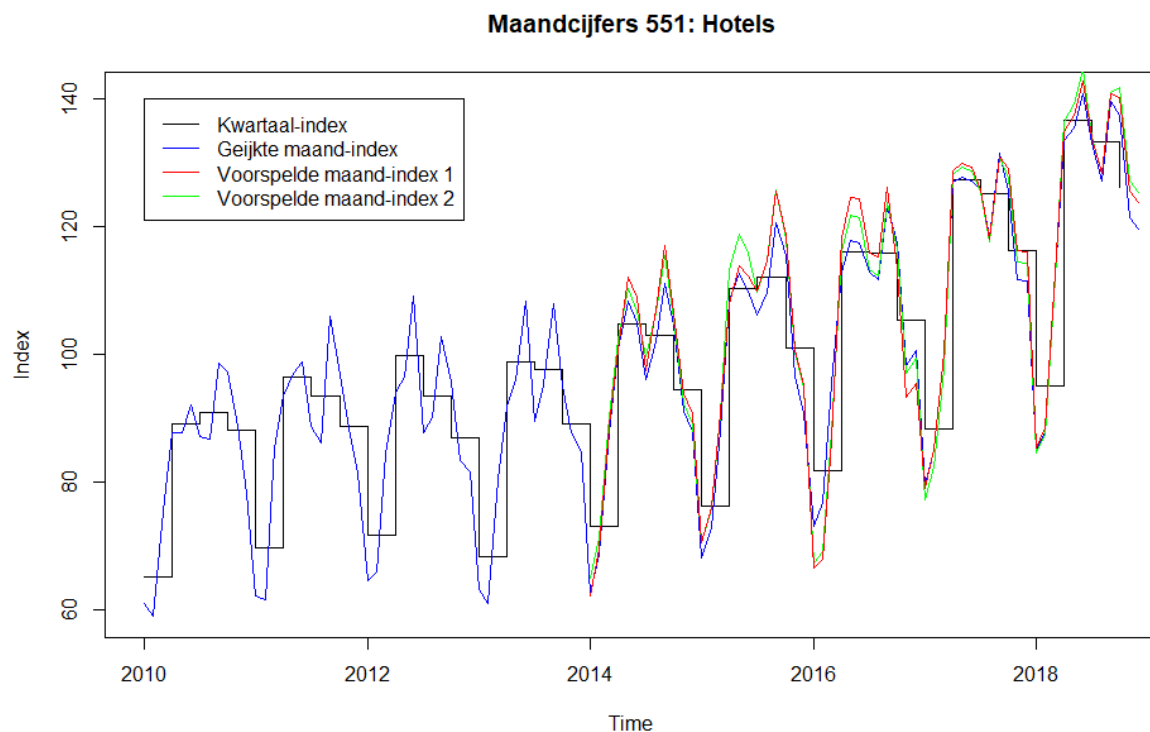


Cost-efficient approaches to build ISPs

Statistics Netherlands faces an uphill battle in order to comply with FRIBS regulations from 2024 onwards. FRIBS requires us to construct a monthly index of service production (ISP) for all 2-digit service NACE divisions. In the current situation, only quarterly turnover estimates for 80% of the FRIBS scope and quarterly price estimates for 50% of the FRIBS scope are produced by Statistics Netherlands. The budget that has been awarded by the Dutch government is limited and the pressure not to increase the administrative burden of Dutch companies is high. That is why we are working on several innovative approaches that would allow us to increase the scope and frequency of our turnover and price estimates without increasing the number of surveys sent out. This paper briefly discusses four of these approaches. As all projects are still being worked on, no final results can be presented as of yet.

Nowcasting monthly turnover changes when quarterly data are available only

For the majority of NACE divisions, Statistics Netherlands bases its STS turnover estimates on VAT register data. In the Netherlands, VAT return is required on a quarterly basis, which complicates Statistics Netherlands' task to increase the frequency of these estimates to a monthly level. Luckily, some Dutch companies do file their VAT return on a monthly basis. In order to comply with FRIBS, Statistics Netherlands will be using nowcasting techniques in which these monthly data are exploited to estimate monthly turnover changes for the entire population. Once the regular quarterly figure becomes available, monthly changes are recalibrated. In order to gain insight into the quality of our method, we test for the average magnitude of the recalibration in each NACE division as the graph below makes clear.



Nowcasting monthly price changes when quarterly data are available only

Once we have our monthly turnover series, these should be deflated with a corresponding SPPI in order to construct a monthly ISP. However, our SPPIs are produced on a quarterly basis (reference months are February, May, August and November). Replacing quarterly surveys by monthly surveys would be a highly expensive solution to this problem. We are looking for more cost-efficient solutions.

The easiest option would be to deflate turnover changes of February, May, August and November with price changes of Q1, Q2, Q3 and Q4 respectively, and to set the volume changes of the remaining months equal to the turnover changes of those months. However, with such an approach our volume series would most likely be characterized by cascading patterns: sudden drops in February, May, August and November, and speedy growth in between. A better option may be to 'draw a linear line' in the SPPI series between February and May, in between May and August, etcetera. However, also this option is hardly ideal. What if prices in fact usually change in specific months? For example, it is known that many companies recalibrate their prices in January.

Our preferred approach would therefore be to build a nowcasting technique in which the relation between certain regressors (the independent variables) and price changes (the dependent variable) is first estimated as a quarterly level and then used to "predict" monthly price estimates. Obviously, this is only possible if the regressors are available on a monthly basis. Suitable regressors could be the overall consumer price index, the overall producer price index and the turnover index of the industry that the SPPI in question refers to.

Measuring volume directly

Statistics Netherlands' default approach to measure volume is to deflate VAT turnover with a corresponding SPPI, based on survey data. However, for some NACE divisions register data are available that allow us to estimate volume directly. SPPIs can then be derived from volume and turnover, so that price surveys are no longer needed.

Measuring volume directly basically comes down to measuring the number of units sold and attaching price weights to these units. This is tricky, as the register data that Statistics Netherlands uses do not include the individual price of each unit. Therefore, we try to divide the units into groups that are as homogeneous as possible, and we attach the same price weight to each unit inside a group. Consider the following theoretical example of a direct volume estimate of a NACE division that involves retail trade in new cars. VAT turnover and the number plate license register are available. No price information is available. One option would be to send out price surveys, however, in this case volume can also be measured directly by deriving the number of units sold from the number plate license register and dividing them into brand groups. Using expert guesses and desk research, price weights can be attached to the groups.

The main weakness of approaches like these is that it is hard to get proper correspondence between turnover and volume, as they are based on a different source. As a consequence, resulting SPPIs can follow implausible patterns.

Several examples for which Statistics Netherlands is experimenting with direct volume estimates include:

- NACE 68.31 (real estate brokers): data on the number of houses sold each month are available, including metadata that allow us to divide the houses into quality groups.

- NACE 78 (temporary employment agencies): wage tax declaration data are available from which the number of hours worked by temporary employees can be derived. Metadata, most notably wages, can be used to attach price weights to the different “units” (people).
- NACE 77.1 (car lease): the national branch organization of lease companies delivers us a monthly dataset on the recurring number of lease contracts.

Estimating price series through time series analysis

For some NACE divisions, constructing SPPIs with survey data is not feasible, for example because the industry is too heterogeneous, because large companies are reluctant to provide survey data, or because the activities are too complex to capture in a model contract. In that case, the alternative is to impute price changes. The ‘bottom line’ to do this is to employ some proxy, like the overall SPPI, a combination of other price series or wage data. At Statistics Netherlands, we are planning to do some research on more sophisticated methods in which time series analysis is used to impute price changes.

An option is to test for the relation between wage changes and price changes in the NACE divisions for which regular SPPIs are already produced. The (significance of the) correlation coefficient may depend on the labour intensiveness of the NACE in question. If clear patterns are observed, a combination of wage data and correlation coefficients can be used to estimate price changes in other NACE divisions.

A second option would be to make use of standard economic theory on prices, like the Cobb-Douglas production function in which price depends on labour, capital, the wage rate, the interest rate and technological progress. Labour can be derived from wage tax declaration data, capital can be derived from investment and capital good statistics. As of September 2019, no start has been made yet with research into time series imputations.

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