

Economic Commentaries

Real-time indicators provide information support during rapid cyclical turnarounds

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The coronavirus pandemic and its effects have dominated recent months. The necessary restrictions placed on the life of our communities have led to a sudden and dramatic weakening of global economic activity. Statistics and various indicators that the Riksbank normally relies upon to assess economic developments are published once a month or once a quarter, and are subject to a time lag. For example, the National Accounts are published about 60 days after the end of the quarter, which means that the first ordinary GDP outcome for the first quarter is published at the end of May.² When the economy is moving as quickly as it has in recent months, backward-looking data does not provide enough support for economic policy decisions or to assess the current situation and developments in the near future. To gain a rapid estimate of how the coronavirus pandemic is affecting the Swedish economy and labour market, the Riksbank has expanded its collection and compilation of high-frequency data, known as real-time indicators. Data has been collected from other authorities, from various Internet websites and in collaboration with various commercial data suppliers that have previously collected and compiled real-time indicators. The Riksbank regularly interviews a number of major Swedish companies and, as of March, has conducted more frequent telephone interviews as a complement to the real-time indicators described here.

Natural continuation of earlier work

In recent years, the amount of data created and stored by both private and public actors has grown enormously. Even if the management of large amounts of complex data is something that researchers and statisticians have long worked with, digitalisation has created new possibilities for the collection, structuring and analysis of very large amounts of data. There has been much discussion of how central banks are to apply the new methods that have emerged for the collection and analysis of this type of information³. Even though the aggregated statistics published with a time lag remain an important source of information for policy analysis, the Riksbank has started work in recent years on developing and investigating more high-frequency indicators, based on our own data collections.

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² Nowadays, an early view of quarterly GDP growth is also obtained from the new GDP indicator published by Statistics Sweden about 35 days after the end of the quarter.

³ See, for example, material from the international workshop on big data arranged by the Riksbank in 2015.

Sudden and powerful cyclical fluctuations mean that the Riksbank needs information more rapidly and more frequently than many traditional statistical products are capable of providing. To gain a quick oversight of how the coronavirus pandemic is affecting the Swedish economy, the Riksbank has expanded its collection of high-frequency data with real-time indicators. In many cases, these appear to give a fair and clear view of the development of demand, the labour market and prices. There is a lot to suggest that real-time indicators will become a more important source of data for policy analyses in the period ahead.

Real-time indicators do not just give a current view of the situation and approaching developments but, in several cases, can also give a more detailed view than can be gleaned from aggregated statistics.⁴

The rapid developments surrounding the coronavirus pandemic have created an urgent need for real-time data, which has hastened the development of new indicators for the economy that are updated more frequently. Thanks to the lessons and skills learned in earlier data projects, the Riksbank was able to get started relatively quickly with collecting and including new types of high-frequency indicators in its analysis.

Many real-time indicators seem to covary well with more traditional statistics.

In recent months, the Riksbank has used a number of different real-time indicators in its analysis. The indicators cover several different dimensions in the Swedish economy, such as household consumption, transport, the labour market and the housing market. Development work has not been concluded yet but is still in progress; nevertheless, we present below some examples of data being used at the moment. We present indicators constructed from different sources of data such as search engine queries, scraped data and micro data. Some of these were published in the Monetary Policy Report in April. The examples were chosen because they show both different methods of collection and different parts of the economy.

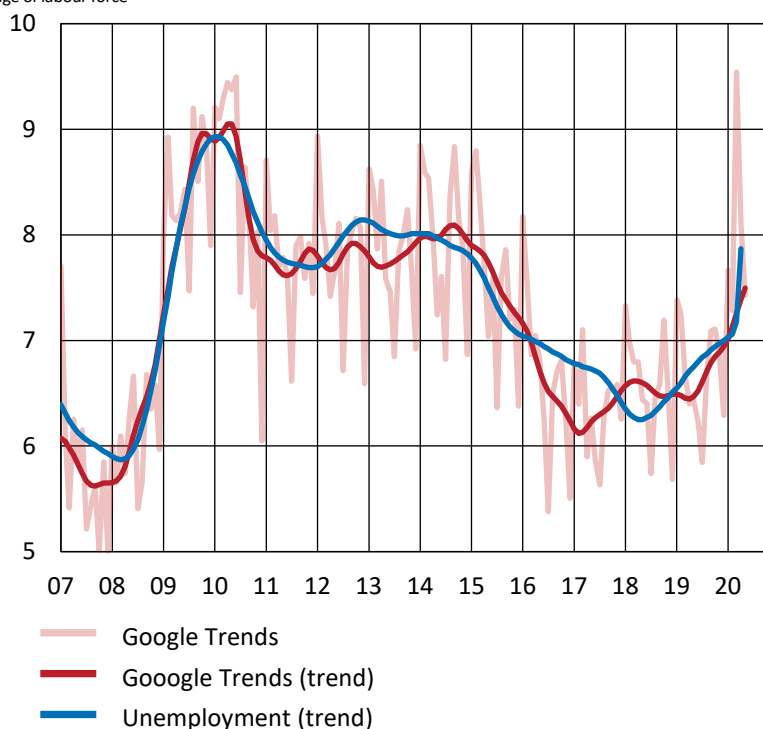
Figure 1 below shows the proportion of **unemployed** people according to Statistics Sweden's labour force surveys (LFS), together with a series constructed with the aid of indexed search volumes from Google for a number of words and themes related to unemployment.⁵ There is a clear link and the correlation between the two series is higher than 0.9 for comparable monthly data over the period January 2007 to April 2019. However, as the diagram shows, the search data does not fully capture the rapid upswing in April. Official statistics for the month of May are not published until 17 June, but, as search volumes for Google are available on both daily and weekly bases, it is possible to create a preview of the development of unemployment right now. The final observation using Internet data points to continued increase in unemployment in May.

⁴ See, for example, Turrell et al. (2018)

⁵ See Bholat et al. (2015)

Diagram 1. Unemployment and data from Google Trends

Percentage of labour force



Note. The series named Google Trends has been developed using search volumes for a number of words and themes related to unemployment. The series is by a Ridge regression, in which the relative occurrence of search words is compared with actual unemployment. The values for the last 12 months are predictions based on the available data on search volumes for that month. The trend value has been estimated with X13-ARIMA-SEATS.

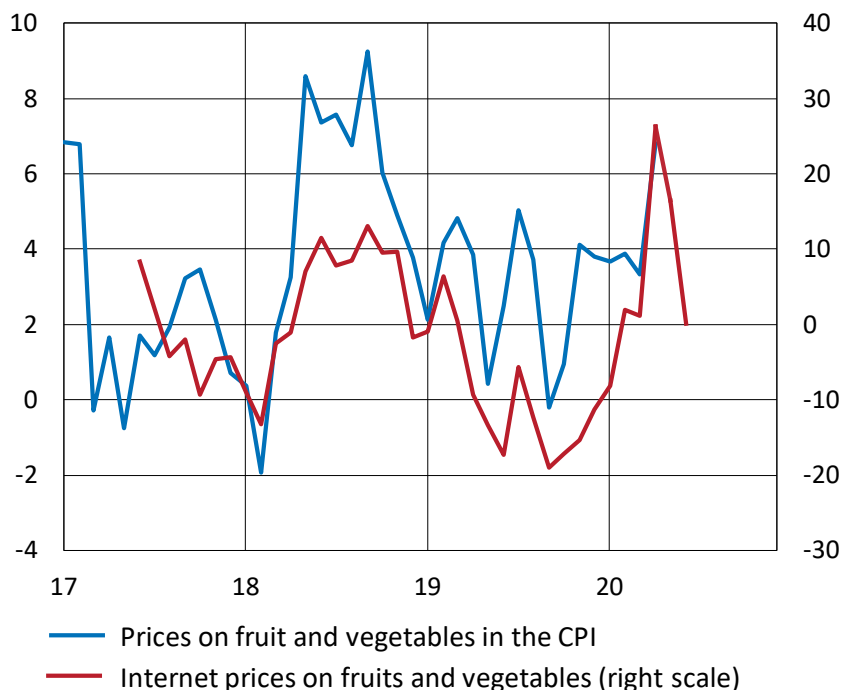
Sources: Statistics Sweden and Google Trends

In 2015, the Riksbank initiated a smaller pilot study to investigate whether **prices of fruit and vegetables**, available on the Internet, could be used to increase the accuracy of short-term inflation forecasts.⁶ The weight for fruit and vegetable prices in the basket for the consumer price index (CPI) is only about 3 per cent but, since these prices are highly volatile, they can have a non-negligible impact on the aggregated inflation figures. This type of Internet data is shown in Diagram 2 together with the CPI index for fruit and vegetable prices (both as an annual percentage change). The correlation is close to 0.7 for the period between January 2017 and the end of April 2020. Prices for fruit and vegetables rose in April, as it had already been possible to discern from the Internet data. One explanation could be provided by the travel restrictions that have been in place in recent months and that have disrupted transport routes at the start of the crisis with increased costs as a consequence. The CPI for May will not be published until 11 June, but Internet data for May suggests that the rate of increase has slowed down slightly.

⁶ See Hull et al. (2017). These prices are collected on a daily basis using a fully automated procedure.

Diagram 2. Prices for fruit and vegetables according to Internet data and the consumer price index

Annual percentage change



Sources: Statistics Sweden and the Riksbank

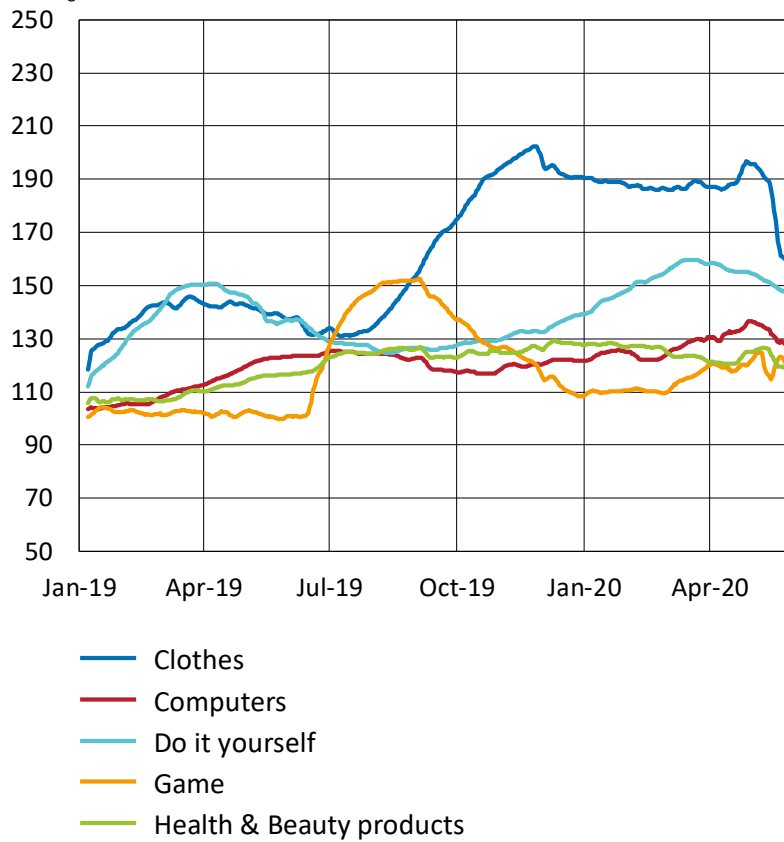
As part of its work on real-time indicators, the Riksbank has opened an experimental public channel, through which academics and private companies can contribute data and visualisations in real time.⁷ One example from this is price data made available by Pricerunner, which is a Swedish comparison shopping website.⁸ It has access to millions of prices, observed every day, from different retailers in a variety of different sectors, see Diagram 3. Diagram 4 shows the monthly percentage **price change for clothes and shoes** according to the CPI and the corresponding price change for aggregated clothes and accessories according to Pricerunner. The price series are not entirely comparable since they are based on different data and constructed in different ways. Statistics Sweden uses fewer price observations per month than Pricerunner and also uses different aggregation methods for different product groups. During April, the price change for clothes and shoes fell according to the CPI. Internet data for May indicates a continued weak development in clothing prices.

⁷ See <https://c19impact.com/public>

⁸ In 2019, Pricerunner monitored around 1,800,000 products sold by almost 900 retailers. Pricerunner does not sell any products of its own. It earns money by sending traffic to online retailers and through advertising (Pricerunner.se).

Diagram 3. Price index for fifteen different categories from Pricerunner

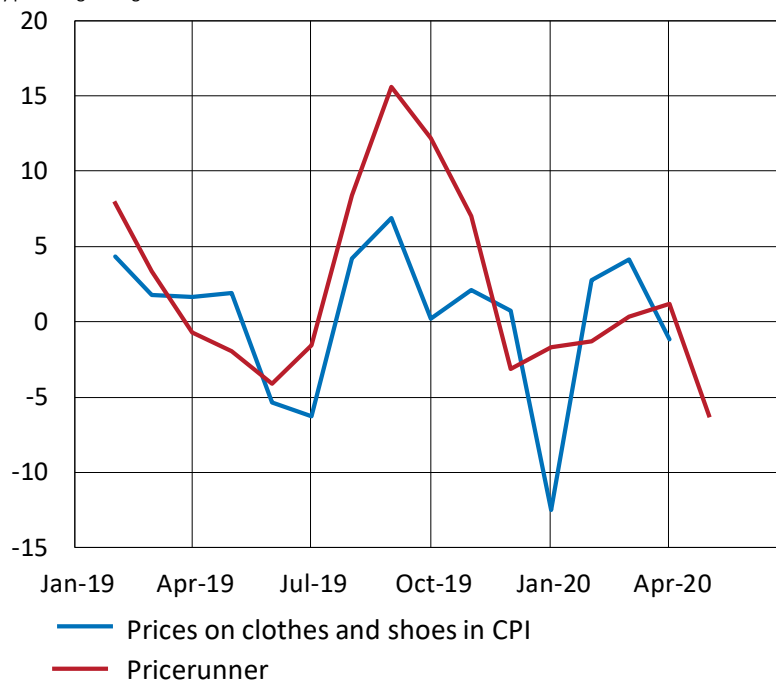
Index, fixed weights



Source: Pricerunner

Diagram 4. Prices for clothes and shoes according to the CPI, together with data from Pricerunner

Monthly percentage change

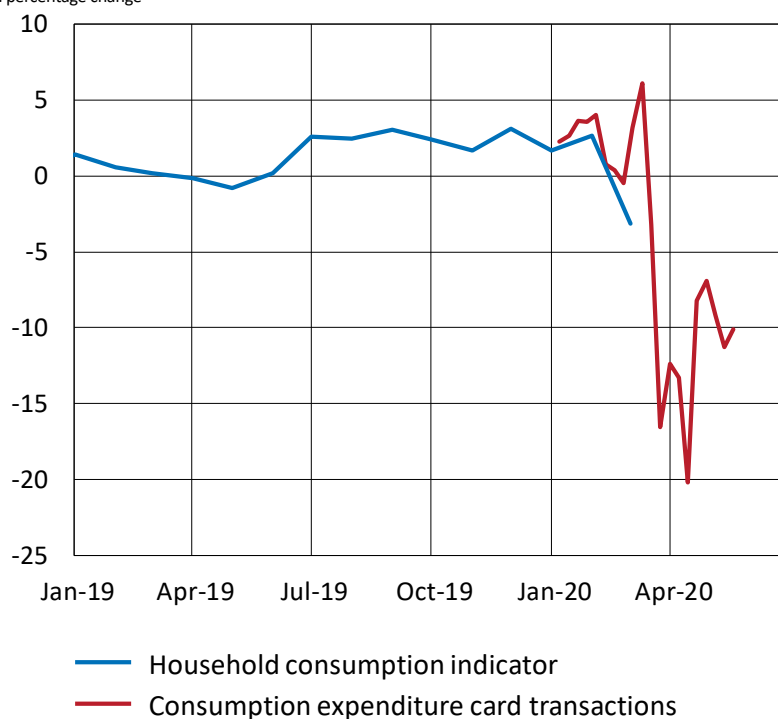


Sources: Statistics Sweden and Pricerunner

From Swedbank, we have access to aggregate turnover from **daily card transactions** in Sweden, both online and in shops. This information is based on about 5.3 million transactions per day, which is assumed to correspond to over 50 per cent of all transactions. Diagram 5 below shows the total turnover compared with the same day last year (red broken line). Card data is shown together with the household consumption indicator, which includes data from up to the end of March. We do not have access to a longer time series for card transactions but, even though the indicators do not match each other completely, they seem to follow each other well. Households' card transactions fell by 13 per cent in April, but recovered thereafter. As household consumption also consists of items that are not affected by the control measures, for example expenditure for accommodation, which is not usually paid for by card, this suggests that the downturn in household consumption will be less than that.

Diagram 5. Indicators of household consumption

Annual percentage change



Sources: Statistics Sweden and Swedbank

Real-time data is increasing in importance

In line with the rapid digitalisation and developments abroad, it is likely that new types of data will be used increasingly often in policy analysis in the period ahead. The Riksbank's need to analyse and draw conclusions from sources with large amounts of micro data will probably also increase.

Many central banks are working on developing systems to collect, organise and analyse greater amounts of data.⁹ The Riksbank also intends to upgrade its information supply correspondingly. Among other things, the Riksbank's strategic plan for 2019–2022 emphasises that analysis needs to “rest on robust foundations, be based on research and be

⁹ See IFC Report (2020).

at the cutting-edge, with a high level of preparedness so that it can be rapidly deployed to meet new challenges".¹⁰ This will require the Riksbank to develop its capacity to collect, structure, store and analyse new types of data.

¹⁰ See Sveriges Riksbank (2018).

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