
Title — No More than 120 Characters (with Spaces) — This File is an Example on How to Use the “revstat-v4.sty” Package

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Abstract:

- A summary of less than one hundred words, followed by a maximum of six key words and the AMS 2020 subject classification. The paper should not have more than 25 pages. If necessary authors may consider a file for Supplementary Material, from their own responsibility. This paper approaches issues related with frame problems and nonresponse in surveys. These *nonsampling errors* affect the accuracy of the estimates whereas the estimators become biased and less precise. We analyse some estimation methods that deal with those problems and give an especial focus to the poststratification procedures. We then address the Bootstrap methodology for variance estimation.

Keywords:

- *poststratification; frame problems; nonresponse; reweighting; adjustment methods; bootstrap.*

AMS Subject Classification:

- 49A05, 78B26.

1. INTRODUCTION

The importance of the treatment of factual items in the XYZ has long been recognized in the literature¹. If not excluded for the purposes of index number compilation, the most common approaches to the treatment of such goods are the so-called fix...(see details in [Rubin, 1988](#)).

2. DESCRIPTION OF THE PROBLEM

2.1. Theoretical background

As mentioned in Section 1, in principle, the difficulties raised by the existence of factual items can be tackle by either:

- a) ignoring the issue and excluding all the possible ‘problematic’ items from XYZ compilation;
- b) allocating fixed weights, assuming that factual items are to be treated in the same way as all other items (this is the fixed weights approach);
- c) allocating variable/changing weights, according to the consumption pattern found in the base year (this is the variable weights approach).

Table 1 summarises the main advantages and disadvantages of the three considered approaches.

| Approach | Advantages | Disadvantages |
|-----------------|-------------------------|---------------------------|
| Ignore... | Simplicity | Overlooking... |
| Fixed-weight | Theoretical consistency | Choice of imputation... |
| Variable-weight | Minimisation... | Theoretical inconsistency |

Table 1: Advantages and disadvantages of different approaches to the treatment of factual items in a XYZ.

Ignoring the ‘problematic’ or more ‘volatile’ items can be seen as a non-solution in the context of an index that wants to reflect changes in consumption prices. If these items have some importance in the XYZ basket, then there is, in principle, no reason for ignoring them.

Figure 1 compares the carry forward and percentage change indices as in [Robert \(1999\)](#). Although different in level, they nearly have the same turning points and behaviour in terms

¹See, for instance, [Rothwell \(1958\)](#).

of movement (details in Rothwell, 1958; Author1, 1980, 1990; Robert, 1999; Rubin, 1988; Author1, 2000; Author1 and Author2, 1980; Author1 et al., 1980, for instance).

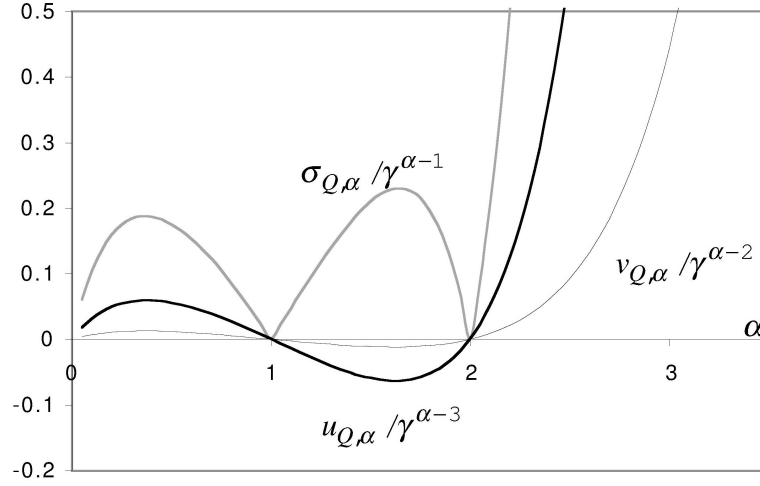


Figure 1: Carry forward and percentage change indices.
Both indices tend to approximate in the months with less prices.

Theorem 2.1. Consider aggregation with all the other XYZ components.

$$(2.1) \quad I_{i;o,m}^{t,m} = \frac{p_{i;t,m}}{p_{i;o,m}}.$$

Proof: This could be the proof of the previous Theorem... □

2.1.1. This is a subsubsection

The percentage change index presents a higher volatility than the forward imputation method (2.1), (2.2) and (2.3) (see Theorem 2.1 and Lemma 2.1).

Lemma 2.1. Consider aggregation with all the other XYZ components. That is only possible at the class level:

$$(2.2) \quad I_{i;o,m}^{t,m} = \frac{p_{i;t,m}}{p_{i;o,m}}, \quad m, n \in \mathbb{N};$$

$$(2.3) \quad {}_s I_{o,m}^{t,m} = \sum_i I_{i;o,m}^{t,m} \frac{p_{i;t,m} \cdot q_{i;o,m}}{\sum_i p_{i;t,m} \cdot q_{i;o,m}}.$$

No matter which approach is followed, one has to bear in mind that no “perfect” solution exists...

(Similar environment for corollary, proposition, ...)

Proof of Lemma 2.1: This is the proof of the previous Lemma... □

Corollary 2.1. *First Corollary...*

Proof of Corollary 2.1: This is the proof of the previous Corollary... □

Proposition 2.1. *First Proposition...*

Proof of Proposition 2.1: This is the proof of the previous Proposition... □

Remark 2.1. First Remark...

As stated in the Remark 2.1

(Similar environment for definition, example, note, ...)

Definition 2.1. First Definition...

As considered in the Definition 2.1

Example 2.1. First Example...

As observed in the Example 2.1

Note 2.1. First Note...

As enhanced in Note 2.1 the References section should be **ordered alphabetically**.

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