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**SESSION 1: RECONSTRUCTING THE PAST**

**THE CONSTRUCTION OF LONG-TERM TIME SERIES IN CYPRUS:  
EXPERIENCES AND PROBLEMS ENCOUNTERED**

Report submitted by the Ministry of Finance of the Republic of Cyprus 1/

**INTRODUCTION**

1. Comparable long-term time series are a crucial element in planning and formulating economic and social policy and constitute an important function of every national statistical office. To compile and keep up-to-date such series, covering the main social and economic indicators of a country, is no doubt a formidable task which involves conceptual issues as well as empirical problems.

2. The growing need for satisfying the demand from users (economic researchers and analysts, policy makers, academics and students) and the efforts to enhance the capability of the national statistical system in producing accurate short and long-term predictions and projections for

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various macro-economic variables, induced the Department of Statistics and Research, which is the central statistical office of the Republic of Cyprus, to embark on a project of constructing long-term time series.

3. This paper examines the construction of various long-term time series in Cyprus since independence in 1960. It outlines the problems encountered and methods used to resolve them.

#### Long-term Time Series Construction

4. The work of constructing long-term time series essentially involved collecting together into one publication all available statistical information which could develop into a statistically adequate time series. The task was two-fold and involved the compilation of both annual and monthly series.

5. The annual sets of data referred to time series of a macro-economic nature. Data pertained to national income, production, investment, consumption, labour, earnings, balance of payments, money and banking and public finance. They covered data for the period 1960 (i.e. since independence) to 1991. The time series compiled were published in the report "Historical Data on the Economy of Cyprus, 1960-1991", issued by the Department of Statistics and Research. This publication will be issued at regular intervals with updated information.

6. The monthly and quarterly sets of data, which form the basis of discussion in this paper, referred to those series compiled on a regular basis with the aim of assisting in the assessment of the performance of various sectors of economic activity as a tool for short-term management of the economy. Data pertained to volume and price indices of production for various sectors of economic activity (such as agriculture, industry, construction, retail trade and transport and communication), value of sales and volume of production of the most important industrial and agricultural products, production and consumption of electricity, number, value and volume of building permits, passenger and freight movements, registrations of motor vehicles, exports and imports, balance of payments by category of items, foreign exchange reserves, foreign exchange rates, monetary and financial statistics (money stock and its components, bank deposits and credit), share price indices, consumer price index, employment, unemployment and job vacancies, movement of tourists, guest nights, bed capacity and bed occupancy rates in tourist accommodation and public finance (government expenditure and revenue by category).

7. Each series was presented historically, from the time it commenced to be compiled on a monthly or quarterly basis to the end of 1993, with the exception of those series whose scope, coverage and classification have changed significantly over time, thus rendering the data for the various years not strictly comparable. The series compiled were published in the report "Monthly Economic Series, 1960-1993" of the Department of Statistics and Research.

8. The majority of the data presented is compiled regularly by the Department of Statistics and Research. Data on the balance of payments, foreign exchange and money and banking are provided by the Central Bank of

Cyprus. Government accounts are prepared by the Economic Studies Division of the Ministry of Finance. Some of the data on tourism (guest nights, bed capacity and bed occupancy rates in tourist accommodation) is compiled by the Cyprus Tourism Organisation. Other series, such as registrations of motor vehicles and job vacancies, are derived from various administrative records.

9. The work of constructing these series involved going through various past statistical publications, administrative records, worksheets and computer outputs. The main source of data for the compilation of the long-term monthly series was the report "Monthly Economic Indicators" of the Department of Statistics and Research. This is a bi-monthly report, published on a regular basis since 1978, which contains most of the indicators listed above. Data for earlier periods of time were extracted from reports such as the "Short-term Industrial Indicators", the "Quarterly Statistical Digest" and others which ceased to be published in 1978, as well as from the annual editions of the various sectoral reports of the Department.

10. Much of the time and energy put into the task of constructing long-term time series was associated with developing ways and methods to overcome the various problems and difficulties encountered so as to ensure that the series constructed will be reliable, consistent and comparable over time. An outline of the various problems encountered and the ways employed to overcome them will be outlined in the next section. It must be stressed that the majority of the series were compiled without any serious difficulty. The problems discussed here below were only met in certain cases and are given to serve as examples.

#### **Problems Encountered in the Compilation of Long-term Time Series**

11. To understand the nature of some of the problems encountered during the compilation process of these time series, it must be borne in mind that the statistical system of Cyprus, though now well-advanced, is quite young and is continuously developing and improving. The Department of Statistics and Research was established in 1954 as a supporting administrative unit to the then British colonial rule. It was not until independence in 1960 that it gained its true life and important function. By the Statistics Law of 1968 all government statistical work was centralised under the Department of Statistics and Research.

12. Naturally, the early years of its functioning were marked with some degree of inexperience, the absence of adequate in numbers and qualified staff and the lack of such facilities as computers and libraries. Associated with these factors was the non-availability of proper storage facilities for previous data. This emanated to a great extent from the lack of appreciation on behalf of the producers of this data, of the importance of and need for keeping a well-informed statistical system to accommodate the requirements of future users and their failure to envisage the need for making forecasts based on monthly data over a number of years. It was not until very recently that the Department of Statistics and Research started employing such data in constructing composite leading indicators for the overall economic activity

and various other key components of the economy such as tourism, exports and inflation, as its main tool in producing short-term forecasts. No quarterly national accounts are prepared in Cyprus on a systematic basis.

13. The difficulty mentioned above of not having ready access to the original sets of data proved to be the most serious handicap to the construction of accurate, compatible and consistent series over time. It prevented, for example, any attempts to carry out checks and verifications where needed so as to ensure the matching of monthly data with the annual figures published in the statistical yearbook, especially in those circumstances where revisions were brought about to the annual figures and were not at the same time reflected in the monthly figures. This was often the case with data on exports of minerals and potatoes, where revisions are made some time later on the basis of the actual prices realised. The need for presentation of data to the same level of detail and the same degree of accuracy over time, as well as the effort to deal with breaks in the series or to correct errors that may have accumulated over time, was also seriously inhibited. Difficulties were again encountered with respect to the reviewing and rebasing of volume and price indices so as to have a common base year over time.

14. Another equally important problem arising was related to various changes which have taken place over this long (for a small and newly independent country) period of time in the classification systems used, the units of measurement, the frequency of reporting, the methods of collection of data, the questionnaires and other administrative forms used, the definitions and the coverage of the variables examined, the degree of accuracy and the authorities supplying the data.

15. The introduction of a new classification system immediately rendered a series discontinued, unless the old and new systems could easily be matched together or provision were taken, at the time of adoption of the new system, for the series to be compiled from raw data in both ways.

16. The much used Consumer Price Index series also presented a serious problem relating to its continuity over time. The rebasing of the Index carried out in 1992 was accompanied with the inclusion of a large number of new items and the adoption of a new classification of economic groups. This, however, did not allow the direct linking of indices relating to economic groups prior to 1992 with the new ones. There was, of course, no problem to the continuity of the series on the overall Index.

17. The decision to incorporate defence transactions into foreign trade statistics and balance of payments figures also caused some difficulties. Data on imports of military equipment were available on a monthly basis only for the last three years, so that figures for earlier years had to be allocated equally to the various months. Problems of a similar nature also arose with a number of other series and, in cases where these could not be resolved, the differences in coverage existing between the various years was indicated in order to caution the users.

18. The level of detail sought and the degree of accuracy of the data presented also posed a serious problem. Data for earlier years were often less aggregated to various categories. Subsequent construction of new more disaggregated categories failed to ensure the continuity of a series over time. In the same manner, data now presented in thousand pounds, for example, were in the past only reported in million pounds. The absence of the raw data was again the reason for concern.

19. Differences in the sources of data and the methods of data collection also proved to cause some difficulties. For example, the main source of data on tourist arrivals were the arrival and departure cards filled in by all foreign passport holders on the points of passport control at the ports and airports of Cyprus. Gradually, however, these cards were abolished and as from the second half of 1991 figures on the number of tourist arrivals to Cyprus, one of the most important short-term indicators, are based on estimations.

#### **CONCLUSION**

20. The construction of long-term time series proved to be an indispensable tool in the process of economic and social development in Cyprus and a major task in the work of the Department of Statistics and Research. An adequate set of such series will provide a sound basis for the short-term management of the economy and for monitoring long and short-term developments in the country.

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