so to put them on the more useful quarterly basis. So they are not a thing to be given high priority at the beginning of research work in a central bank. Instead, it is better to concentrate on such partial measures of production as an index of industrial production and on such partial measures of income as estimates of total wage income and total agricultural income.

B. Deepening knowledge. Going beyond the questions of "What?" and "When?," we come to the questions of "How?" An economic research department in a central bank begins to show its potential worth when it finds itself able to go beyond the assembling of statistics and beyond the reporting of underlying events piece by piece in an isolated way. Statistics take on meaning when answers can be given to questions not only of "what

happened, and when?" but also of "how did they happen?" What I am trying to convey by these words is the thought that isolated statistics are barren curiosities for the human mind. To stimulate thinking, statistics become fertile only when we can see the interrelationships of events and observe dynamic mechanisms of cause and effect at work.

It has always seemed to me a fortunate thing for the development of effective central banking in the United States that the Federal Reserve Board took the lead in the 1920's in developing an industrial production index for the United States. Data are drawn from other Governmental sources and from industry association sources, but the compilation and analysis of the industrial production index has always been and still remains in the hands of the Board's staff. The value of this procedure, from the Board's point of view, has been two-fold. First, the generation of this highly sensitive and broadly representative indicator of economic trends and cycles has added immeasurably to the Board's authority in public opinion as an interpreter of current economic developments in the United States. Second -- and this is particularly relevant for our present discussion -- responsibility for publishing the index has stimulated the Board's staff to give close attention to these important statistics in detail, so as to improve the accuracy of the index as a whole and to find new ways of classifying and grouping its components into subindexes that will be of maximum usefulness for economic analysis. In giving this sort of close study to these statistics, the Board's economic research staff has been drawn into answering questions of "How?"

Sometimes there are ways in which refinement and manipulations of statistical data can make them yield us more meaning than they showed before. For example, the breakdown that is now made of the Federal Reserve index of U.S. industrial production between final products on the one hand and materials and components on the other helps us to visualize how at some times total production outruns final purchases, as stocks of materials and components accumulate in the pipelines of production and distribution, and how at other times industrial activity falls, and with it the generation of current income, while final purchases do not fall off as much.

To take another example, the computation of annual or quarterly ratios of total liquid assets held outside the banking system to current national income, and the comparison of changes over time in this ratio with the simultaneous movements of long-term interest rates has thrown a good deal of light on questions of how interest rates in the United States tended to rise in the postwar period, from their unusually low levels of the 1930's and 1940's, as excessive liquidity was "absorbed" by the postwar rise in national income.

The search for answers to the question "How?" makes no progress in an intellectual vacuum. It can be stimulated in two ways. First, we can gain insights from economic theory, on the basis of which we can form hypotheses that can be tested by the facts. Second, the economic research staff of a central bank needs to keep in touch as best it can with the views about current developments that people outside the central bank have.

This includes the views of businessmen about what they are doing in their own businesses. It may include the views of research organizations in other countries about developments in other countries or in world trade or about the behavior of prices of internationally traded commodities. And so on. The necessity of making sense of the views of other people, or else rejecting them, can lead the economic analyst to a deeper understanding of the facts he has at his disposal -- or perhaps, on occasion -- to some skepticism about the validity of what had seemed to him to be facts.

Sometimes the views of practical businessmen, reflected in the columns of a good financial newspaper or obtained in direct conversation, furnish valuable supplements to the economic theory that can be found in academic writing. A prime example of the sort of thing often given too little attention in academic writing is the influence of expectations about changes in costs and prices on the behavior of businessmen. In the short run, in actual life, a rise in costs and prices in a particular industry may lead businessmen to step up their purchases of materials and their output of products, and so build up stocks. An economic analyst with sensitive antennae, paying attention to businessmen's opinions of the situation, and at the same time looking carefully at statistics of production, trade, and prices, can often arrive at a deeper understanding of how the situation is developing. He may then be able to form an hypothesis about likely future developments. With the passage of time, he will be able to verify or disprove his hypothesis, and either way he will have deepened his knowledge.

I spoke a while ago of the potential usefulness of refining and manipulating statistical data, and I gave a couple of particular examples. There is one technique of very general applicability which I would like to talk about a little. This is the seasonal adjustment of statistical data. This is a very powerful tool for clarifying and deepening knowledge of events and their interrelationships. Let me give a brief hypothetical example of its usefulness.

Suppose that the underlying tendency of industrial production in the course of a year which I will call "1965," were steadily downward apart from month-to-month variations that experience had shown could be regarded as seasonal, and suppose that the underlying tendency in the following year "1966" were steadily upward, from the beginning of the year on. This would be an important thing to know as soon as possible in 1966, because this knowledge could throw much light on other related developments, say in prices or in exports or in the demand for bank credit, for each of which the normal seasonal variations might be somewhat different than those in industrial production.

But suppose techniques of seasonal adjustment were not in use. The raw data on industrial production might seem to be fluctuating irregularly from month to month, and these fluctuations might be so large as to obscure entirely the underlying direction or directions of movement. Nevertheless, trying to form the best view he could of the underlying

tendency, the analyst would probably make a comparison of production in January 1966 with production in January 1965, and he would find it was lower. He would draw the same conclusion about February 1966 in comparison with February 1965. Not until after midyear would he finally realize that production had begun to run higher than a year earlier.

If the analyst had been able to make use of seasonally adjusted data he would have formed a very different picture. He would have seen much earlier in the year, perhaps as soon as the January and February figures became available, that the low point had really been reached at the end of 1965 and that the character of the business situation in the first half of 1966 was totally different from the recession that had been taking place in 1965. Without seasonal adjustments, the analyst fell into a serious error of diagnosis. With seasonal adjustments he could avoid the error, recognize the change in the situation much earlier, and with this more accurate knowledge be in a position to recognize and understand many relationships between what was happening in production and the developments in prices or exports or retail trade, and so on.

Of course the unadjusted figures are important in themselves. And some statistical series have no regular seasonality. If all statistics are put on a seasonally adjusted basis, analysts then have to guard against forgetting how the unadjusted figures behaved, with whatever seasonality they exhibited.

Another general technique for getting the most enlightenment out of statistics is graphing them. Graphs -- or "charts," as we usually call them at the Federal Reserve Board -- are often very useful supplements to a written report, to illustrate what the report has to say. But they are even more useful, I believe, as an aid to analysis. A series graphed over a considerable period of time will reveal many things that are hard to observe in a table of figures. Two series graphed together will often reveal significant similarities or differences of movement, or significant leads and lags in time. These are some of the things we want to know when we ask the question "How?"

C. Advising policymakers. When the economic research department of a central bank has broadened its knowledge of financial developments and of trends in the production and distribution of goods and services, and when it has deepened its knowledge so as to be able to give a more or less unified and intelligible account of the whole moving web of events, it has gone a long way toward realizing its full potentialities. From the policymaker's point of view, the making of judgments is now fortified. Take the simple question I asked some time ago. In a given situation, trying to decide whether any change should be made in monetary policy, the policymaker looked back at some earlier similar situation and made up his mind about present policy on the basis of an analogy with the past. The question I asked was: was that earlier situation indeed really similar to the present situation? This is a question to which a good economic research department should be able to give an accurate and enlightening answer.

Beyond this, as I suggested earlier, lie the hardest things of all for the economic research department to do -- and, as I said, the hardest things even for me to talk about understandably. I used as a symbol the question "Why?" Perhaps by this I mean merely that the best economic research department is one that provides the most penetrating and the most illuminating answers to the utilitarian questions of "What?" and "When?" and "How?" But this is not quite all I have in mind. In answering those simpler questions the economic analyst was looking at actualities, past and present. The policymaker still has to try to visualize possibilities: how things might have been different in the past if policies had been different; what will happen in the future if his decisions break away from past patterns.

Let me give you very briefly two examples. Country A has had very rapid economic growth in the past decade, but along with this a great inflation of the money supply and of prices. The inflation was slow at first, but then it accelerated. Now the balance of payments is in a critical state. Worst of all, economic growth has slowed almost to a halt. Why did things work out this way? Would growth have been slower, yet healthier and more sustainable, if the country's monetary and fiscal policies had been different? What should be done now to get out of the tangle, and what should be done after the crisis is over?

Country B has had very little rise in prices in the past five years, but before that its price level had risen rather steadily. Now it has a good deal of unemployment and a very unsatisfactory balance of payments. The combination of problems facing the country is one for which there are no parallels in the central bank's past experience. Why had things come to this pass? If a sharp departure is now made from earlier patterns of policy, what will happen to unemployment and what will happen to the balance of payments?

Questions like these are the ultimate challenge to a central bank. Finding the right answer, or a right enough answer, surely calls for art as well as science.

In answering questions of "What?" and "When?," and questions of "How?," and questions of "Why?," the economic research department must not only find the answers, but must communicate them effectively to the policymakers. Its work then inevitably becomes part of the whole process of policymaking. But the research department must never let its participation in policymaking weaken its original aim of dealing with the facts as objectively as it can.

V. Some concluding observations.

I have tried to give you some idea of the spirit in which the economic research department of a central bank should go to work, without saying anything about problems of staffing and organization, or about the varied tasks to which individual persons have to be assigned within the organization, or about the mechanical or electronic equipment a research department can use, and so on. I will have to pass over these questions.

I should like to end my remarks, however, with a few observations about publication and internal dissemination of products of the work of an economic research department.

I consider it of the highest importance for the development of a good economic research department, and for the maintenance of its work at a high standard of quality, that some of its work be published. This applies not only to its statistical compilations, but also, and perhaps especially, to descriptive and analytical writing. There are three good reasons for publishing such work, assuming that it comes up to proper standards of excellence.

1. Publication of such work, by bringing to the attention of outside economists the results of work done in the central bank, should help in attracting to the central bank's service people with the qualifications the central bank needs. In particular, professors in universities can do the central bank much good by advising their best students to apply for jobs at the bank.
2. Publication may stimulate economic analysis outside the central bank on similar and related subjects. This should (a) help to raise the general level of understanding of current economic problems, and (b) have a "feed-back" effect of stimulating fresh thinking within the central bank itself.
3. Publication of work showing the range of information and analysis on which the central bank has relied in forming its policies should help to demonstrate the objectivity of the central bank and its concern for the national welfare, and thus strengthen its prestige and authority in the nation.

I consider it also of very great importance that much written work done in the economic research department, over and beyond the work written especially for outside publication, should be given circulation within the department and in other departments of the central bank. There are two main reasons why this is important.

1. Analysts at various levels (not only the senior advisers) should be called on to do writing suitable for such circulation as a way of making them clarify their own thinking and stimulating them to set down what they have learned in a clear and comprehensible way for others to read.
2. Internal dissemination of appropriate material can help immeasurably to improve the understanding of the central bank's functions and problems on the part of officials in all departments, and in educating junior members of the economic research department in the techniques needed for better performance of their own work.

In this matter of spreading an understanding of policy problems and research techniques, the relatively new central bank has one disadvantage and one advantage over a large and long-established central bank. Its disadvantage lies, of course, in inexperience. But its advantage is that the problems and techniques are new to both writers and readers. The intellectual stimulus of attacking new material can be great. As the economic research department grows to maturity, many of its members will be acquiring, in a peculiarly dynamic way, a new education from the ground up. This is training of a kind that a large and long-established economic research department, where many elementary things have come to be taken for granted or forgotten, may find it difficult to give its new recruits.