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IPS Paper

Controlling drift when extending index series of consumer price change over time

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Brief Description

The Consumer Price Index (CPI) is widely used as the most important indicator of inflation.

The CPI is going through a series of rapid transformations as national statistical institutes (NSIs) are acquiring transaction data sets containing product sales from retail chains.

The availability of consumer expenditures and sold product quantities in these large data sets allows NSIs to increase the accuracy of their inflation figures, as a result of both a huge increase in product sample size and a shift towards investigating and using more refined index methods.
The use of transaction data in a CPI poses numerous new challenges.

Price changes that are compiled each month with newly available data have to be linked to a price index of a previous month in order to extend an index series to the current month.

Traditional bilateral index methods are not suited to handle variability in both prices and sold quantities and hence are sensitive to drift; that is, different linking strategies lead to different results regarding price change.

Multilateral methods have the advantage of being transitive on fixed time windows, but unfortunately this property is lost once index series calculated on successive time windows are linked, so that drift in extended multilateral index series cannot be excluded either.
This paper presents the results of an extensive comparative study, which makes use of a large sample of transaction data sets that cover almost 15 percent of the total weight in the Dutch CPI.

Numerous index extension methods are compared, which vary both in the length of the time window (13 and 25 months) and in linking months.

Several methods that use 25-month windows yield accurate inflation figures and are particularly suited for capturing price changes of seasonal goods.

However, the results can even be improved by optimising the choice of the linking month while limiting the length of the time window to 13 months in most cases, yielding drift-free indices for even the most dynamic product categories like clothing and garden furniture.

Abstract

The Consumer Price Index (CPI) is widely used as the most important indicator of inflation, which is intended as a 12-month rate of price change in overall consumer expenditure. The CPI is going through a series of rapid transformations as national statistical institutes (NSIs) are acquiring transaction data sets containing product sales from retail chains. The availability of both consumer expenditures and sold product quantities in these large data sets allows NSIs to increase the accuracy of their inflation figures, as a result of both a huge increase in product sample size and a shift towards investigating and using more refined index methods.
The use of transaction data in the CPI poses numerous new challenges. Price changes that are compiled each month with newly available data have to be linked to a price index of a previous month in order to extend an index series to the current month. Traditional bilateral index methods are not well suited to handle variability in both prices and sold quantities and are sensitive to drift; that is, different linking strategies lead to different results regarding price change. Multilateral methods have the advantage of being transitive on fixed time windows, but unfortunately this property is lost once index series calculated on successive time windows are linked, so that drift in extended multilateral index series cannot be excluded either. However, a huge benefit of multilateral methods is the richer number of variables for extending index series, which enhances the possibilities of controlling drift.
This paper presents the results of an extensive comparative study, which makes use of a large sample of transaction data sets that cover over

15 percent of the total weight in the Dutch CPI. Numerous index extension methods are compared, which vary both in the length of the time window (13 and 25 months), linking month and index in the linking month (published or recalculated). Linking 12-month rates of change on indices published 12 months ago yields very accurate inflation figures when using 25-month windows, but short-term changes may be inaccurate. Linking on the most recent recalculated indices of around six months ago produces index series with accurate short-term and 12-month rates of change, even with 13-month windows for most product aggregates. Further improvements for detailed product aggregates can be obtained by optimising the choice of window length and linking month, which however become negligible at higher aggregate product levels and headline inflation.