

Article

Real-time indicators: a year on

A review of the production and publication of real-time indicators by national statistical institutes in response to the coronavirus (COVID-19) pandemic including both the UK and international experience.

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1 . Overview

One challenge for policymakers is identifying turning points, particularly in real time, which requires timely and relevant information on the current state of the economy. Economists have tracked [real-time indicators](#) over the course of the coronavirus (COVID-19) pandemic as part of enhancing the evidence base of how the economy is evolving. A feature of official estimates is that these are often published with a lag. Real-time indicators are timelier and so are often most valuable to policymakers and forecasters in identifying turning points.

The appetite for real-time indicators is not a new phenomenon. One of the recommendations of the [Independent Review of UK Economic Statistics](#) was to collect and analyse “big data”, including examples of where these can help inform real-time indicators of economic activity, which have become increasingly available in recent years. Previous research found that [it was not common practice for national statistical institutes \(NSIs\) to compile these indicators prior to the coronavirus pandemic](#). However, we published our first indicators in the UK in early 2019 as part of tracking the effects of EU exit. These have played a more central role in informing policymakers, media and the public, which are much more important in a time of rapid change.

2 . Examples of real-time indicators

The nature of the coronavirus (COVID-19) pandemic and the public health restrictions to limit transmission of the virus have resulted in shocks to the economy, which are particular to this point in time. This has necessitated a broadening of the set of high-frequency indicators used to gauge the level of economic activity. This has highlighted the power of looking for as much closer to real-time information to understand what types of output and expenditure have been affected.

One example has been the restrictions on physical movements, which has led to interest in tracking mobility indicators and their impacts on the economy. Figure 1 shows the falls in mobility in April 2020, November 2020 and January 2021 as these restrictions were tightened, then how mobility levels recovered as these restrictions were eased. There is some evidence that it was a helpful indicator of movements in gross domestic product (GDP) around the time of the first lockdown. However, the mobility indicator appears to have had less information content in subsequent lockdowns, where the fall in output was much less pronounced than the mobility levels would have implied.

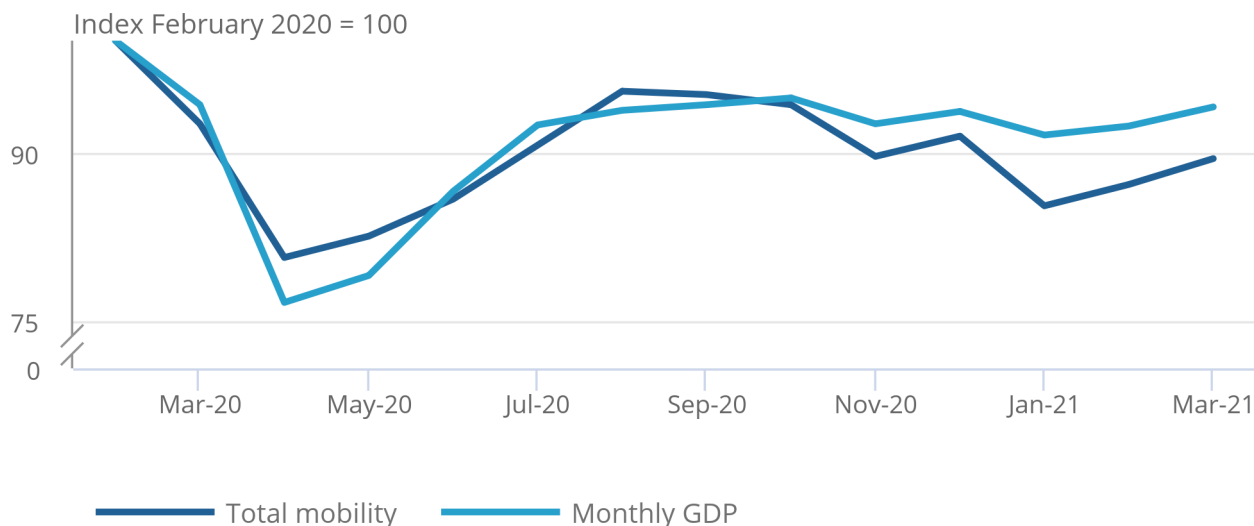
Similarly, the [Bank of England](#) finds that the “impact of restrictions on GDP has lessened when compared to the early stages of the pandemic” for many countries. One potential reason might be that businesses and consumers have adapted their behaviours to the impact of the virus over time. This highlights one of the challenges of these types of indicators that are indirect proxies for spending, as these relationships can change over time.

Figure 1: There has been a weakening in the relationship between gross domestic product and mobility indicators over time

Monthly GDP and Google Mobility

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Monthly GDP and Google Mobility



Source: Office for National Statistics, Google

Notes:

1. GDP excludes health and education, given that these largely comprise non-market output, which are based on direct volume indicators.
2. Google mobility indicators exclude parks and residential.

Card transactions have more potential in providing more reliable insights on the underlying trends of consumer spending as these directly capture the economic transactions that are of interest. We have been able to draw upon anonymised total financial transaction information supplied by a [range of private and public institutions across the UK financial payments industry](#). This has helped us understand what impact local and national lockdowns have had on overall consumer spending, as well as any changes in the composition of that expenditure as the stringency of these restrictions changed over time.

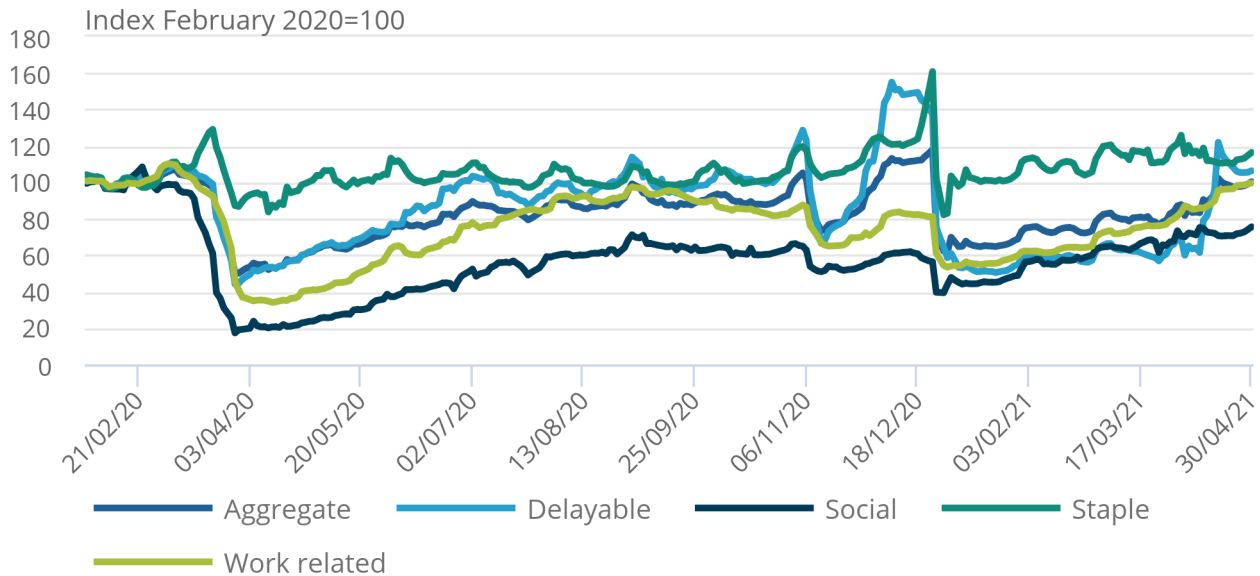
We have recently expanded our own real-time indicators to include settlements of credit and debit card purchases sent through the Bank of England's [CHAPS payment system](#) which processes high-value and time-sensitive payments. Figure 2 shows how this has provided timely insights on changes in these expenditures, including capturing the behavioural responses to public health restrictions that have led to compositional changes in spending on "staples", "work-related", "delayables" and "social". This shows how spending has responded to the tightening and loosening of restrictions over this period and it will also likely be useful to track whether these shifts will prove to be temporary or permanent in the future. Previous analysis has also showcased [how this can help understand the relative impacts of different lockdowns](#).

Figure 2: CHAPS-based credit and debit card purchases help show how spending has been affected over the course of the coronavirus (COVID-19) pandemic

A backward looking seven-day rolling average, from 3 February 2020 to 30 April 2021

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A backward looking seven-day rolling average, from 3 February 2020 to 30 April 2021



Source: Office for National Statistics and Bank of England calculations

Notes:

1. Users should note the daily payment data are the sum of card transactions processed up to the previous working day, so there is slight time lag when compared with real-life events on the chart.

3 . Developing faster indicators in the UK

We first published our [real-time indicators](#) in April 2019, in response to providing early insights on any effects of EU exit on the UK economy, covering Value Added Tax returns, road traffic sensor information, and shipping visits by port and type of vessel. These were identified as having the potential to pick up any disruptive effects of leaving the European Union. Research was already under way investigating further indicators at the time of the coronavirus (COVID-19) pandemic, where producing indicators in close to real time became an instant priority.

We introduced the [Business Insights and Conditions Survey \(BICS\)](#) – an online fortnightly survey of businesses, which is now sent to 39,000 businesses each fortnight with a 25 to 30% response rate. This has allowed us to publish real-time updates on the extent to which firms and industries have been impacted by the pandemic, including the effects on turnover, workforce and cash reserves, and how these effects have changed over time. This has helped provide further evidence for how the economy has adapted to the virus (Figure 3).

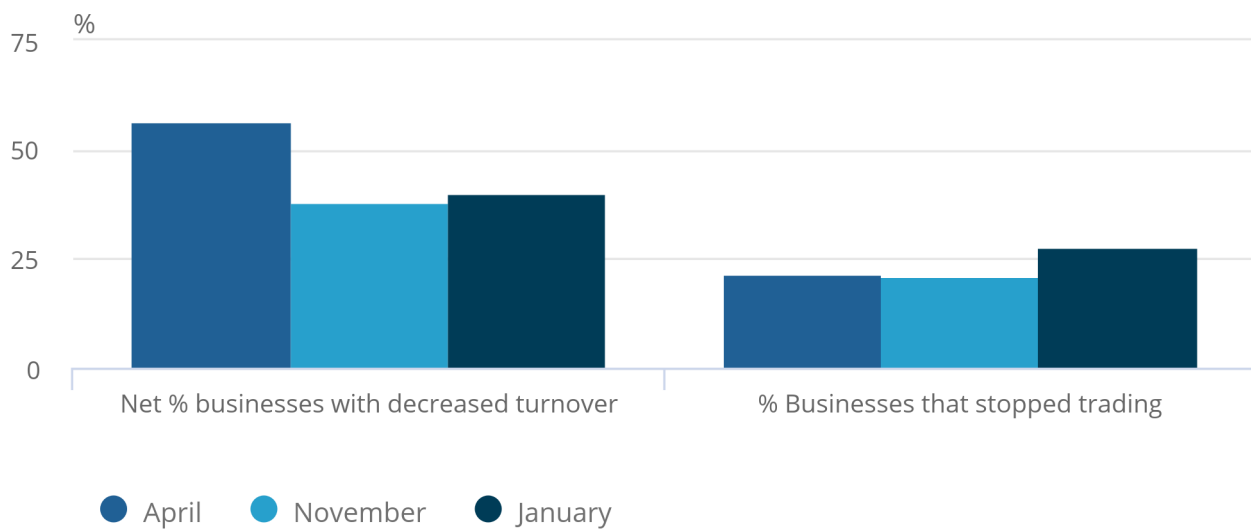
The BICS has also collected information on the scope for permanent impacts on the economy, including the effects on capital and productivity. These responses have proved invaluable in providing insights into many areas of the economy. The flexibility in reviewing the survey has also provided the opportunity to respond to the evolving economic landscape and the topics of most interest to the wider community. Future plans include monitoring the effect of the roadmap milestones and reporting on how people and businesses adapt to the changing landscape to return to a “new normal”.

Figure 3: Fewer businesses experienced lower-than-normal levels turnover in the more recent lockdowns, in comparison with the first lockdown in spring 2020

Percentage of UK businesses that experienced lower-than-normal levels of turnover and that temporarily or permanently stopped trading, across the first month of each lockdown period

Figure 3: Fewer businesses experienced lower-than-normal levels turnover in the more recent lockdowns, in comparison with the first lockdown in spring 2020

Percentage of UK businesses that experienced lower-than-normal levels of turnover and that temporarily or permanently stopped trading, across the first month of each lockdown period



Source: Office for National Statistics - Business Insights and Conditions Survey

Notes:

1. This includes unweighted estimates for April and weighted estimates for November and January so some caution should be exercised when comparing these.
2. April is an average of Wave 3 and 4, November is an average of Wave 18 and 19, and January is an average of Wave 23 and 24.

We have also collaborated with external partners as part of tracking the effects of public health restrictions on the economy. Some examples include the following.

Retail footfall

Springboard provide retail footfall indicators, which paint an informative picture on mobility levels and how the retail industry has responded to the change in the stringency of restrictions in place over the last year.

Road traffic

The Department for Transport provide information on the volume of all motor vehicle traffic, which allows further insight on mobility as well as picking up some of the effects of border disruptions.

Restaurant reservations

OpenTable provides their numbers of restaurant seated diners, including those from online reservations, phone reservations and walk-ins, capturing how demand for these hospitality services has changed over the pandemic.

Job vacancies

Adzuna provides information on the volume of online job adverts, which provides further information on how labour demand is evolving with the change in public health restrictions at the industry and regional level.

Card transactions

CHAPS payment data provided by the Bank of England gives a daily picture of credit and debit card spend for a variety of consumption categories in the UK, providing real-time insights on changes in the level and composition of consumer spending.

The fundamental principle for developing and introducing new real-time indicators is to collaborate with data providers to publish a wide range of indicators, including the underlying datasets where possible, so that we can inform policymaking and their effect on the economy. We plan to introduce further indicators, for example, including those that will provide insights into air travel - passengers, the numbers of flights from and to the UK and the goods transported by air - and the number of businesses filing for insolvency.

4 . Responding to the production challenges of official estimates

National statistical institutes (NSIs) have encountered theoretical and practical challenges in compiling official estimates over the course of the pandemic. These real-time indicators have provided a valuable resource into responding to some of these challenges. These include the following.

Industries' turnover and output

There has been a wide dispersion in how industries have been affected, reflecting how public health restrictions have been particularly concentrated in those industries that are reliant on face-to-face interactions. This has been helpful in verifying movements in monthly gross domestic product (GDP). The [Business Insights and Conditions Survey \(BICS\)](#) provides high-frequency snapshots of industry-level estimates of the extent to which turnover compares with normal expectations, while other indicators have provided proxies of the change in output produced for an industry. For example, the Energy Performance Certificates provide an indication of the existing housing market and the new build of domestic property in the construction industry. Card transactions have helped understand the change in consumer spending over the last year.

Consumer spending

There have been large changes in consumption patterns over the last year. While international guidance recommends that official estimates of consumer price inflation continue to be based on a fixed basket concept, there has been user interest in how the change in expenditure patterns might have impacted on consumer price inflation.

We have produced additional experimental figures in which we have removed unavailable items and adjusted the weight of remaining items according to our best available evidence of consumption patterns over the period of the pandemic, which have been informed by the latest official retail sales estimates, payment processing data from Barclays PLC and Revolut transaction data. Table 1 shows the compositional effects of the change in total expenditure for each month. The latest estimates show that [the annual rate of the reweighted basket has been very close to a “re-chained” version of the official rate of late](#) – that is, a comparable version – although “there remains considerable variation in the scale and make-up of consumer spending compared with the pre-pandemic period”¹.

Labour force

There have been theoretical and practical challenges in recording the size and composition of the UK labour force, particularly around how we measure the migration population. This has led to higher levels of uncertainty around the levels of employment, unemployment and inactivity at this time.

We have accelerated the development of experimental monthly estimates of payrolled employees in collaboration with Her Majesty's Revenue and Customs (HMRC), which likely provides a more reliable estimate of these levels and more insights into the distributional impacts in the labour market.

International travel

In March 2020, we suspended the International Passenger Survey, which would feed into our estimates of the international trade in travel services. We were able to produce early modelled estimates of travel services, based on anonymised foreign-issued card spend processed through Barclays Point-of-Sale and “card-not present” channels as well as additional indicators of the volume of travel provided by the Civil Aviation Authority and Eurotunnel.

Notes

1. Previous analysis also shows [how real-time information has helped inform the effects of Eat Out to Help Out on consumer price inflation](#).

Table 1: There have been large shifts in consumer expenditure patterns
Divisional weights for CPIH official and reweighted baskets, UK, April 2020 to December 2020

	Normal weights ¹	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Food and non-alcoholic beverages	79	135	127	109	88	87	81	85	100	94
Alcohol and tobacco	32	65	60	51	40	37	30	36	49	46
Clothing and footwear	51	30	35	49	53	56	53	56	55	72
Housing and household services	296	453	420	362	310	304	288	302	328	291
Furniture and household goods	50	39	45	59	62	59	59	70	78	67
Health	22	14	15	18	25	23	23	25	27	26
Transport	120	50	69	108	125	116	161	120	107	106
Communication	17	27	25	21	18	18	17	18	20	17
Recreation and culture	136	66	73	86	103	103	102	104	103	115
Education	24	40	35	30	25	25	24	24	28	24
Restaurants and hotels	96	10	12	20	67	88	83	75	17	57
Miscellaneous goods and services	77	72	84	86	83	83	78	85	89	86

Source: Office for National Statistics

Notes

1. Refers to the official consumer prices 2020 weights.
2. These are the 2019 annual CPIH expenditures uprated by the monthly change in expenditure in 2020 based on a range of timely information for this period.

5 . International practices

There have been a range of experiences in how national statistical institutes have developed real-time indicators. These include the following.

Germany

Germany's Federal Statistical Office publish daily [mobility indicators](#) based on mobile phones, so as to "map the changed mobility behaviour as a result of the Covid-19 pandemic in Germany and to analyse the effects of individual restriction measures". The monthly truck-toll-mileage index provides approximate indications of the development of industrial production at an early stage by tracing the development of the mileage of large trucks on German motorways. The monthly [transport index](#) looks at other modes of goods transport, such as air, rail and maritime.

France

In France, the National Institute of Statistics and Economic Studies publish daily [bank card transactions](#) to track changes in household consumption patterns during lockdown, collaborating with France's national interbank network. It has also published daily road traffic data, weekly Google mobility figures and daily data on electricity consumption by residential and non-residential customers.

Spain

In Spain, [daily mobility indicators](#) have been compiled, recording the extent of commuting between regional areas, based on signals issued by mobile phones. A daily indicator on the sales of big companies of retail trade has also been compiled, which are provided by the Tax Agency.

United States

The Bureau of Economic Analysis in the United States publishes daily [card transactions](#) while the US Census Bureau provides weekly information on how small business are navigating the pandemic via the [Small Business Pulse Survey](#). This includes information on operations and finances, requests and receipt of assistance and expectations for recovery. Household information is collected through the weekly [Household Pulse Survey](#), including employment status, spending patterns and travel practices.

Canada

Statistics Canada has an [Economic Dashboard](#) to track the impacts of COVID-19 on economic activity, including aircraft movements, railway car-loadings and travel between Canada and other countries, which helps show which types of travellers have been most impacted. Experimental [monthly business openings and closures](#) are also published.

Australia

The Australian Bureau of Statistics has developed new surveys - including the Business Impacts of COVID-19, Household Impacts of COVID-19 and Weekly Payroll Jobs and Wages in Australia - to provide insights into the impacts of COVID-19 on financial well-being, mental health and social behaviour. It has explored [new data sources](#) to inform official estimates during the pandemic including data on bank transactions, energy consumption and mobility.

New Zealand

Stats New Zealand has developed a [COVID-19 data portal](#) that reports on the economic, environmental and social aspects of COVID-19, covering information on electricity grid demand, card transactions, and industry and household emissions of greenhouse gases.

6 . Future developments

Real-time indicators have been invaluable in providing information on how the economy has evolved over the pandemic. These have also helped in responding to some of the production challenges that have been encountered. Given the power of these real-time indicators, we will continue to explore how we can respond to the need for timely information on the economy. We will continue with the Business Insights and Conditions Survey, so we are also committed to publishing wider real-time indicators and understanding its information content on the state of the economy, working with public and private partners as part of improving this public good.

The Economic Statistics Centre of Excellence (ESCoE) is undertaking research to identify the predictive power of these real-time indicators to see if we can improve the nowcasting capabilities. We will publish initial findings later this year, including early proposals into producing our own coincident indicator of real-time economic activity, similar to the [United States \(New York\) Weekly Economic Index](#). We hope this research will then produce a framework to help us decide when new indicators should be introduced based on their predictive powers. We see these as complements to our official estimates that help provide a richer understanding of the state of the economy.

Authors

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7 . Related links

[Economic activity and social change in the UK, real-time indicators](#)

Bulletin | Weekly

Early experimental data and analysis on economic activity and social change in the UK. These faster indicators are created using rapid response surveys, novel data sources and experimental methods.

[Real-time turning point indicators](#)

Article | Published 27 April 2020

Identifies what methodologies exist to identify economic turning points in real time and what indicators leading international statistical and economic institutions publish.

[Real-time turning point indicators: a UK focus](#)

Article | Published 27 April 2020

The UK's experience of producing real-time turning point indicators over the last 50 years, covering the development of UK cyclical indicators to the recent development of faster indicators.