Preface

Our interest in the subject of quantitative international economics developed in the course of drafting some chapters of a book by Mr. Stern, *The Balance of Payments: Theory and Economic Policy*. It was thought that it would be worthwhile to include in that book some discussion of empirical work and statistical methods for estimating relationships of various kinds that are relevant to international financial matters. As the work progressed, it became increasingly evident how difficult it was to report on what had been done because of the diverse statistical specifications and methods used and the comparatively few reliable results that pertained to particular countries.

As a result, we decided to write something more general on this subject that could serve as a guide and reference work for economics graduate students, academicians, and practicing economists in private and governmental circles. The object was to set forth on a reasonably advanced level the various methods for quantitative measurement of what we considered to be the most important relationships at issue in the areas of international finance and trade, to give some flavor of the results achieved in studies done in recent years, and to indicate directions for new research.

The level at which we have aimed is that of first- and second-year economics graduate students who have had a one- or two-semester course in international economics and in econometrics as an integral part of their training. A number of our chapters contain extensive discussions of the economic theory underlying the relationships to be measured. The reason for this is that many published contributions have lacked a clear theoretical rationale, with the consequence that sometimes inadequate or incorrect statistical specifications have been employed. Although we feel very strongly that valid empirical work must have a solid theoretical base, our intent is not to cover all international economic theory. We are not concerned, moreover, with the development per se of the econometric methods to be discussed. Abundant references are supplied on both of these scores in the individual chapters in case the

reader wants to delve more deeply into some particular problem. While we do offer some concrete advice on what and how things should be done, our primary goal is to enhance the reader's understanding of what the important relationships are and the problems he may encounter in attempting to measure these relationships statistically. We employ on the whole relatively simple algebraic and geometric formulations, reserving for footnotes and appendixes the somewhat more advanced material.

All of the chapters have benefited greatly from the criticisms and suggestions for improvement offered by members of the Research Seminar in International Economics at The University of Michigan. We are indebted especially to J. David Richardson for his extensive comments on the entire manuscript and to Giorgio Basevi, Ralph Bryant, Kevin Collins, John Cross, Alan Ginsburg, Jay Levin, Norman Miller, Th. Peeters, Martin Prachowny, Thomas Willett, Sidney Winter, Charles Wolf, and Kunio Yoshihara for comments on individual chapters.

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Introduction

Our concern in this book is with the quantitative measurement of international economic relationships. The relationships we discuss were selected in terms of their theoretical importance and policy relevance in the areas of international finance and trade. We follow the procedure of beginning each chapter with a discussion of the theoretical rationale underlying the particular relationship. We then treat measurement considerations, drawing in this regard upon some of the most noteworthy studies published in recent years. We try insofar as possible to offer concrete suggestions on research methodology and to point out the directions in which we think future research might profitably go.

Part I dealing with the balance of payments consists of Chapters 2 through 5. The longest of these by far is Chapter 2, in which we treat at length the time-series analysis of the demand for imports and exports from the point of view of an individual country. This subject has a long and somewhat checkered history dating from the 1940's, when a number of estimates using least squares multiple regression methods were made of import and export demand functions for the interwar period. The noteworthy feature of many of these estimates was that they suggested relatively low price elasticities of demand in international trade. The implication was thus drawn that the international price mechanism could not be relied on for balance-of-payments adjustment purposes.

However, this implication was shown by Orcutt in his pathbreaking 1950 article not to be altogether valid since there were tendencies for the regression methods and statistical specifications employed to bias the measured elasticities downward towards zero. In the years following Orcutt's work, there was great hesitation in using traditional least squares regression in the time-series analysis of demand. This situation has since been altered by further theoretical inquiry into the statistical issues raised by Orcutt. It is now believed that Orcutt's arguments were not so conclusive and general as

they first appeared to be. In addition, as more data points became available for the post–World War II period, a number of studies using least squares regression were made of import and export demand functions with results that seemed quite plausible in view of a priori theoretical considerations concerning price elasticities. It seems therefore that while there were special characteristics in the interwar period that made this period unconducive to the use of least squares analysis, these characteristics are much less important today.

Our object in Chapter 2 is thus to discuss at some length the most important points that an investigation using least squares analysis should be concerned with in estimating import and export demand functions. Considerable evidence has already accumulated regarding the demand factors that determine the international flow of goods, thereby providing information useful to policymakers concerned with the balance of payments. However, further improvements are possible.

Chapter 3, dealing with the measurement of the elasticity of substitution in international trade, represents a bit of a digression. This is justified in our judgment by the amount of effort in the past that has gone into such measurement. Much of this effort was motivated by a search for alternative specifications that would yield more reliable and larger price elasticities than those obtained in estimating demand functions directly. However, given our increased understanding of statistical and data problems and the fact that the elasticity of substitution in international trade lacks a clear theoretical rationale, we take the position that there may be a greater payoff in direct estimation of the demand functions in question. It may be nevertheless that measurement of the elasticity of substitution is useful in models of relative export performance that embody both price and nonprice factors.

The measurement of factors determining international capital movements is treated in Chapter 4. This poses more difficult problems than trade in real goods and services especially because of the greater importance of expectational variables and the impingement of institutional practices and constraints. Moreover, some of the first works on capital movements in the early 1960's were limited by an inadequate theoretical framework, which resulted in improper selections of variables. The fact that the confusion over the appropriate variables has lasted as long as it has is attributable to a premature preoccupation with statistical problems of secondary importance. Much remains to be done as far as the empirical examination of the capital account of the balance of payments is concerned.

In Chapter 5, we attempt to bring the current and capital account relationships to bear on the problems of forecasting and policy analysis of the balance of payments. While this is a burgeoning subject, due especially to the great advances that have been made in computer technology, we are nevertheless still at a stage where there are somewhat divergent views on exactly

what should go into the construction of econometric models and the uses to which these models should be put in forecasting and policy analysis. Much of our discussion in this chapter is therefore somewhat tentative and suggestive. We have reviewed the treatment of the foreign sector in some of the existing econometric models of the United States economy. Since this treatment is quite simple at the present time, there remains much to be done, at least in the United States, to integrate the domestic and foreign sectors into a comprehensive model capable of yielding reasonably accurate forecasts and serving as the basis for analyzing alternative economic policies.

Part II dealing with international trade and welfare consists of Chapters 6 through 8. There is of course a large body of empirical literature dealing with the different aspects of trade theory. In general, much of this literature is aimed at particular implications of the theory, such as comparative advantage, the validity of the factor endowments model of international trade, and, more recently, the explanation of trade according to the "product-cycle" and "technological-gap" hypotheses. Since most of these studies have not raised important questions of conceptual design and statistical methodology and since they have been in large measure reviewed at length elsewhere, we have chosen to restrict ourselves to a narrower range of topics that appeared to us important and not always well understood. Perhaps at some later time we may expand our scope to include the other topics mentioned.

In Chapter 6 we are concerned with providing a general equilibrium framework into which can be fitted the analysis of factors determining the size of a country's foreign sector and the flows of goods between pairs of countries. Of all the topics treated in the various chapters, the material in Chapter 6 is perhaps the most unfamiliar, at least to American readers, since the bulk of the work involved has been carried on in continental Europe. The lack of an explicit theoretical framework has been the greatest failure of these studies. Without such a theory the analysis tends to degenerate into a search for meaningless empirical regularities. It thus is quite important to bring international trade theory to bear upon the role the variables may play and thereby provide some rationale for the otherwise ad hoc empirical impressions that such studies convey.

The material contained in Chapter 7 has grown out of a concern for analyzing the component factors that affect a country's export growth over time. The basis for the analysis is the assumption that a country's share in world markets should be constant over time. The application of an identity based on the constant-share norm highlights the importance to a country of concentrating its exports in high-growth commodities and markets and indicates whether the country has been successful in competing with other sources of supply during the period in question.

Chapter 8 deals with estimating the welfare effects of trade liberalization. This analysis is relevant for analyzing the consequences for economic welfare

of unilateral and multilateral tariff changes from the standpoint of individual countries. It can also be applied to cases of preferential tariff changes in the context of customs unions and trade preferences of various kinds. Most of the discussion of this chapter is concerned with the theoretical derivation of the compensated demand curve, which serves as the conceptual basis for analyzing the welfare effects of tariff changes in terms of consumer surplus. The price elasticities required for the actual calculations can in principle be obtained by using the procedures described in Chapter 2, although in practice "guesstimates" of the relevant elasticities are usually employed. The assumptions underlying the compensated demand curve are shown to be rather restrictive. However, the changes involved in trade liberalization are usually relatively small so that the calculation of the welfare effects may provide a reasonable assessment of the order of magnitude of these effects.

Rather than list all the bibliographic items together, we have chosen instead to list them separately with each chapter. These bibliographies contain the most important works of about the past decade, but they are by no means exhaustive.