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EUROSYSTEM

Measuring Calendar Effects in National Accounts

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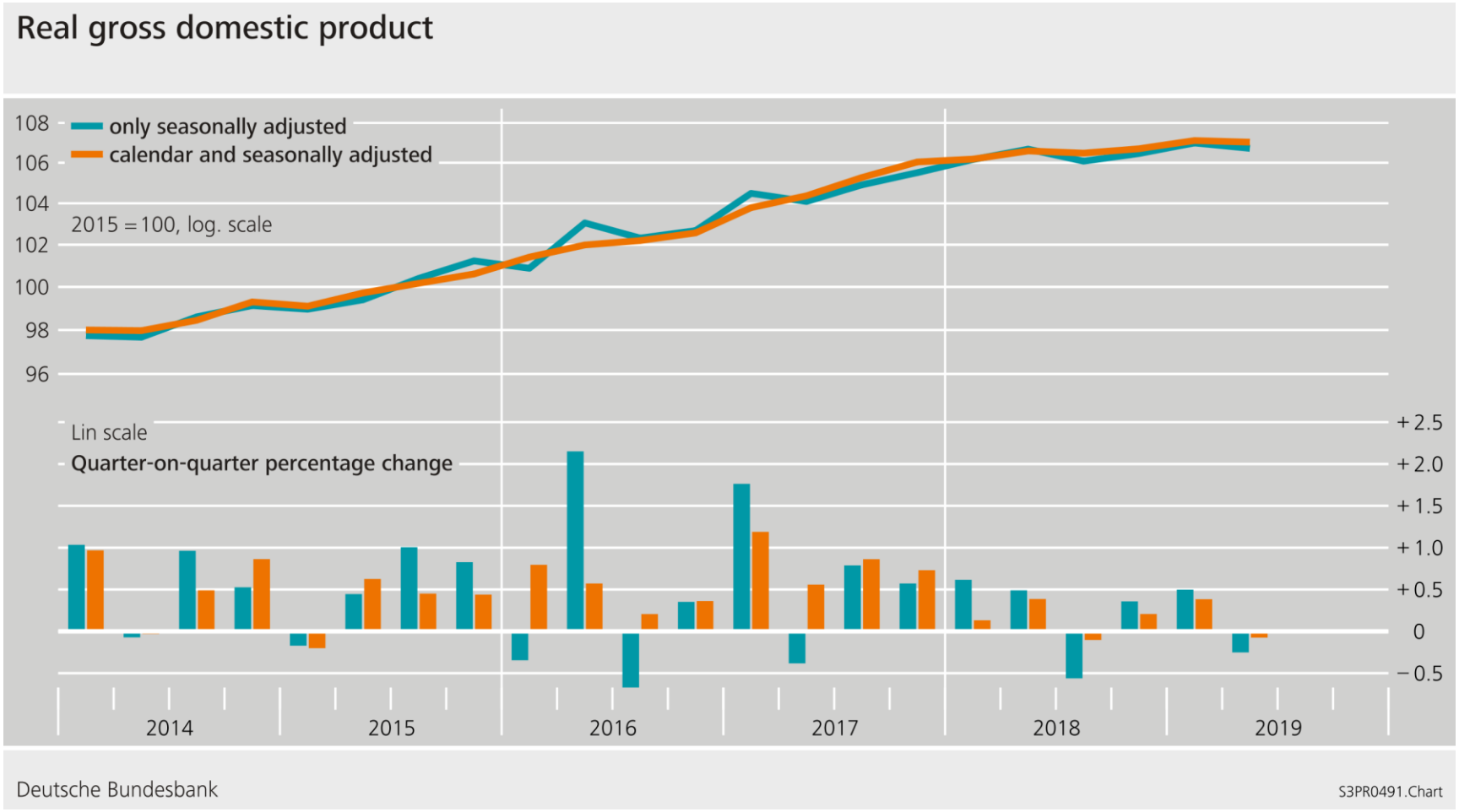
Motivation


Real gross domestic product
only seasonally adjusted
calendar and seasonally adjusted
2015 = 100, log. scale
108
106
104
102
100
98
96
Lin scale
Quarter-on-quarter percentage change
+2.5
+2.0
+1.5
+1.0
+0.5
0
−0.5
2014
2015
2016
2017
2018
2019
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S3PR0491.Chart

Purpose of seasonal adjustment

The purpose of seasonal adjustment is to filter out usual seasonal and calendar fluctuations.

Usual seasonal fluctuations are those movements which recur with similar intensity in the same season each year and which, on the basis of past movements of the time series in question, can, under normal circumstances, be expected to recur".

Seasonal (Noise)

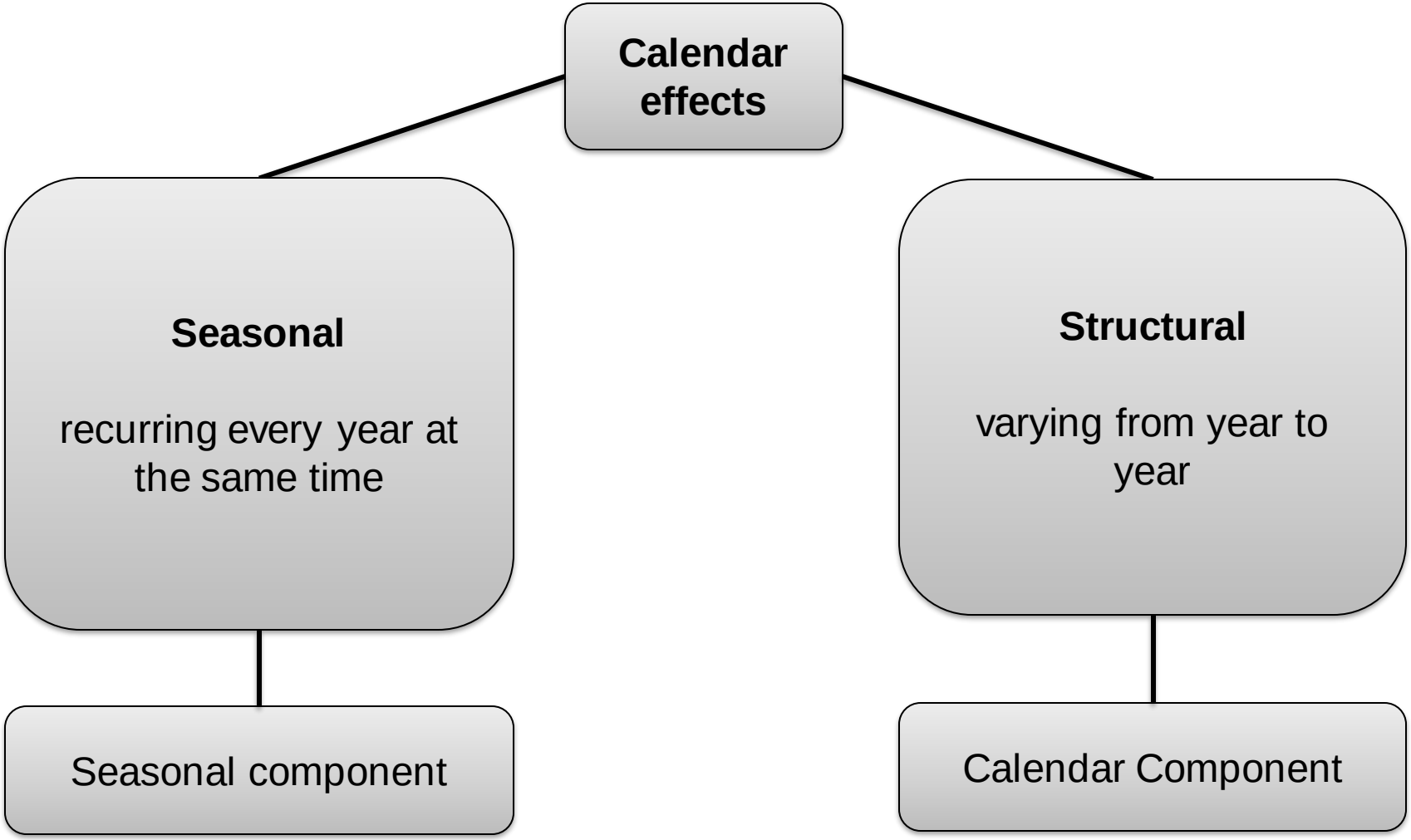
Thus, fluctuations due to exceptionally strong or weak seasonal influences […] will continue to be visible in the seasonally adjusted series to the extent that they exceed, or fall short of, the normal seasonal average.
In general, other random disruptions and unusual movements that are readily understandable in economic terms […] are also not eliminated."

News

Seasonal adjustment also includes the elimination of working-day variations insofar as influences deriving from differences in the number of working days or the dates of particular days (e.g. public holidays) can be demonstrated and quantified.

Calendar (Noise)

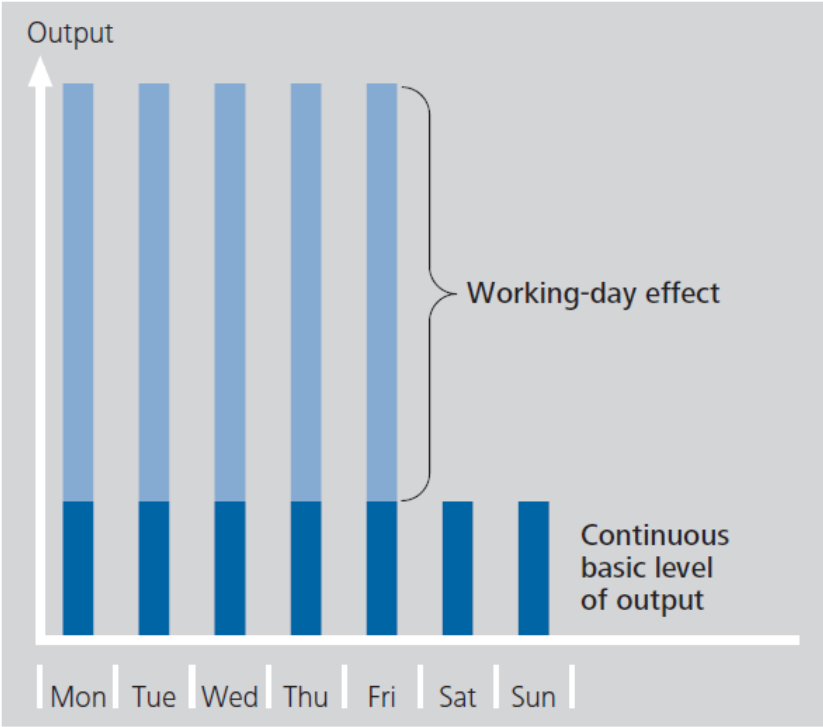
Calendar effects



Structural calendar effects

- Working-day model has proved to be effective for many economic indicators
- Based on five-day working week
- Accounts for some continuous production
- Working-day effect reflects the difference between production on a normal working day and production on a weekend day

Diagram of the working-day model



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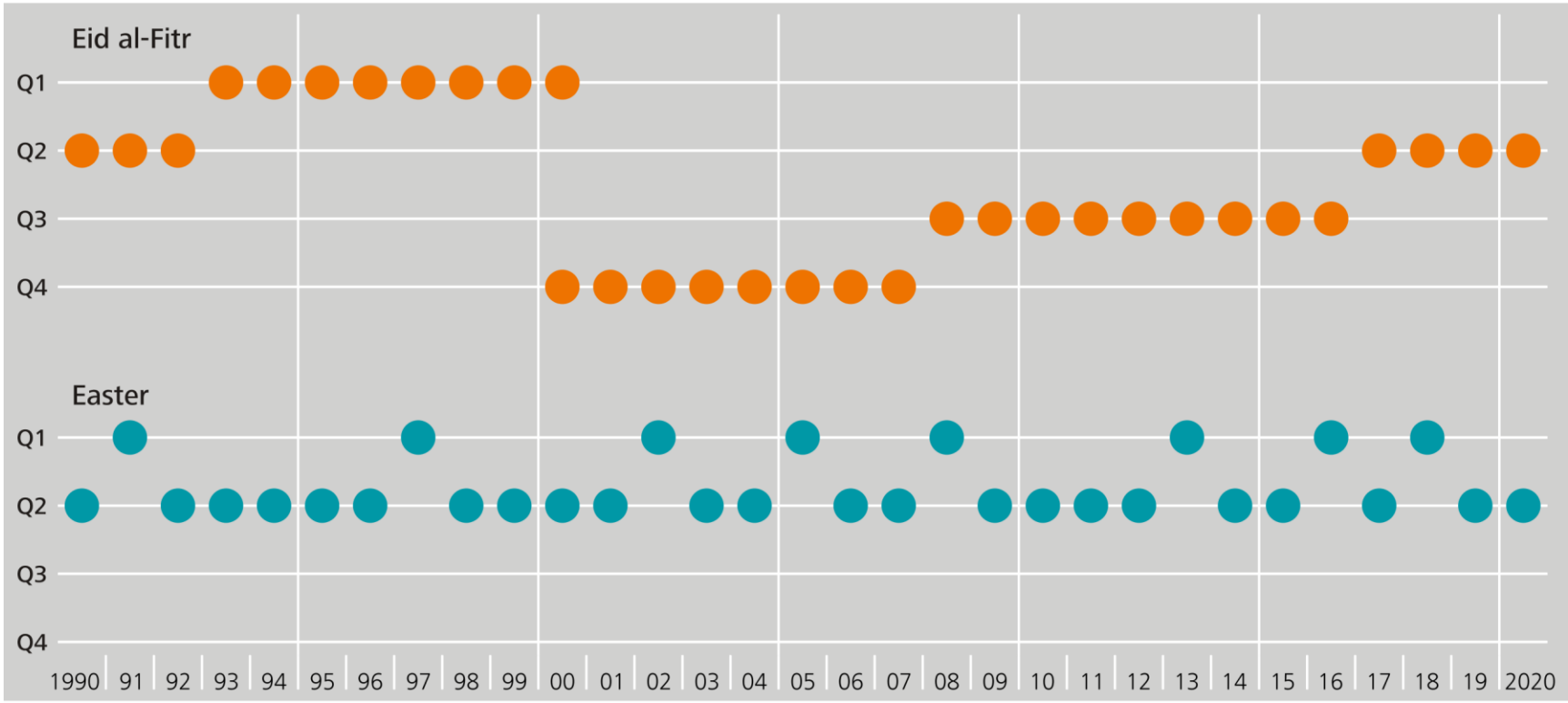
Structural calendar effects

Moving holidays



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S3PR0493A.Chart

Estimating calendar effects

- Daily data are ideally needed for precise quantification of calendar effects

  - Instead: available data are of monthly and quarterly frequency

↓

– Multiple effects overlap within a given period (more severe in longer periods)

– Remedy

  - Monthly data: comparable calendar configurations
  - Quarterly data: related effects of data with higher frequency

Other calendar related effects

Criterion[1)]	Working days	Bridge days	School holidays	Weather
Estimated effect …				
significant	✓	✓	✓	✓
plausible	✓	✓	✗	✓
Majority of adjusted figures plausible	✓	✓	✓	✗
Systematic over-/under-adjustment irrelevant	✓	✗	✗	✗
Catch-up effects quantifiable	✓	✗	✗	✗

1 As described in item 2.6 of ESS guidelines on seasonal adjustment, 2015.

Conclusions

Calendar effects:

- are often of quantitative relevance for national accounts
- depend on national peculiarities
- estimation requires to setup appropriate variables
- can be measured more accurately on higher frequencies, for example using monthly time series that are also used for the compilation of national accounts.

If a statistically significant quantification of calendar effects is not possible:

- opt for an approach that is feasible, such as publishing only seasonally adjusted time series and communicating transparently that calendar effects have not been eliminated.

The Deutsche Bundesbank offers training and assistance as part of its International Central Bank Dialogue activities.

References

- Deutsche Bundesbank (2012), Calendar effects on economic activity (https://www.bundesbank.de/resource/blob/707332/37db302ea1ea94fa8fd6b71916c17991/mL/2012-12-calendar-data.pdf)

- ESS guidelines on seasonal adjustment (2015) (https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-001)

- Handbook on seasonal adjustment (2018) (https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-18-001)