

THE NEW PRICE INDEX MANUALS

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Abstract

The International Monetary Fund (IMF) and the International Labour Organization (ILO) have recently completed work on two new price statistics manuals—*Consumer Price Index Manual: Theory and Practice* and *Producer Price Index Manual: Theory and Practice*. This paper discusses the background and concerns that led to the development of for these complementary volumes. It also provides a brief overview of their contents. While the primary users of these Manuals are expected to be index compilers, other users in government and business also will find them of interest in explaining price index number theory and practice.

1. INTRODUCTION

The IMF and the ILO are responsible for publication of two new price index manuals—*Consumer Price Index: Theory and Practice* and *Producer Price Index: Theory and Practice*. The consumer price index (CPI) and the producer price index (PPI) measure rates of change in prices of goods bought and sold by consumers and producers, respectively. As such, they serve as the key measures of inflation in most economies. The new *Manuals* serve the needs of both compilers in national statistical organizations and most other users of these indices in the public and private sectors. We expect that the *Manuals* will be widely used by academics, central banks, ministries of finance, and many private businesses and research organizations.

The *Manuals* are not “cook books” that provide a simple set of rules and procedures that all countries can follow. Rather, they present detailed explanations of the basic statistical and economic concepts and procedures that are appropriate for institutions to use when compiling CPIs and PPIs. They provide the compiler with detailed information on how to build the index, given the economic circumstances of the country, along with the conceptual and theoretical reasoning for making alternative formulations.

2. BACKGROUND TO PRESENT REVISION

2.1. Use of outdated formulas

The standard fixed basket price index methods used in most countries today date back over 80 years to those proposed by W.C. Mitchell (1927) and G.H. Knibbs (1924). Index number theory has advanced substantially, particularly in the past thirty years, to provide us with better information on what our target index number formula should be. In particular, various approaches have been used to evaluate index number formula and derive those best suited for inflation measures. These can be broken down into four ways of viewing the basic index number problem (i.e., separating a value change into its price and volume components):

¹ The views expressed are those of the author and do not necessarily reflect the views of the IMF or IMF policy.

- Fixed basket and symmetric averages of standard formulas,
- The stochastic (statistical estimator) approach,
- The test or axiomatic approach, and
- The economic approach.

All these approaches are explored in the *Manuals*. As it turns out, all of these views lead to a small set of target index numbers—Fisher, Walsh, and Törnqvist—that have sound statistical and economic underpinnings.

2.2 Index number practice and theory differ

The concerns with current index methods arise from the fact that, in practice, the index numbers in use often do not really correspond to those espoused in theory or those in countries' published methodology documents. For example, many countries say they use a standard Laspeyres index, but the actual formula used is different. For a Laspeyres index, the price reference (base) period must be the same as the weight reference period. Often, the weight reference period is, in fact, earlier than the price reference period. Thus, these compilers are producing either a Lowe or a Young price index rather than a Laspeyres. If the value weights used in the index are from an earlier period and updated for price change to the price reference period, the formula is a Lowe index. If the weights are simply introduced with no price updating, the formula is a Young index.

In addition, different formulas are used at different stages of aggregation. At the elementary or first stage where prices are first combined to form an index many countries will not use weights. At the second and higher levels, weights are applied, but these weights relate to some period in the past that becomes less representative with the passage of time. Now compare this with the approach for the target (superlative) indices such as Fisher, Walsh, or Törnqvist, and it becomes apparent that the indices produced in practice are of substantially lower quality than the target indices. The new *Manuals* discuss these issues thoroughly and provide approaches that countries can implement over time to move closer to the target measures.

2.3 Quality change and new goods

There are also issues related to quality change and the introduction of new goods in our price indices. With the release of the Boskin Report (Michael J. Boskin and others, 1996), users of price indices have become more concerned about the effects of quality change on price index measures. Most countries do not attempt to make quality adjustments as products disappear and replacements are made. New goods often are added with weight updates only when the market basket is replaced. Most countries' price indices have an indeterminate bias from not treating quality change properly as a volume change. The new *Manuals* deal extensively with methods for making quality adjustments and introducing new goods.

2.4 Seasonal products

Yet another area of concern is the treatment of seasonal products. Seasonal products often have quite large price changes, and their prices may be missing at various times throughout the year. Thus, price changes for seasonal products can distort month-to-month price movements. Standard index number approaches may not be adequate to handle seasonal products, and the new *Manuals* address this problem and evaluate alternative approaches.

2.5 Coverage of services

In both CPIs and, particularly, PPIs the number of service items is limited. The service sector is the fastest growing sector in many economies, but the coverage of this sector is not keeping pace. Many services are difficult to price. The services statistical offices cover tend to be those that are easier to collect. Most PPIs are limited to industrial activities, and, only recently, have there been concerted efforts to expand PPIs to include services activities. The new *Manuals* provide practical examples for countries to follow in implementing difficult to price services.

2.6 Different indices for different users

There are a variety of users for CPIs and PPIs and many require different indices depending on the usage of the index. There are users who want measures of inflation for different segments of the population such as urban and rural, or poor and moderate income families, in addition to that for the total population. Some users may want a measure that reflects changes in pensioners' cost of living or those for wage and salary workers. For the PPI, there is interest in both output PPIs (at basic prices) and input PPIs (at purchasers' prices) or indices by stage of processing. In addition policymakers may want certain analytical measures such as the "core" CPI or PPI that exclude certain volatile components.

3. EFFORTS TO ADDRESS THESE INDEX NUMBER CONCERNS

3.1 Ottawa Group (International Working Group on Price Statistics)

In the early 1990s concern was growing among many of the advanced statistical agencies that there were no organized efforts to address the problems being identified with price index measures. Research by academia, central banks, and statistical agencies provided evidence that the existing measures were inadequate and there was a need to delve into these problems and address the perceived shortcomings. These concerns led to the formation of a group of price index specialists to conduct additional practical research into these problems and how they can be resolved operationally. The first meeting of the group took place in Ottawa in October 1994 and has resulted in a continuous flow of research over the past decade. This research has been used in the development of the *Manuals*.

3.2 Voorburg Group (International Working Group on Services Statistics)

The Voorburg Group has included in its activities practical development of PPIs in services. Its areas of research have focused on PPIs for business and professional services. Research conducted by this Group underlies the practical examples in the *PPI Manual*. For example, Chapter 10 of the *Manual* contains detailed descriptions for products that are difficult to price. From the services sector, these include retail trade, wireless telephone communications, commercial banking, software consultancy, insurance, legal services, and general medical hospitals.

3.3 Inter-secretariat Working Group on Price Statistics

The UN Statistical Commission approved formation of the Inter-secretariat Working Group on Price Statistics (IWGPS) in 1998 to oversee the revision of the two price statistics *Manuals*. In November 1997 the ILO/ECE biannual Meeting on Consumer Prices recommended to the Statistical Commission that the ILO *CPI Manual*, published in 1989, should be revised to reflect changes in index number methodology and theory that had been developed over the past decade.

The Statistical Commission also charged the IWGPS with developing a *PPI Manual* to replace the one published by the UN Statistical Division in 1979. The two Manuals would be developed in lock-step with the *CPI Manual* completed first, followed closely by the *PPI Manual*. They would share a common structure and similar approaches where appropriate. In December 2003, the IWGPS subsequently agreed to oversee development of an *Export and Import Price Index Manual* following the completion of the *CPI* and *PPI Manuals*.

4. ORGANIZATION FOR THE MANUAL REVISIONS

Seven international agencies concerned with inflation and inflation policies were initially represented on the IWGPS. These were the ILO, IMF, UN ECE, Eurostat, World Bank, and UN Statistics Division. Price experts from each agency were appointed to the group, and the ILO was the secretariat. In April 2004, the IMF took over the secretariat responsibilities. Each agency had one or two representatives on the IWGPS.

The *Manuals* were closely linked. In addition to sharing common structural features, there were two technical expert groups (TEGs) formed to complete the drafting, review, and initial editing of the each of the *Manuals*. Representatives from the IWGPS served on each of the TEGs. Also, the TEG membership included experts from national statistical offices and academic institutions.

5. ACKNOWLEDGEMENTS

The Preface to the *Manuals* include the list of authors for each chapter and the editors, as well as the membership of the IWGPS, the TEG-CPI, and the TEG-PPI. All of the authors are well-known in their field of expertise. An important aspect in the development of the *Manuals* was the vetting of the draft text in two separate user seminars. The *CPI Manual* seminar was held in Singapore during June 2001, and the PPI seminar was held in Pretoria during June 2003. Seminar participant gave valuable comments that were incorporated in the both *Manuals* as they were finalized. For example, one major input was the ordering of the chapters. Because the primary users of the *Manuals* are compilers, the seminar participants insisted that the practical chapters should appear first.

6. OVERVIEW OF THE PPI MANUAL

The overall structure of the *Manuals* are similar. Table 1 provides the sequence of chapters in the *PPI Manual*. The Preface and Reader's Guide discuss the problems, issues, and importance of different chapters to different users. Chapters 1-13 focus on compilation issues. Chapters 14-22 provide the theory and conceptual framework of the PPI.

One of the key advantages of the *PPI Manual* is that it contains very detailed compilation procedures and presentations of the theory underlying alternative procedures. Not all readers will be interested in reading all chapters—that is, in reading the *Manual* cover to cover. The Preface, Chapters 1-3, and Chapter 14 are meant for all readers. Chapters 4-13 are primarily for compilers, although many users will have an interest in selected topics, particularly Chapter 11 on errors and bias in the PPI. Chapters 15-22 will be of special interest in economists and students of economics although many compilers will find Chapters 15 and 19 of special interest. Policymakers and researchers, for example, should have particular interest in chapters 1 (Introduction), 9 (PPI calculation in practice), 11 (Errors and bias in the PPI), and 15 (Basic index number theory).

There is an extensive Glossary of key terms in index number theory and practice as well as an exhaustive Bibliography of the price index number literature.

7. WHERE TO FIND THE *MANUAL* CHAPTERS

Draft versions of the *Manual* chapters are available on the websites of the organizations responsible for their publication. For the *CPI Manual* these are on the ILO website at www.ilo.org/public/english/bureau/stat/guides/cpi/index.htm, and for the *PPI Manual* these are on the IMF website at www.imf.org/external/np/sta/teggppi/index.htm. The *Manuals* are considered living documents. The IWGPS will conduct periodic reviews and update them as necessary on their respective websites.

Hard copies of the *CPI Manual* are available for order from the ILO publications office and through the ILO website using the Publications menu. Likewise, hard copies of the *PPI Manual* will be available in September from the IMF publications office and through the IMF website using the Publications menu.

REFERENCES

1. Boskin, Michael J., Ellen R. Dulberger, Robert J. Gordon, Zvi Griliches, and Dale W. Jorgenson, 1996, *Towards a More Accurate Measure of the Cost of Living*, Final Report to the Senate Finance Committee, Advisory Commission to Study the Consumer Price Index, Washington, December 4.
2. International Labour Organization, International Labour Office (ILO), 1989, *Consumer Price Indices: An ILO Manual* (Geneva).
3. International Labour Organization, IMF, OECD, Eurostat, UNECE, and the World Bank, 2004, *Consumer Price Index Manual: Theory and Practice* (Geneva).
4. International Monetary Fund, ILO, OECD, Eurostat, UNECE, and the World Bank, 2004, *Producer Price Index Manual: Theory and Practice* (Washington, D.C.).
5. Knibbs, G.H., 1924, *The Nature of an Unequivocal Price Index and Quantity Index*, *Journal of the American Statistical Association*, Vol. 19, pp. 42–60 and pp. 196–205.
6. Mitchell, W.C., 1927, *Business Cycles* (New York: National Bureau of Economic Research).
7. Ottawa Group (International Working Group on Price Indices), reports of various meetings. Available via the Internet: <http://www.ottawagroup.org/>.
8. United Nations, 1979, *Manual on Producers' Price Indices for Industrial Goods*, Statistical Papers, Series M, No. 66 (New York).
9. Voorburg Group (International Working Group on Services Statistics), reports of various meetings. Available via the Internet: http://www4.statcan.ca/english/voorburg/aspfiles/searchall_prompt.asp.

Table 1. List of PPI Manual Chapters

Chapter	Title
	Contents and Foreword
	Preface
	Reader's Guide
1	Abbreviations and Introduction
2	Background, purpose, and uses of Producer Price Indices
3	Coverage and classifications
4	Weights and their sources
5	Sampling issues in price collection
6	Price collection
7	Treatment of quality change
8	Item substitution, sample space, and new goods
9	PPI calculation in practice
10	Treatment of specific products
11	Errors and bias in the PPI
12	Organization and management
13	Publication, dissemination, and user relations
14	The system of price statistics
15	Basic index number theory
16	Axiomatic and stochastic approach
17	Economic approach
18	Transfer Prices
19	Price indices using an artificial data set
20	Elementary indices
21	Quality change and hedonics
22	Treatment of seasonal products
	Glossary
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	Index