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## Chain indices, A Study in Index Theory

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The structure of the book is as follows

Chapter	Comment
<b>0. Introduction</b>	Introduction of some fundamental concepts concerning index theory and price statistics
<b>1. Towards a clear notion of a chain index</b>	It is shown that a distinction should be made between a link and a chain (i.e. the product of links), and that the nature of weights, and of the product presentation of a and chain is quite often misunderstood. There is also some confusion as far as "chainability" (transitivity) is concerned.
<b>2. Elements of direct index theory</b>	Uses and limitations of the axiomatic approach. The meaning (and justification) of some fundamental axioms, like identity, monotonicity etc. Discussion of the relative importance of certain axioms. Detailed analysis of deflation and aggregative properties (esp. also linearity) of price index formulas.
<b>3. Analysis of properties of chain indices</b>	Interpretations of an index function in terms of "means of relatives" or "ratios of expenditures", applicability or violation of axioms. Drift function and growth factors (or growth rates) of chain indices and their relation to "intertemporal correlation". Nonlinearity in the current period's prices and aspects of accuracy in the index compilation.
<b>4. Towards a theory of a chain indices</b>	An attempt is made to find some elements of a theory of "comparability" and "chainability" (showing also the nature of the assumptions usually made tacitly here). The relationship between chaining and consistency in aggregation over commodities as well as over time intervals (i.e. the phenomenon of path dependency), and between chaining and constant adjustment of quantity weights is studied. It is also shown that up-to-dateness of weights (of the basket) is more an obsession rather than theoretically justified.
<b>5. Deflation with chain indices</b>	Some disadvantages of deflating with a direct Fisher index are demonstrated. When the chain version of this index is used (as recommended by the SNA) there are even more shortcomings.
<b>6. Arguments in favour of the chain index approach</b>	This chapter analyses the inconclusiveness (and also ambiguity and vagueness) of most of the well-known arguments commonly used to advocate this type of indices.
<b>7. Divisia index</b>	Relation to chain index numbers and limitations of this approach.
<b>8. Aspects of interpretation and official statistics</b>	This final chapter focuses on practical problems and other considerations (like acceptance and understandability) relevant for official statistics. A final attempt to define and justify the idea of "pure price comparison" is also made.

## Preface

This book is designed as a sort of pamphlet in which the author tries to convince the reader, as follows:

- the reasons given for the alleged advantages chain indices enjoy over direct indices are not conclusive,
- there are definitely many undeniable shortcomings of chain indices such as difficulties in aggregation and deflation, path dependence and inapplicability of axiomatic reasoning, and
- those who advocate chain indices, not infrequently, have misunderstood and neglected some of the ideas underlying the traditional direct Laspeyres index, ideas of which this book tries to remind the reader.

It is primarily the idea of making pure comparisons, or of comparing "like with like" which is ignored by chainers, but which is on the other hand a cornerstone of index theory, if not of statistics in general. Therefore I think it is time to reconsider carefully the decisions in favour of chain indices, because disadvantages of this type of index formulas abound, and there is no conceptual basis aside from some ingratiating rhetoric in terms of "flexibility", "adaptability" "up-to-dateness", "relevance" or so. It is first and foremost this kind of fashionable talk about indices, which decisively promotes the cause of chain indices and to call this into question is the primary concern of this book.

The history of this book began with some TES - courses (in English) on "Price Index Theory and Price Statistics". TES means "Training of European Statisticians" and is an organization (it became an institute meanwhile) of Eurostat (the Statistical Office of the European Union) with which I cooperated for some years fairly intensively. I was glad that I got so much support from the Statistisches Bundesamt, the German Statistical Office (GSO for short), by sending lecturers who presented the practical part of the topic, while I delivered the theory. I am particularly grateful to Mr. Johann Szenzenstein, Mr. Günther Elbel and Mr. Helmut Mayer from the GSO, as well as to varying lecturers from Eurostat who gave me this valuable support.

In these courses, I also discussed among other things repeatedly the most contentious chain index issue, and I prepared some comprehensive English texts on a number of theoretical aspects of index formulas. Some parts of this collection of papers, esp. parts of chapters 3, 4 (on axiomatics), 5 (on deflation), and in the main chapter 7, which was devoted to chaining forms the basis of this book on chain indices.