Chapter 1

INTRODUCTION TO A VOLUME ON THE TREATMENT OF SEASONALITY IN MEASURES OF INFLATION

Bert M. Balk, W. Erwin Diewert and Alice O. Nakamura[1]

Though the problem was signaled already in the 1920s, seasonal products are largely ignored in the main stream of literature on the measurement of price level change. The usual, implicit or explicit, assumption governing the study of alternative index number formulas is that the periods considered are entire years. The application to subperiods, such as months or quarters, then runs into all the difficulties that come with seasonality. For a recent, concise treatment the reader is referred to Balk (2008; section 4.3).

Especially troublesome is the occurrence of missing data. The usual way out is either some form of imputation or the deletion of all or part of the seasonal products from the scope of an index. In any case, the resulting, monthly or quarterly, time series must be seasonally adjusted, using methods that are the culmination of a vast literature on the topic of the seasonal adjustment of economic time series. This literature in turn is an offshoot of an even larger literature on the general topic of the seasonal adjustment of time series of all sorts. The papers in this volume demonstrate that there is an important literature on how to more directly handle seasonal products in price indexes, without making the untenable assumption that prices can be measured for all products in all seasons.

In **chapter 2**, **W. Erwin Diewert** of the University of British Columbia, **Paul A. Armknecht** of the International Monetary Fund, and **Alice O. Nakamura** of the University of Alberta provide a selective survey of the treatment of seasonal products in economic time series. This paper serves three purposes. It provides an encapsulated overview of the material on seasonal adjustment in the international CPI and PPI Manuals. Secondly, it picks up a topic neglected in the CPI and PPI Manuals: the pervasively used X-11 family methods of seasonal adjustment methods. Third, it examines the current state of consensus on the treatment of seasonal products in official price index making, including briefly reviewing some of the literature on this topic since the publication of the 2004 CPI and PPI Manuals.

In **chapter 3**, **Diewert, William F. Alterman** of the Bureau of Labor Statistics and **Robert C. Feenstra** of the University of California at Davis revisit the fundamental issues of what is wanted from, and what it is feasible to accomplish with, seasonal adjustment methods.

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In the CPI and PPI Manual treatments of seasonal adjustment, all the alternative methods considered are implemented and compared using the artificial Turvey data set (tabled in chapter 8 of this volume). Comparisons of different methods based on this artificial data are suggestive of the performance attributes of the different methods. Working through the numerical exercises in the CPI and PPI Manuals is helpful as well for readers interested in insuring they fully understand the various methods. However, the trial by fire for any empirical method is replicated application on real data. One such application is provided in **chapter 4**. In this chapter, **Diewert**, together with **Yoel Finkel** of the Israeli Central Bureau of Statistics and **Yevgeny Artsev** who was formerly with the Israeli Central Bureau of Statistics and is now with the Israeli National Roads Company, apply the methods introduced in the CPI and PPI Manuals to Israeli CPI program data. The objectives of this paper are to summarize the methods and findings on the treatment of seasonal products from the PPI and CPI manuals, to describe some of the methods used in the Israeli CPI to overcome seasonal fluctuations (and bias) in a month-to-month index, and to examine some of the conclusions from the manuals by simulating the methods with real Israeli CPI data. In two final appendices, the authors table the data used in this study, so it can be used by others interested in replicating and extending this research.

Andrew Baldwin of Statistics Canada in his **chapter 5** paper focuses on the Farm Product Price Index (FPPI) produced by Statistics Canada. It is a monthly series that measures the changes in prices that farmers receive for the agriculture commodities they produce and sell. Its primary purpose is to serve as a measure of Canadian agricultural commodity price movement and as a means to deflate agricultural commodity prices.

The FPPI is based on a five-year basket that is updated every year. This captures the continual shift in agricultural commodities produced and sold. The annual weight base is derived from the farm cash receipts series. The FPPI is not adjusted for seasonality, but seasonal baskets are used since the marketing of virtually all farm products is seasonal. The index reflects the mix of agriculture commodities sold in each given month. The FPPI allows the comparison, in percentage terms, of prices in any given time period to prices in the base period. The FPPI has a number of features inspired by the Prices Received by Farmers Index produced by the U.S. Department of Agriculture (USDA), including features that Baldwin views as an improvement on the U.S. methodology.

Some demographic groups are known to buy much higher proportions of their purchases at promotional sale prices than others. Unfortunately, scanner data information is not usually linked to the characteristics of the purchasers or their households. However, in **chapter 6 Rósmundur Guðnason** of Statistics Iceland describes another way of collecting expenditure (or quantity) information that does allow the purchases to be linked back to the characteristics of the buyers and their households, in Iceland at least.

In the **chapter 7** paper, **Peter Hein van Mulligen** and **May Hua Oei** of Statistics Netherlands, apply some of the proposed methods to Dutch scanner data. This paper also contains a fascinating account of how Statistics Netherlands is now introducing scanner data from a number of purchase channels in their official CPI program. At present, seasonal products are excluded from these scanner data. However, this paper reports on efforts to change this situation. A valuable additional contribution of this paper is to point out that promotional sales can produce fluctuations in product prices and quantities that raise some of the same problems as seasonal fluctuations. Whereas promotional sales prices have been ignored in traditional official price index practice, large proportions of total purchases for many sorts of products take place at

promotional sales prices. Van Mulligen and Oei suggest that some of the same methods considered for dealing with seasonal products such as fruits and vegetables might also be used to incorporate promotional sales activity into official price statistics. A key advantage of scanner data, from this perspective, is that it includes purchase quantity information matched with the collected price information.

Chapter 8 is an excerpt from a classic 1983 paper by **W. Erwin Diewert**. In particular, this excerpt includes the proposal in the original paper for a radically new way of dealing with seasonality in a CPI or PPI. This approach is studied in a number of papers in this volume. Also it has now been picked up and recommended in the international Consumer Price Index Manual (Hill, 2004) and Producer Price Index Manual (Armknecht). This except from Diewert's 1983 paper is included in this volume for the convenience of readers who do not have access to the Statistics Canada volume where the original paper appeared.

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