Office for National Statistics

Article

# Measuring monthly and quarterly UK gross domestic product during the coronavirus (COVID-19) pandemic

How we produce monthly and quarterly estimates of UK gross domestic product and why this affects estimating where the economy is relative to its pre-coronavirus (COVID-19) pandemic level.

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# 1 . Main points

- In the UK, we produce estimates of gross domestic product (GDP) on a monthly and quarterly basis, which gives two estimates of where the UK economy is relative to its pre-coronavirus (COVID-19) pandemic level.
- Our estimates of monthly GDP are based only on the output approach to GDP, specifically the contribution of each industry or producer by using gross value added (GVA) as a proxy indicator.
- In comparison, our estimates of quarterly GDP reflect the average of the three measurement approaches – output, income and expenditure.
- We consider quarterly our lead estimate of GDP, however, measuring GDP has been challenging during the coronavirus pandemic, which has led to more uncertainty around our lead quarterly estimate of GDP.
- The output measure of GDP has typically been stronger than the income and/or expenditure estimates through 2020, which will have an impact on when monthly and quarterly estimates of GDP are reported to have returned to pre-coronavirus pandemic levels.
- In the income approach to GDP, we do capture the impact of the Coronavirus Job Retention Scheme (CJRS) and the Self Employment Income Support Scheme (SEISS); However, there is likely to be more initial uncertainty around the recording these new policies, which may explain some of the difference between our income measure and other approaches to measuring GDP.

# 2 . Measuring UK gross domestic product

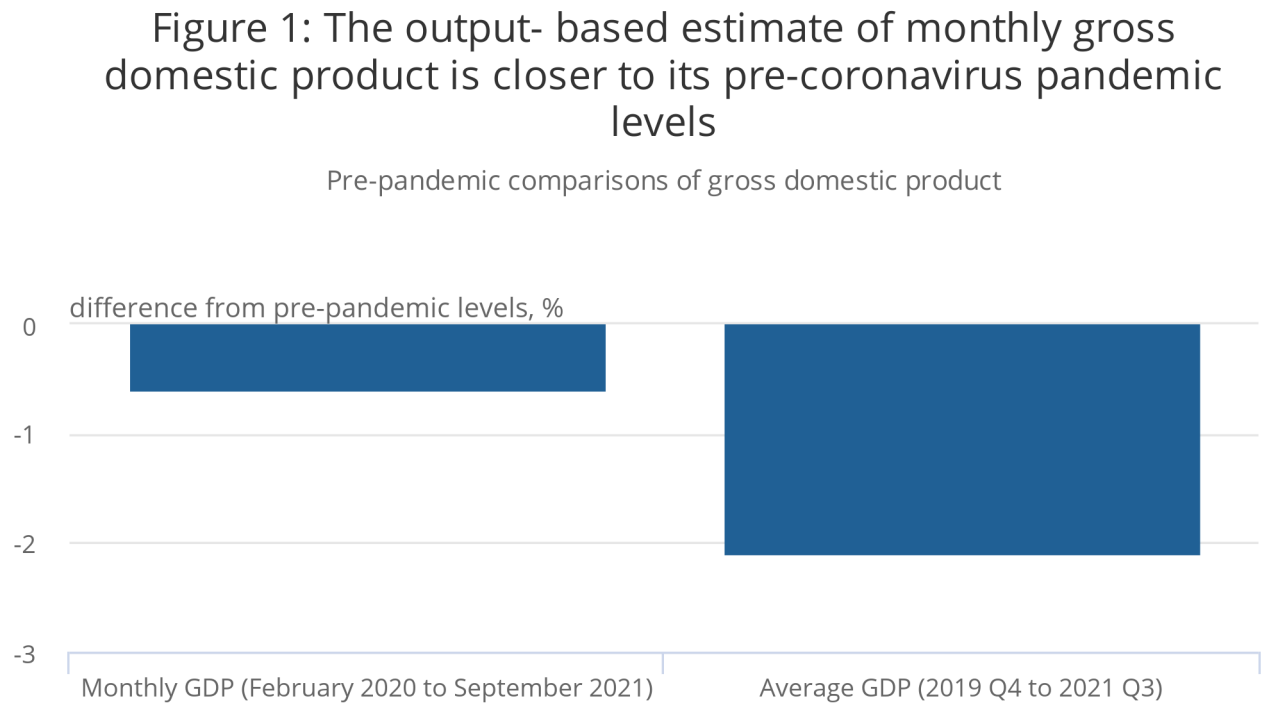
There have been large movements in UK gross domestic product (GDP) over the course of the coronavirus (COVID-19) pandemic. This is primarily in response to public health restrictions and voluntary social distancing that have been in place over this period. Given the size of these impacts, there has been a focus on where the economy is relative to its pre-coronavirus pandemic levels.

In the UK, we produce estimates of monthly and quarterly GDP. However, there are reasons as to why these would not provide the same estimate as to where the economy is relative to its pre-pandemic levels (Figure 1). This primarily reflects that monthly estimates of GDP are based on only the output measure of GDP, while quarterly estimates of GDP reflect the average of the three approaches – output, income and expenditure.

However, the coronavirus pandemic has brought many measurement challenges that have created more uncertainty around our three approaches. This has led to an initial divergence between the output and average estimate, which is then reflected in how we compare monthly and quarterly estimates of GDP.

**Figure 1: The output- based estimate of monthly gross domestic product is closer to its pre-coronavirus pandemic levels**

**Pre-pandemic comparisons of gross domestic product**




**Source: Office for National Statistics, GDP quarterly estimate**

## Measuring quarterly GDP

In the national accounts, quarterly gross domestic product (GDP) is measured by the output, income, and expenditure approaches, where these are balanced to produce one coherent estimate of GDP.

The output estimate captures how much is produced in the economy – that is, the value of the output of goods and services that are produced, less the intermediate inputs used in their production.

The income estimate records how much income is earned by households and businesses in the production of goods and services, plus any taxes net of subsidies on production and products.

The expenditure estimate refers to how much is spent – that is, the value of the final expenditure on goods and services by households, businesses and the government, plus net exports of goods and services.

For the latest quarterly periods, we produce a best estimate of the level and change of GDP for all three measurement approaches. An average figure must be used until all three estimates of GDP are balanced using the annual Supply and Use Tables (SUTs) framework, except in the latest two quarters where we put more emphasis on our output measure because of the larger data content for this measure.

The annual Supply and Use Tables (SUTs) framework provides the basis for producing a single estimate of GDP. However, it takes around two years for us to produce annually balanced estimates of GDP in a SUTs framework because of the time it takes to collect and process our data completely. Estimates over the course of the pandemic period, covering 2020 and 2021, have not yet been fully balanced within our annual SUTs framework.

Table 1 shows that based on the latest Quarterly National Accounts:

- data up to the last supply use balanced year (2019) are fully reconciled using the annual SUTs framework – there is one single estimate for all periods that have been fully balanced, which cover up to the end of 2019.

- data from Quarter 1 (Jan to Mar) 2020 to Quarter 4 (Oct to Dec) 2020 are balanced from all three approaches to produce an average – that is, the headline GDP figure reflects the average growth rates of the output, income and expenditure measures.

- data for the 2021 quarters are led by the output measure with expenditure and income balanced to produce headline GDP – the headline GDP figure reflects the output growth rate, which income and expenditure are balanced to.

Table 1: The output-based estimate of gross domestic product (GDP) has been relatively stronger than the headline estimate of GDP over the course of the pandemic

Comparison of three measures and average GDP, quarter on quarter and growth in comparison to Quarter 4 2019

| | Average GDP | Expenditure | Income | Output |
|---|---|---|---|---|
| **Quarter on quarter growth rates** | | | | |
| **2019 Q4** | 0 | 0 | 0 | 0 |
| **2020 Q1** | -2.7 | -2.8 | -2.8 | -2.5 |
| **2020 Q2** | -19.6 | -19.2 | -20.3 | -19.3 |
| **2020 Q3** | 17.4 | 17.1 | 17.5 | 17.7 |
| **2020 Q4** | 1.1 | 0.9 | 1 | 1.4 |
| **Cumulative position** | | | | |
| **2019 Q4 to 2021 Q3** | -2.1 | -2.1 | -3 | -1.1 |

Source: Office for National Statistics, GDP quarterly estimate

Notes

1. Estimates of monthly GDP are comparable with the output-based estimates.

2. The headline GDP figure for 2020 is the average of the expenditure, income and output GDP growth rates.

3. Please note we are balanced to output in the latest quarters of 2021.

Table 1 shows the profiles of the three measures of GDP and how these compare with the headline average estimate for those periods that have not yet been fully balanced. Given the levels of data uncertainty at this stage of the production cycle, it would not be expected that the respective cumulative positions would provide the same estimate. However, there have been more measurement challenges in the coronavirus pandemic, which has led to higher levels of uncertainty and so these differences are larger than would typically be the case.

This distinction between the headline and output-led measure of GDP has an impact on where the economy is relative to its pre-pandemic levels, especially as the output measure of GDP has been relatively stronger over this period than income and/or expenditure. We would be 1.1% below pre-pandemic levels if we only looked at the quarterly output measure of GDP, compared with one of 2.1% based on the headline average quarterly GDP estimate. Given monthly GDP is only an output-based estimate, this has an impact on how we compare monthly and quarterly estimates of GDP.

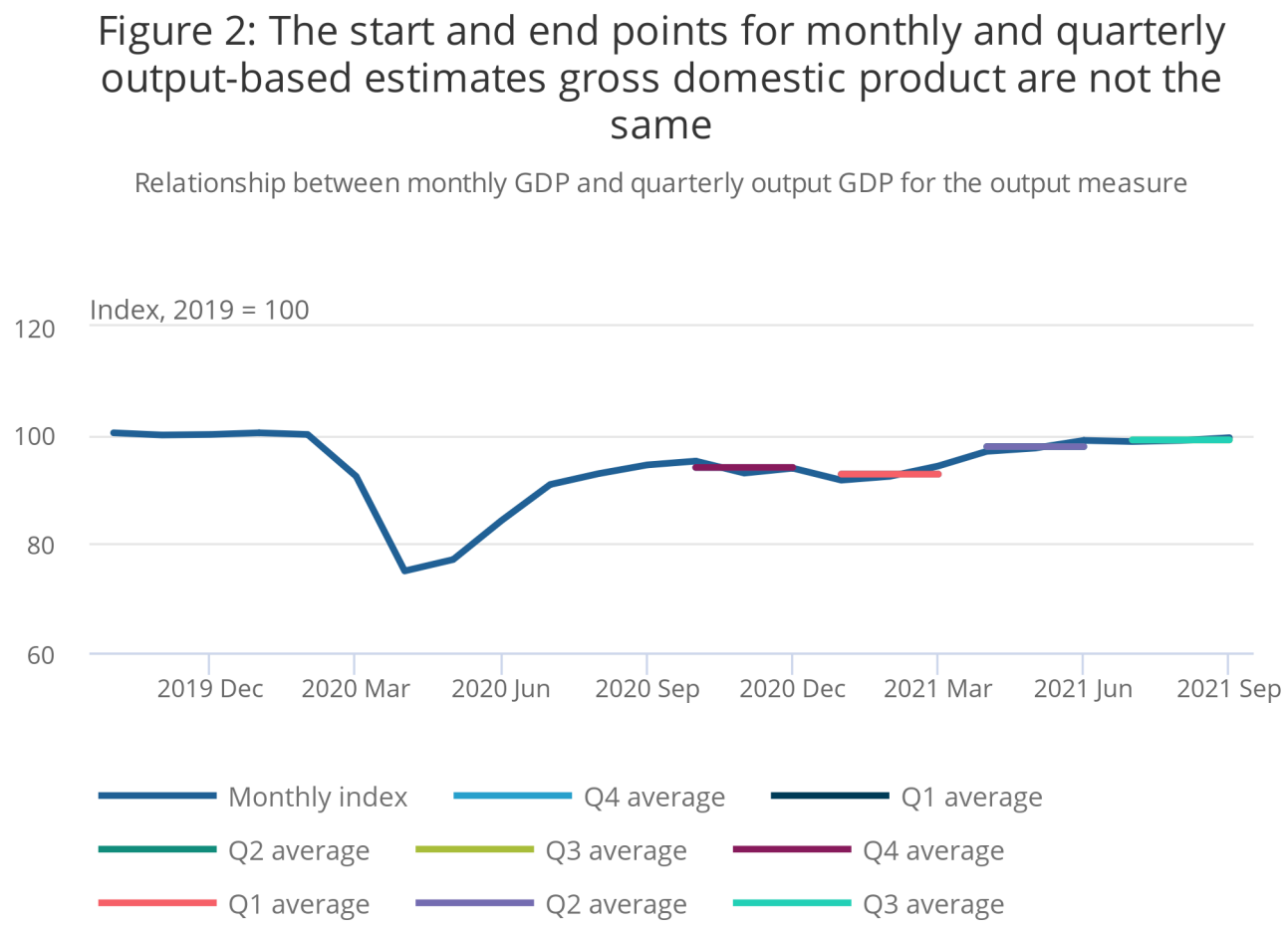
## Measuring monthly GDP

In July 2018, we implemented a new publication model for GDP, including the introduction of monthly GDP estimates. Movements in output are considered a proxy for gross value added (GVA), which in itself then considered an approximation for GDP. We are in effect producing an estimate of monthly GVA rather than headline GDP.

Figure 2 shows the levels of monthly GDP and the quarterly output measure of GDP, which reflects the average level of monthly output for the relevant three-month period. If the headline estimate of quarterly GDP was only an output-led one, then it would still not be the case that the monthly and quarterly estimates of GDP would return to its pre-coronavirus pandemic levels at the same time. Figure 2 shows that the monthly level of GDP in September is higher than that for the third quarter, given the lower, monthly GDP would be closer tothe same pre-pandemic level than the quarterly output level. The pre-pandemic level of monthly UK GDP is also taken to be February 2020, which is a little below the Quarter 4 (Oct to Dec) 2019 output level.

**Figure 2: The start and end points for monthly and quarterly output-based estimates gross domestic product are not the same**

**Relationship between monthly GDP and quarterly output GDP for the output measure**




**Source: Office for National Statistics, GDP**

## Measurement challenges

For these most recent quarterly periods that have not yet been subject to a full balancing process in a SUTs framework, we confront our data and balance the three measures of quarterly GDP. This is achieved by the following methods.

## Alignment adjustments

This is applied to the Change in Inventories component of expenditure and the Private Non-Financial Corporations Gross Operating Surplus component of income. The alignment adjustment acts to offset transactions which have a timing of recording effect. For example, if the production of a good occurs in one quarter but the household consumption of that good is recorded in the following quarter, then the alignment adjustments will help to balance both quarters across all three measures of GDP. The alignment adjustments have a target of +/- £3 billion per quarter, although this may be exceeded when it is proving to be particularly challenging to achieve a balance. However, as the purpose is one of adjusting for timing effects within a year, the alignment adjustment will sum to zero on a calendar year basis. As such, it has no effect on the annual difference in GDP.

## Statistical discrepancies

There can be small discrepancies in the annual levels of the three measures of GDP. These happen at various points over time – particularly in times of heightened uncertainty. It ensures that each approach to measuring GDP equals the average on an annual basis. As part of our compilation process, these differences are then apportioned across the four quarters to minimise the impact on quarterly GDP growth.

## Coherence adjustments

These reflect where there are quality concerns around specific components. These coherence adjustments are undertaken through consultation with our data experts, which are applied to where there is known data uncertainty. These are published as part of the regular GDP releases.

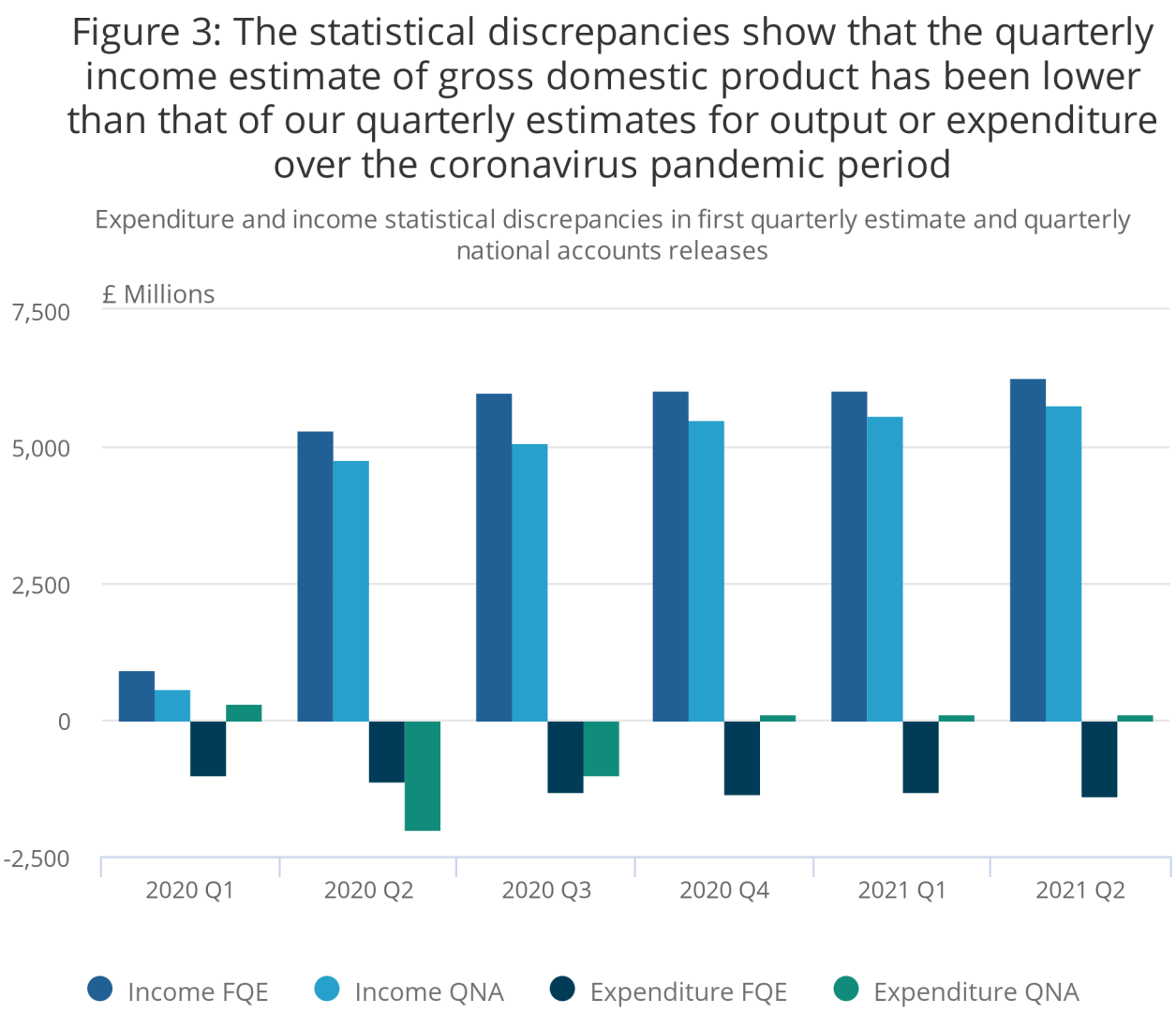
## Heightened levels of uncertainty

Our latest quarterly estimates illustrate some of the measurement challenges that have been experienced over the course of pandemic, particularly in the income measure (Figure 3). Given that we would not expect the statistical discrepancy figure to reach +/- £10 billion in any year, the current income statistical discrepancies show the heightened levels of uncertainty that there are now.

The Coronavirus Job Retention Scheme (CJRS) and the Self Employment Income Support Scheme (SEISS) are recorded as part of the income approach to GDP. Measuring these in a consistent manner has been particularly challenging and is likely to explain why average quarterly GDP has been lower than output-based quarterly GDP.

**Figure 3: The statistical discrepancies show that the quarterly income estimate of gross domestic product has been lower than that of our quarterly estimates for output or expenditure over the coronavirus pandemic period**

**Expenditure and income statistical discrepancies in first quarterly estimate and quarterly national accounts releases**




**Source: Office for National Statistics, GDP**

**Notes:**

1. This reflects that the quarterly income estimate in gross domestic product (GDP) is lower than the other approaches to quarterly GDP, which in turn explains why the average quarterly GDP estimate is lower than the output-based quarterly estimate.

2. It is possible that the level of output or expenditure estimates for 2020 could be revised down before the next Annual National Accounts. If so, this would reduce the level of average GDP figure and so would reduce the size of the income statistical discrepancy, all else the same.

The statistical discrepancy for income for these quarters has reduced recently as further income information has become available (Figure 3). Statistical discrepancies for fully SUTs-balanced years are always zero as a full balanced is achieved. Looking ahead, we will naturally have more comprehensive annual data sources for all three approaches to GDP, including final outturn figures from government, which will then enable data confrontation to occur at the 112-industry by 112-product level. As part of our regular production approach, we will then produce fully balanced SUTs estimates in which we will have a single estimate for the level and change in 2020 from all the three different approaches to measuring GDP.

## Comparing monthly and quarterly GDP

There has been much interest in where the UK economy is relative to its pre-coronavirus pandemic levels. Our experience so far shows that our output measure of GDP has typically been stronger than the income and/or expenditure estimates, which will have an impact on when monthly and quarterly estimates of GDP are reported to have returned to pre-pandemic levels. It is also important to consider the monthly profile of output within a quarter to understand the relative position of the UK economy.

During the course of the coronavirus pandemic, the compilation of the UK National Accounts has been subject to higher levels of uncertainty, reflecting the theoretical and practical impacts of the coronavirus pandemic. We still consider quarterly GDP as our lead estimate of GDP, although we recognise that these have recently been subject to higher levels of uncertainty. This has been reflected in the increased challenges of balancing the different quarterly measures of GDP, which have not yet been subject to the annual process of balancing in a Supply and Use Tables (SUTs) framework.

We will acknowledge once the level of monthly GDP has returned to its pre-pandemic levels, though we recommend that users also consider the quarterly estimates as this will provide a more holistic picture of the state of the economy. Our monthly and quarterly estimates of GDP in 2021 will be open to revision over the course of the next year until the next Annual National Accounts are published in September 2022, where we will have our first fully reconciled position for 2020.

# 3 . Data

GDP data tables
Dataset | Released on 11 November 2021
Annual and quarterly data for UK gross domestic product (GDP) estimates, in chained volume measures and current market prices.

Monthly gross domestic product by gross value added
Dataset | Released 11 November 2021
The gross value added (GVA) tables showing the monthly and annual growths and indices as published within the monthly gross domestic product (GDP) statistical bulletin.

# 4 . Glossary

## Gross domestic product (GDP)

A measure of the economic activity produced by a country or region. Gross domestic product (GDP) growth is the main indicator of economic performance. There are three approaches used to measure GDP:

- the output approach
- the expenditure approach
- the income approach

## Index numbers

Data relative to a given base value, which typically refers to a year.

For further definitions, please see the Glossary of economic terms.

# 5 . Data sources and quality

The UK National Accounts are drawn together using data from many different sources. This ensures that they are comprehensive and provide different perspectives on the economy, for example, sales by retailers and purchases by households. Further information on measuring gross domestic product (GDP) can be found in the Guide to the UK National Accounts and more quality and methodology information is available in the Gross domestic product (GDP) QMI.

# 6 . Related links

GDP quarterly national accounts, UK: April to June 2021
Statistical bulletin | Released 30 September 2021
Revised quarterly estimate of gross domestic product (GDP) for the UK. Uses additional data to provide a more precise indication of economic growth than the first estimate.

GDP first quarterly estimate, UK: July to September 2021
Statistical bulletin | Released 11 November 2021
First quarterly estimate of gross domestic product (GDP). Contains current and constant price data on the value of goods and services to indicate the economic performance of the UK.

GDP monthly estimates, UK: September 2021
Bulletin | Released 11 November 2021
Gross domestic product (GDP) measures the value of goods and services produced in the UK. It estimates the size of and growth in the economy.

Coronavirus and the effects on GDP
Article | Released 6 May 2020
How the global coronavirus (COVID-19) pandemic and the wider containment efforts are expected to impact on UK gross domestic product (GDP) as well as some of the challenges that national statistical institutes are likely to face.