

Introduction to Workshops

In its courses on *Financial Analysis and Policy*, the IMF Institute for many years has utilized a set of integrated workshops designed to enable the participants to apply the analytical tools discussed in these courses to an actual situation in a member country of the International Monetary Fund. These workshops, which have been elaborated upon and refined over the years in the light of teaching experience, assist the participants in preparing a financial program for a given country. Such a program consists of a set of policies in the monetary, fiscal, and balance of payments fields to achieve a balance between financial resources and their use. Therefore, these workshops deal with the organization of statistical data in a relevant framework, the economic analysis of the data, and the formulation of policies to achieve desired objectives.

The nine workshops presented in this publication use Kenya as the case study country. After a brief chapter entitled "Kenya: The General Setting" (Chapter 2), giving some background on the Kenyan economy, the workshops follow in separate chapters. The basic plan of the series of workshops is to familiarize the reader with

the statistical framework and institutional setting relevant for the formulation of financial policy, to analyze the data, to forecast sectorally significant macrovariables on the basis of assumed policies and assumed values of other independent variables, and finally, to bring together the sectoral forecasts in a consistent whole in the workshop entitled "Financial Programming."

It is assumed that the reader of this publication already has some familiarity with the elements of general macroeconomic theory, as well as an understanding of the rudiments of public finance, monetary theory, and international economics. Some knowledge of the principles of statistics and of simple econometric techniques, such as regression and solution of simultaneous equation models, is also assumed.

The methodology of the workshops follows a consistent pedagogical approach. Each workshop provides data (including the institutional setting, where needed) on some aspect of the economic and financial performance of Kenya. On the basis of the data, readers are asked to do exercises involving some calculation. Finally, each workshop contains a number of issues for discussion, which aim at exposing readers to the kind of problems faced by economic analysts and policy advisors.

The data for the workshops have been taken from published sources, and care has been taken to ensure that no confidential information has been included. In the case of the statistical or accounting workshops, the data are generally provided for a period of five years. For the forecasting workshops, the data cover a longer period, usually ten years. For the accounting workshops, the exercises relate to calendar year 1976 or fiscal year 1977, whichever is appropriate, and answers are provided. In the case of the forecasting workshops, the forecasts are to be made for calendar year 1977 or fiscal year 1978, whichever is appropriate. No answers are given for the exercises in the forecasting workshops, except for the purely numerical or algebraic questions, because no unique forecast is possible and answers will vary according to the assumptions made with respect to policy measures and the values of other exogenous variables.

ACCOUNTING WORKSHOPS

The first four workshops in the series are statistical or accounting workshops. Their objective is to acquaint readers with the structure, coverage, and limitations of the Kenyan data in the monetary, fiscal, and external sectors, as well as to provide an economic interpretation of statistical relationships as a prelude to policymaking. These workshops are divided into two parts. The first part deals with concepts and principles for the compilation of the respective data. The second part illustrates how these concepts and principles are applied to the Kenyan data.

The workshop entitled "Monetary and Financial Survey" (Workshop 1) discusses the organization and consolidation of data for the financial institutions of Kenya, in accordance with the format used in *International Financial Statistics (IFS)*, a monthly publication of the International Monetary Fund. Particular attention is focused on the accounts of the monetary system of Kenya and on the information that these accounts provide in regard to general monetary developments.

The workshop "Government Finance Statistics" (Workshop 2) analyzes the conceptual framework for the organization of the government finance statistics of Kenya, using the format in the *Government Finance Statistics Yearbook*, an annual publication of the International Monetary Fund. The workshop examines some statistical problems of Kenyan data on government finance, the consistency of budgetary accounts with monetary and other accounts, and the information provided by the government finance statistics of Kenya on overall budgetary developments.

The workshop "Balance of Payments Statistics" (Workshop 3) explains the principles for the compilation of the balance of payments statistics of Kenya, as set forth in the fourth edition of the *Balance of Payments Manual*, published by the International Monetary Fund. It then deals with the organization of the balance of payments data of Kenya into both a standard presentation and an analytic presentation, according to the format used in the *Balance of Payments Year-*

book, an annual publication of the International Monetary Fund. The workshop emphasizes the significance of different indicators of balance of payments performance and examines the relationship of balance of payments data and monetary accounts.

The workshop "Flow of Funds" (Workshop 4) demonstrates how the income and financial transactions in the economy of Kenya can be summarized in a set of interrelated sectoral accounts. It then explains the relationship of flow-of-funds accounts with the monetary survey, government finance statistics, and balance of payments statistics. The significance of flow-of-funds accounts for policymaking is emphasized.

FORECASTING WORKSHOPS

Following the four accounting workshops, there are the workshop on the Polak model, three sectoral forecasting workshops, and the final workshop on financial programming.

The workshop entitled "The Polak Model: An Application" (Workshop 5) applies to Kenyan data the Polak model, a simple macroeconomic model incorporating the monetary approach to the balance of payments. While the Polak model is not used for forecasting purposes in subsequent workshops, this workshop illustrates the uses of the Polak model for the forecasting of imports and for the formulation of monetary policy to achieve balance of payments equilibrium.

The aim of the three sectoral forecasting workshops is to teach a particular methodology of sectoral forecasting, based on past trends as well as on certain assumptions about economic outlook and policy stance. In each of these workshops, information is given on the institutional background, the legal framework, and recent developments (including policy actions) in the field covered by the workshop, in order to facilitate the making of assumptions needed for forecasting. It must be emphasized that these workshops do not envisage that the forecasts will be made solely on the basis of past trends, and hence they are not designed to yield forecasts which can then simply be "fed" into the final workshop. In fact, the methodology shown in

these forecasting workshops can yield any number of alternative forecasts, depending on the assumptions made as to future economic developments or policy actions. Furthermore, different, and equally acceptable, forecasting techniques may be used to produce different forecasts. All the forecasting workshops stress that forecasting is not a mechanical process and that it is essential to make the forecasts on the basis of economic evaluation of actual and expected developments.

In the workshop "Projection of Monetary Aggregates" (Workshop 6), an approach is shown for projecting monetary aggregates—the major components of the balance sheets of the banking system. These forecasts are to be made partly on the basis of given information about economic developments, as well as policy actions and intentions, and partly on the basis of functional relationships, with the values of the parameters, such as the money multiplier, being computed on the basis of regression analysis. The workshop makes projections for money and quasi-money on the basis of both supply factors and demand factors, and it also examines the policy implications of the forecasts.

The workshop "Revenue Forecasting" (Workshop 7) describes an approach to the forecasting of the revenues of the Central Government of Kenya, based on functional relationships adjusted for the effect of discretionary changes in the tax system and using the proportional data adjustment method. Among the issues discussed are the significance of proper classification of government revenues, the choice of proxy bases, and the effect of price changes.

The workshop "Balance of Payments Forecasting" (Workshop 8) contains methods and guidelines for the forecasting of different components of the balance of payments of Kenya through the use of regression equations as well as judgmental factors. Emphasis is placed on the need to take into account economic developments in Kenya and in the rest of the world.

The final workshop, entitled "Financial Programming" (Workshop 9), is devoted to the formulation of a comprehensive and consistent financial program—that is, an appropriate mix of fiscal, monetary, and balance of payments policies, designed to achieve stated

macroeconomic targets within specified constraints. Forecasts made in previous workshops may be used, but it often happens that these sectoral forecasts may not be consistent, in a macroeconomic setting, with each other or with the assumptions and policies in other parts of the financial program. New forecasts may have to be made (using the methodology expounded in the earlier workshops) repeatedly, following an iterative process, until the desired consistency among the different parts of the financial program is achieved. Considerable stress is laid on the need to analyze the significance of constraints, the existence of different policy trade-offs within these constraints, the need to assess the impact of recommended policies on other parts of the financial program, and the importance of specified consistency tests.

The forecasting workshops adopt an analytical approach based on sectoral econometric models. Many problems of a statistical nature arise in the process of estimating these sectoral models. The econometric forecasting methods utilized in these workshops are not very sophisticated but are tailored to the availability of data in a developing country such as Kenya. The forecasts obtained through the application of these methods are, in general, useful for purposes of analysis and as a guide to policymaking. Because of the data limitations and the importance of isolated events in the underlying series, econometric forecasts may not be sufficiently accurate for the formulation of concrete policy measures and must therefore be supplemented by experience and judgment to arrive at realistic values.

The problems discussed below are presented to caution the potential user against relying on purely mechanical application of statistical tools to obtain accurate forecasts. These problems are related to limitations of the data base, simultaneous equation bias, misspecification, multicollinearity, and evaluation of residuals.

1. *Limitations of the data base.* The data available in a developing country such as Kenya have four major deficiencies. First, as most of the data series for the majority of macroeconomic variables cover ten years or less and are available on an annual basis only, they are too short for the use of statistical techniques requiring numerous

independent variables or involving similar losses in degrees of freedom. Second, for a variety of reasons, the existing data tend to contain errors of measurement and therefore tend to be unreliable. Third, major data series are revised frequently, with little or no information available to enable the researcher to reconcile differences between these revisions. Finally, when the timing of the recording of statistical data differs between series, such as between fiscal statistics and other national accounting statistics, estimation based on two sets of statistics requires adjustment of the data and information may not be available to adjust them.

2. *Simultaneous equation bias.* As mentioned above, partial equilibrium or sectoral models have been used. In the workshop "Balance of Payments Forecasting" (Workshop 8), for example, aggregate import-forecasting equations relate the quantity of imports demanded (a) to the ratio of import prices to domestic prices, and (b) to domestic real income. It is assumed in these equations that the forecast values for domestic real income and domestic prices are independent of the resulting forecast for imports. This assumption may not be realistic in specific cases and may thus yield only an approximate forecast. The bias introduced by the forecast values for gross national product and prices, which may not be compatible with estimates for other important variables, is referred to as the simultaneous equation bias.

3. *Misspecification.* This problem arises from misspecification of the "true" model underlying a given economic relationship, such as the demand for imports. Misspecification can take several forms. For example, a misspecification bias is introduced if some of the relevant explanatory variables are not included in the equation because of the unavailability of data. Another kind of misspecification of relationship arises if a linear relation is assumed when in fact a nonlinear relation exists.

4. *Multicollinearity.* In an economy characterized by average rates of inflation at the double-digit level, any two macroeconomic variables in current prices are bound to be highly correlated. Collinearity among explanatory variables could lead to implausible

results. Thus, in the presence of multicollinear data, the sample data contain little information to enable the researcher to estimate individual parameters with a reasonable degree of precision.

It is, however, worth noting that the tolerance level of the bias due to multicollinearity and specification bias depends on the *end use* of the model or equation. If the model is to be used for forecasting, specification errors or multicollinearity might not be very serious. However, if the estimated parameters, such as propensities and income elasticities, are used to formulate precise policy prescriptions, more attention to such bias would be necessary.

5. *Evaluation of residuals.* In a forecasting exercise, the evaluation of residuals for the most recent observations is important in assessing the adequacy of a point estimate for a coming period. In a typical less developed country, the errors in data base, the splicing of series, and the lumpiness of events, as well as actual serial correlation, may all generate residuals which appear significantly different in the most recent period from those in earlier years. A graphical depiction of regression results is an essential tool in identifying large residuals and their patterns. For example, a recent export boom may lead to a significant positive residual in the demand for money equation. It is extremely important that the pattern of this residual be evaluated, as it will affect the values utilized for policy variables. Although statistical techniques reducing serial correlation are well known and are widely used in correcting equations used for forecasting, these techniques are generally inadequate for satisfactory forecasting and the policymaker must also use prudent judgment.