The German GDP Flash Estimate and its Contribution to the Preliminary GDP Flash Estimate for the European Union and the Euro Area

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(The views expressed in this paper are those of the authors. They do not necessarily reflect the views of the German Federal Statistical Office.)

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Abstract

In spring 2016, Eurostat began publishing a first so-called preliminary flash estimate for the quarterly GDP of the European Union and the euro area within 30 days after the end of the quarter. This European GDP flash is currently based on national data of 17 member states that cover 94% of the GDP of the euro area and 90% of the GDP of the European Union (as of May 2018). The data for Germany are provided by the Federal Statistical Office that has an experience of more than 15 years in conducting GDP flash estimates.

This paper presents the German contribution to the European preliminary flash estimate at t+30. It shows the way from the first study on the feasibility of a quarterly German flash estimate beginning in 2002 towards the current situation of the flash estimate within the calculations of the German and the European GDP.

The German GDP flash estimate can be characterised as a three-pillar-approach that consists of

- an econometric calculation,

- an experts' calculation,

- the reconciliation of the econometric and the experts' calculation.

All three pillars of the German GDP flash estimate are discussed with a focus set on their properties and their risks and opportunities. The paper ends with some considerations about the quality of the estimates and the way forward.

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1 Introduction

Change in gross domestic product (GDP) is generally considered to be one of the main indicators of economic growth. Both Germany and Eurostat began publishing quarterly GDP flash estimates in 2003. Since then, these estimates have been released every quarter, 45 days after the end of the quarter. The economic, financial and technological developments in recent years have led to a growing demand for more timely results, especially from European policymakers like the European Commission and the European Central Bank. Eurostat therefore began publishing quarterly preliminary GDP flash estimates 30 days after the end of the quarter (t+30) for the EU and the euro area in 2016. Member States contributed by providing the national estimates to Eurostat, in the case of Germany under embargo. Even though German national accounts have had 15 years of experience on GDP flash estimation after t+30 days, the results have so far not been published. Apart from the transmission to Eurostat for the calculation of European aggregates, the results are used for internal quality assurance.

This paper discusses the terms, definitions and limitations of GDP flash estimates. It describes the development of the GDP release policies in Germany and Europe in the last fifteen years towards the first early release of a preliminary European GDP flash estimate at t+30 days. It provides an overview of the so-called three-pillars-approach of the German GDP flash estimations and discusses different criteria to assess the accuracy of the results. Finally, it briefly looks ahead at possible future work and developments regarding flash estimations in German national accounts.

2 GDP flash estimates: Terms, definitions and limitations

Flash estimates of quarterly GDP give an early picture of the latest economic developments. The terms that are used within the framework of GDP flash estimates[1] are often confusing and sometimes even misleading. For instance, in Germany, the first release of GDP in t+45 is called "rapid release" ("Schnellmeldung") and the unpublished estimate in t+30 is called "GDP flash" or "GDP rapid estimate". Eurostat, on the other hand, calls the first publication for the European Union and the euro area in t+30 the "preliminary flash estimate" and the second publication in t+45 the "flash estimate".

Nevertheless, there are some characteristics which can define GDP flash estimates. A common definition is the one used by Eurostat in their section "Statistics explained":

"A **flash estimate** is an early estimate for an economic variable of interest over the most recent reference period and is normally calculated on the basis of a statistical or econometric model. The flash estimate should have a release date appreciably earlier than the first release date of the actual data for that variable.

Although it is likely calculated using a more incomplete set of information than the set used for traditional estimates, it is produced using the same methodology that is employed for the regular estimates. Statistical techniques can help in adjusting the temporary incomplete observations."[2]

Thus, flash estimates are based on mostly the same data sources and methods as regular estimates by definition. To help distinguish flash estimations from traditional GDP calculations, the European Task Force "GDP flash at t+30 days" specified a couple of criteria for flash estimates (Eurostat, 2016, p. 13 - 14):

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[1] Synonyms used are for example advance estimate, preliminary estimate or rapid estimate.

[2] http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Flash_estimate

- Flash estimates are released earlier than traditional estimates (typically 30-45 days after the end of the reference period).

- Flash estimates are generally less accurate than traditional estimates due to the trade-off between timeliness and accuracy; the loss of accuracy is, however, kept as small as possible.

- Flash estimates are based on a more limited set of information (e.g. usually no quarterly source data available).

- Flash estimations use more statistical methods and models and alternative indicators to estimate missing data (e.g. the third month of a statistic) due to the lack of direct information.

- Flash estimates are generally less detailed (the number of breakdowns of variables included is usually more limited than for regular estimates)

- Data for the preceding and earlier quarters is not usually revised when flash estimates are published.

Still, the distinction between flash estimates and traditional GDP calculations is not always clear. For example, with respect to timeliness, flash estimates for one country may be available later than the traditional first estimates for another.

On the other hand, flash estimates also differ from earlier estimates like nowcasts or forecasts. The main difference is that the reference period for flash estimates lies in the past, whereas forecasts try to predict developments in the future, and nowcasts are focused on the current period. As a consequence, flash estimates should be based primarily on basic data for the reference quarter, whereas extrapolative techniques that do not use a relevant indicator should only be used as a last resort and only to a minor extent for the estimation of GDP flash estimates, according to the Eurostat Handbook on quarterly national accounts, edition 2013 (Eurostat 2013a, p. 116). Nowcasts and forecasts do not have such restrictions.

Limitations of flash estimates are therefore, on the one hand, the availability of basic data for their compilation, which usually gets sparser, the earlier the estimation. For example, for many quarterly aggregates there is only monthly basic data available for two months and not for the full quarter, so that the third month has to be estimated; in some cases, the part of the aggregate that has to be estimated or imputed is larger and can even include the whole quarterly period. As a consequence, the estimates are usually less accurate than regular, later estimates, because of the trade-off between timeliness and accuracy. Even though this is well-known and a somewhat lower quality of flash estimates compared to regular and less timely estimates is widely accepted, it is important to test for the quality of the flash estimate, especially before taking the decision to publish (see Chapter 5).

3 GDP release policies in Germany and Europe

The releases of quarterly national accounts results are widely harmonized across Europe according to the current legislative rules (European System of National and Regional Accounts, ESA 2010, Annex B – Transmission programme). The programme stipulates the deadlines and frequency of transmissions as well as the dates until which the national data has to be transmitted to Eurostat at the latest.

Apart from the legally binding transmission programme, there are additional arrangements between Eurostat and the Member States – so-called Gentleman's Agreements – regarding earlier data transmission of national GDP results. The release of GDP flash estimates is not part of the current transmission programme; nevertheless, quite a few countries have started to publish them in the recent past (e.g. France, Italy) or even have a tradition to do so (e.g. UK, Belgium).

GDP release dates in Germany are announced well in advance to all users by publishing them on the internet. The advance annual release calendar that gives the precise release dates for the coming year for several important indicators including quarterly and annual GDP is disseminated already at the end of the preceding year on the Internet website of the Federal Statistical Office[1].

Besides the officially released GDP data, German national accounts have a long tradition of calculating an additional internal GDP flash estimate at t+30 days before the first regular calculation and publication. The results are not published, but are used for internal quality checks and for the calculation of European aggregates.

3.1 State of the art

First results of quarterly gross domestic product without particular breakdown – the so-called rapid release (Germany) or flash estimate (Eurostat) of GDP (see Chapter 2) – are published at around 45 days after the end of the reporting quarter. This release is largely harmonised at the European level due to a Gentleman's agreement between Eurostat and the EU Member States, even though the data isn't due until 60 days after the reference quarter according to the transmission programme of ESA2010. To enable the calculation and simultaneous publication of national and European GDP, the results of the national GDP estimates at t+45 days are transmitted to Eurostat already one day prior to publication subject to an embargo. The detailed results for German national accounts are published around ten days later, i.e. after t+55 days, for European national accounts after around t+65 days.

Since April 2016, Eurostat publishes preliminary flash estimates of quarterly GDP for the euro area (EA) and for the European Union (EU) at about 30 days after the end of the quarter (t+30). This earlier publication was the result of a Eurostat Task Force with experts from several member states (including Germany), who shared their experiences and analysed the reliability of the early estimates (see Chapter 3.2). In brief, a majority of the EU Member States transmit to Eurostat their GDP flash growth estimates one day before the agreed publication date. This group includes those Member States already publishing their t+30 estimates as well as a number of Member States – including Germany – that transmit confidential estimates to Eurostat. Eurostat then aggregates countries' quarter-on-quarter growth rates by using the weights of countries' annual GDP to obtain estimates for the EU and euro area GDP growth rates.

Generally, the quarterly results of German national accounts are transmitted to Eurostat in accordance with the transmission programme and the additional Gentleman's agreements mentioned above. This is true both for the preliminary GDP release at t+45 and the preliminary GDP flash release at t+30. The difference is, though, that the data at t+30 is to be used for the calculation of the European aggregates only, whereas the GDP data for Germany at t+45 is also published nationally.

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[1] http://www.destatis.de › Press › Preview

3.2   The way towards the current situation

The first quarterly data on GDP for Germany were published in 1978 with the first quarter of 1968 as the first reported quarter. Data were published for GDP, gross value added by five branches, the gross national product, and components of the demand side of GDP. These data were shown at current prices and at constant prices (with 1970 as the base year). But seasonally adjusted data were not yet published (Speich, 2009, p. 126).

When these data where published, it was intended to provide the following releases of quarterly GDP about two months after the end of the quarter (Hamer/Engelmann, 1978, p. 15). From 1983 to 1999 the first release on GDP was published no later than t+70. Until 2002 this time span was reduced to t+55, and in May 2003 the quarterly GDP was published at t+45 for the first time. The main reason for this was to support the European preliminary estimate of GDP which was also first published at this time (Eurostat, 2003, p. 8).

Around this time, the Federal Statistical Office also performed several feasibility studies on a quarterly GDP flash estimate at t+30 days to provide users with reliable early estimates already within 30 days after the end of a quarter. As the results were ambiguous, especially with a focus on the reliability of the estimates, it was decided not to publish the results at the time. German national accounts, however, continued to compile an internal GDP flash estimate until today, using the results to support and ensure the quality of the regular calculations with the additional benchmark. The release policy did not change, though; the first quarterly GDP estimate for Germany is still published around 45 days after the end of the quarter.

Since those first feasibility studies on GDP flash estimates, there has been systematic work in the European Statistical System to further improve the timeliness of the basic data sources, especially in the short term business statistics (STS). The launch of the GDP t+45 releases in 2003 was viewed as an intermediate stage that would eventually lead to estimates of quarterly GDP being released 30 days after the end of the reference quarter. The purpose was mainly to provide policy-makers, analysts and businesses with reliable information on the economic situation as early as possible.

Ten years later, in 2013, Eurostat set up a Task Force with the aim to assess the feasibility of estimating quarterly GDP for the euro area and the European Union at t+30 days. At that time, usually STS data for two months (out of three) was available at 30 days after the quarter-end. In addition, for the third month, some Member States also had data available on the deflated retail trade. The nowcasting techniques for the third month with partial data (with full data for two months and partial data for the third month) had improved as well. Also, the experience with the GDP t+45 flash estimates could be used for developing the GDP t+30 estimates.

At that time, apart from the harmonized European release date at t+45 days, the national results of some countries were available even earlier so that they released their preliminary results in advance (usually at t+30 days). For example, the UK, Belgium, Lithuania and Spain were already publishing a GDP flash estimate at t+30 days way before the Eurostat Task Force was set up, others started shortly afterwards (e.g. France in 2016, Italy in 2018). Outside Europe, the United States have a long tradition of publishing their GDP results according to a 30−60−90 days schedule.

The Task Force members finalised their work at the end of 2015 with a clear vote in favour of the publication of a preliminary flash estimate for EU and euro area GDP at t+30 days.

Thus, in April 2016, Eurostat started to publish an additional "preliminary flash estimate" for the EU and euro area GDP, which is released after t+30 days. Member States contributed by providing their national estimates to Eurostat one day prior to publication, i.e., two weeks earlier than before. Member States could decide themselves whether or not to publish their estimates. Germany decided against a publication, so that national (internal!) GDP results are also transmitted

to Eurostat, subject to an embargo, allowing it to be used for calculating European aggregates only, but not to be published itself. The main reason for not publishing the German national data was the somewhat lower reliability of the results at that time. The GDP growth rate is typically somewhat less volatile the larger the area it is calculated for. Therefore, it is easier to prepare and publish reliable early estimates for a larger economic area (like the EU or the euro area) than for an individual country, and revisions are usually smaller, as the experience with the t+45 flash has also shown.

4 The German way: The three pillar approach

When estimating GDP, three levels of aggregation can be used: the GDP itself, a level according to the published quarterly data at t+55 days (branches of production side and/or components of demand side of GDP), or any other level of disaggregation.

At the beginning of the German GDP flash estimations at t+30 days, the different approaches were tested. An early outcome was that a direct estimate of the quarterly GDP and its growth rate would lead to high forecasting errors. Furthermore, it could be shown that a breakdown of branches of the production side and of the components of the demand side is useful for the estimates. In some cases, the quality of the estimates increased if the estimation was performed on a more disaggregated level. This approach follows the Eurostat recommendation to derive quarterly estimates of GDP by using the production, the expenditure, and the income approach simultaneously, ideally also for flash estimates (Eurostat 2013a, p. 116). Due to the lack of information on entrepreneurial income for periods of less than one year, the income approach is not used for determining GDP in Germany, though.

Based on a detailed stocktaking of the methods for calculating GDP flash estimates at t+30 days applied by other national statistical offices, a German method was developed which is called the "three-pillar approach" and which is described in detail below. The system of GDP flash estimates developed in 2002 and the following years is not fully comparable to the present-day system, though. Since then, the concept of chain-linked indices was introduced, there were three benchmark revisions, and the timeliness and availability of indicators for the flash estimate has changed substantially. The methods and models thus had to be adapted continuously to the new requirements. The concept and the idea of the three pillars, however, have remained.

4.1 The three pillars of the GDP flash

The German flash estimates consist of three independent pillars:

- Pillar 1 is the estimation of national accounts experts. It consists of the estimates of the organisational units within the national accounts that are responsible for the calculations of the different branches and components of GDP.

- Pillar 2 is the econometric approach. This approach consists of econometric calculations for the aggregates of the production side and the demand side of GDP.

- Pillar 3 is the process of reconciliation. It is based on the four estimates of GDP from pillar 1 and pillar 2. In a two-step-procedure these estimates are reconciled to one estimate. The reconciliation is done in form of an internal conference at t+29 days.

In this way, the GDP flash estimate combines the established methods of national accounts calculations with econometric forecasting of macroeconomic data. The procedure was selected deliberately and follows the procedure of the subsequent "regular" GDP calculation: on the one hand, to prevent breaks due to methodology, and on the other hand, to make comprehensive use of the existing know-how of all experts. It also leads to a consistent and reconciled result for the quarterly GDP and its components on the production side and the demand side. Within 30 days after the end of the quarter, this procedure delivers information on:

- the price-adjusted quarterly GDP compared to the same quarter of the preceding-year,

- the price-, seasonally- and calendar-adjusted GDP compared to the previous quarter,

- the development of main aggregates of the production and the demand side of GDP.

4.2 Expert approach

The first pillar of the German GDP flash estimate is the so-called expert approach. The expert approach consists of the estimates of the units within the national accounts divisions, which are responsible for the calculations of GDP at t+45 days and t+55 days as well as annual GDP results. The methods and data used by the experts for the flash estimate are strongly connected with the traditional calculations of quarterly national accounts. These calculations are documented sufficiently (Federal Statistical Office, 2017). However, the situation at t+30 differs from the situation at t+45/55, as monthly indicators are not available for all months of the quarter, and quarterly indicators are not available at all. Thus, the experts have to estimate the missing data additionally. Every unit is responsible to find the best method for estimating the missing values, and the methods used differ from branch to branch and from aggregate to aggregate. In some cases, econometric methods are used, in others, the rule of thumb or other methods are applied. In addition, new indicators have to be identified, or established indicators have to be used in a new way.

4.3 Econometric calculation

The second pillar of the German GDP flash model provides estimates by using solely econometric and time series forecasts, respectively. Together with the expert estimates, these estimates are used to reconcile quarterly GDP results for the production approach and the expenditure approach. From this point of view, some methodological requirements for the econometric calculation can be derived.

Generally, the econometric approach has to consider the different data situations at the time of the estimate:

- estimation of a monthly indicator
- estimation of a quarterly aggregate/component of GDP or a quarterly indicator
- adoption of predefined values

The level of disaggregation is chosen in such a manner, that the results can be compared with the estimates of the expert approach. But the level of disaggregation is the result of some more considerations: on the one hand, it should be detailed enough to enable the use of monthly indicators, of model calculations or setting for special areas. On the other hand, the level should not be too detailed. If the level of disaggregation is too detailed, the efforts or costs for the econometric approach could exceed the use.

For the production approach, the level of disaggregation corresponds to the A*21 level of the NACE Rev. 2. An exception is made for the branch "real estate activities". For "renting", which is the main part of this branch, a model calculation exists for the calculations both at t+30 and t+45 for the whole current year. This model is applied to both the expert approach and the econometric approach. Another exception is made for "taxes less subsidies on products", where the same data based on the government finance statistics are used for the econometric approach as for the expert approach. All industries are estimated on a price-adjusted base.

On the demand side of the GDP, several components are estimated at current prices, and are price-adjusted afterwards with the deflators of the expert approach. This concerns the consumption expenditure of private households (by delivering branches), the consumption expenditure of the government, and the exports and imports of goods and services. All other components are originally estimated on a price-adjusted base.

The econometric approach is calculated independently from the expert approach, and it is not simply a copy of the expert approach. Therefore, it is neither necessary nor intended that the data base or the models used are matching the calculation of the experts.

Main data sources for the econometric approach are internal sources of the Federal Statistical Office. They are complemented by data from external data producers. Internal sources are, among others, quarterly national accounts data and monthly data from several short-term statistics (manufacturing industries, retail trade etc.). The most important external data source is the balance of payment statistics, which is calculated by the Deutsche Bundesbank. Data from the balance of payment statistics are used for the exports and imports of services and for the "balance of final consumption expenditure with the rest of the world".

As regards the methods used, the forecasting procedures are so-called ARIMA models. Depending on the data base, these models are used to forecast monthly or quarterly indicators, which are then used to determine the trend of an aggregate, or to forecast the aggregate itself. Model selection and forecasting are conducted for the original time series, which are not seasonally adjusted. The seasonal adjustment is performed as a last step of the reconciliation.

4.4 Reconciliation

The reconciliation as the third pillar of the German flash estimate of GDP brings together the results of the expert approach and the econometric approach. In an internal conference at t+29 days, representatives of the expert approach as well as representatives of the econometric approach present and justify their estimates. At the end the different results are balanced to one quarterly GDP.

The starting point of the conference is constituted by four usually deviating results of the GDP:

- production side of the expert approach

- production side of the econometric approach

- demand side of the expert approach

- demand side of the econometric approach

These four results define the boundaries of the reconciled quarterly GDP. To reach the aim of one balanced GDP, the conference is organised in two steps, as is shown in figure 1.

The first step of reconciliation for the expert approach and the econometric approach is a process that can encompass several stages. The number of stages depends on the quantitative differences between the two approaches. Understandably, high discrepancies of estimates increase this number of stages. The aim of the first step is to match the two different results each of the production side and the demand side, respectively.

As a result of the first step, there is one reconciled estimate for the production side and one for the demand side of GDP. Usually, these two estimates do not match exactly, either. Therefore, they are reconciled in a second step to the same result for both approaches of GDP.

Figure 1: Reconciliation of the GDP for the German flash estimate
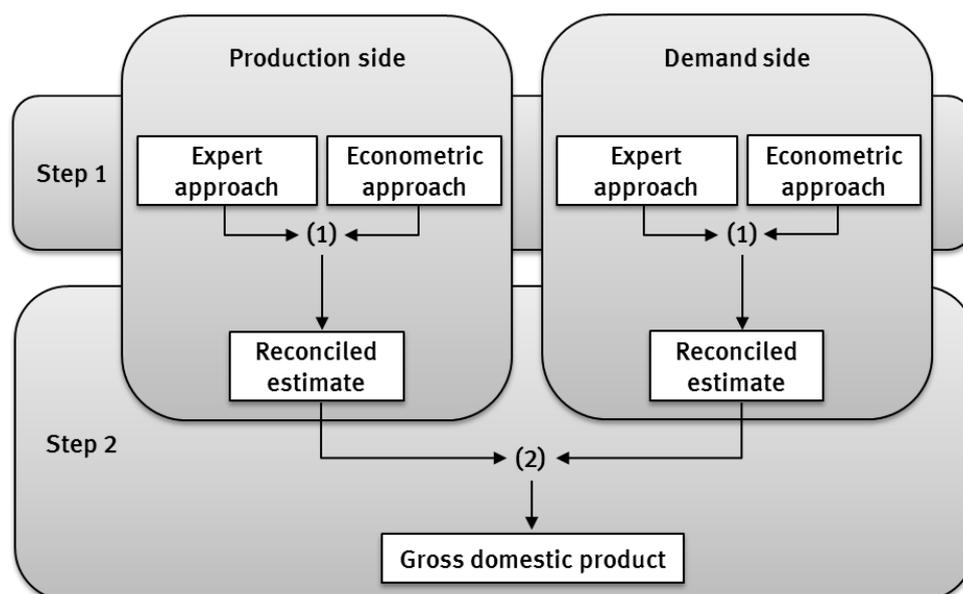
The result of this two-step conference is a reconciled growth rate for the price-adjusted quarterly GDP compared to the same quarter of the preceding year. Based on the time series of the quarterly GDP, the data is then seasonally and calendar-adjusted.

Both the price-, seasonally and calendar-adjusted year-on-year growth rate of GDP and quarter-on-quarter growth rate are sent to Eurostat after the reconciliation procedure at around t+29 days. The data sent to Eurostat also includes revisions of the previous quarters. Depending on the respective quarter, GDP figures of a maximum of 17 quarters can be revised.

Flash estimates usually have to be revised more than later estimates as less basic data is available at the time of the estimation. These revisions can be used as a quality indicator to assess the accuracy of the flash estimate, the significance of the data used, and the adequacy of the models in use.

5 Quality of the German GDP flash estimate

It is clear that quality is important to users of official statistics and that it should be a main consideration when developing statistics for publication. The accuracy of results is probably the most important quality indicator of GDP estimates. Unlike many short-term indicators, there is no simple way of measuring the accuracy of GDP, though. A common way is using evidence from analyses of revisions to assess the closeness of early estimates to subsequently estimated values. Revisions are an inevitable consequence of the earlier calculation of flash estimates, as there is a trade-off between timeliness and accuracy. The estimate is subject to revisions as more data become available over time. To measure the accuracy of German GDP flash results, the quality acceptance criteria defined by the Task Force "GDP Flash at t+30 days" for their decision to publish the European GDP flash can be used.

5.1 European quality requirements

Before Eurostat started publishing quarterly GDP for EU and euro area aggregates 30 days after the end of the quarter in 2016, the quality of the early estimate had to be ensured. The members of the Task Force defined different quality criteria for assessing the accuracy of European flash results. Two of the quality criteria are also suitable to be used as a benchmark for the accuracy of national flash estimates:

1) t+30 should be an unbiased estimate of GDP growth at t+45, with an average revision between −0.05 and +0.05 percentage points (ppt), and no more than 66.7% of revisions in the same direction.

2) The average absolute revision for GDP growth at t+30 should be within 0.10 ppt compared with t+45 GDP growth estimate, and within 0.13 ppt compared with t+65 GDP growth estimate.

The first quality criterion ensures that estimates are not systematically under- or overestimated and that no bias exists in the revisions. To control the case where a small amount of large revisions in one direction compensates multiple revisions in the other direction, the first quality criterion is supplemented by a threshold for the percentage of revisions in one direction. As negative revisions offset positive revisions, the first quality criterion is not an indicator for the extent of revisions. In theory, the first quality acceptance criterion could be even met with very large revisions of the flash estimate if these revisions had the same size in both directions. Therefore, the mean absolute revision is used to measure the size of revisions.

When setting up the quality acceptance criteria, several aspects had to be considered by the members of the Task Force. One critical issue was the rather short time span for which t+30 results were available (16 quarters). Consideration was also given to the fact that Member States were mostly at the start of a developmental process, so that later quarters might provide a better barometer for accuracy than the earlier estimates. To determine what was an acceptable level of revision, the Task Force agreed to consider the revisions made to the current GDP t+45 flash estimates as a starting point. The available data at the time showed rather small revisions to the t+45 GDP releases with a mean average revision of 0.3 ppt when compared to t+100. To put this data into context, and also as an indication for fixing the revision thresholds to be met by the earlier GDP t+30 flash estimate, data from the US GDP were used, which has a long history of t+30 flash releases. Looking at the revisions of US GDP flash estimates for the quarters of the years from 2003 to 2014, the mean revision (MR) between t+30 and t+60 was 0.02 ppt, and the mean absolute revision (MAR) was 0.13 ppt. The MR between t+30 and t+90 was also around 0.02 ppt, and the MAR of 0.16 ppt was only slightly larger than for the shorter timespan (Eurostat 2016, p. 19f.).

Table 1: Revisions to quarter-on-quarter t+30 GDP growth of the United States at 60 and 90 days, in 2003Q1–2014Q3 (percentage points of GDP growth)

	Mean revision (MR)	Mean absolute revision (MAR)
t+30 to t+60	0.02	0.13
t+30 to t+90	0.02	0.16
Source: Eurostat calculations		

5.2 Revisions analysis for the German GDP flash estimate

The very first GDP flash estimate 30 days after the end of the quarter was compiled for the third quarter of 2002. Therefore, an extensive data set with more than 50 observations exists to analyze the accuracy of Germany's GDP flash estimate at t+30 days. The time span includes different stages of the economic cycle with ups and downs, boom times and recessions. As the methodology of the flash estimate at t+30 days follows the same bottom-up approach as the t+45 calculation in Germany, data is also available for aggregates of the production and the expenditure approach. This goes beyond the scope of this paper, however, which only covers the quality assessment of aggregated GDP estimates. Data for GDP estimates at t+30 days is available for price-adjusted year-on-year growth rates and for price-, seasonally and calendar-adjusted quarter-on-quarter growth rates.

5.2.1 Data set of the German GDP flash estimate at t+30 days

The German GDP flash estimate data set can be split into three different time frames: a) long-term, b) mid-term and c) short-term.

The long-term data set starts with the benchmark revision in summer 2005. The estimates before this point of time were left out for the following analysis, because these early estimates have rather an experimental status. In addition, major changes such as the introduction of chain-linked volumes have been carried out in the benchmark revision 2005. The long-term data set starting from 2005 allows the observation of different economic cycles, and the performance of the flash estimates at turning points can be tested. Disadvantages are that the methodology, data sources, and classifications changed through the years, so that the results are not fully comparable over time.

The mid-term data set starts with the benchmark revision in summer 2011. It spans roughly a similar time period and includes a similar amount of years as the EU testing phase did. It is used for a comparison with the results of the Task Force "GDP Flash at t+30 days". A major change in the data set starting from 2011 is the implementation of NACE Rev. 2 which was introduced among other things during the benchmark revision. This is an important change when analyzing the individual economic sector estimates of the production approach, but not that relevant for the analysis of aggregate GDP.

The short-term data set starts with the third quarter of 2014, which was the first quarter after the implementation of the ESA 2010 methodology during the benchmark revision in 2014. The data also includes the most recent developments in the flash estimation process.

All three time frames end with the second quarter of 2017 when the current testing phase of GDP at t+30 days in Germany was finished.

5.2.2 Germany's GDP t+30 flash results and quality assessment

The quality acceptance criteria for the mean revision and the mean absolute revision defined by the Task Force "GDP Flash at t+30 days" are applied to all three data sets. GDP in Germany is published at t+45 days, and main aggregates are first published at t+55 days. At the later date, GDP figures are not revised and, consequently, the second quality acceptance criterion can't be fully applied to the data sets. As an alternative, data of the first revised quarter at t+135 are used for the following analysis and the quality assessment of the German GDP flash estimate at t+30 days. The analysis is based on year-on-year growth rates. Quarter-on-quarter growth rates are also available and the results are similar, because revisions of year-on-year growth rates often lead to similar revisions of quarter-on-quarter growth rates.

A quick glance at the GDP estimates at t+30 days, t+45 days and the most recently published results shows that the early GDP flash estimates already give an accurate picture of the latest developments of the economy, and the first estimates are close to the results two weeks later. The missing values for the flash estimates of the second quarter of 2011 and 2014 are due to benchmark revisions, where no flash estimates have been compiled.

Figure 2: German GDP quarter-on-quarter growth rate at t+30, t+ 45 and the most recently published results, in 2007Q1–2017Q3 (in %)
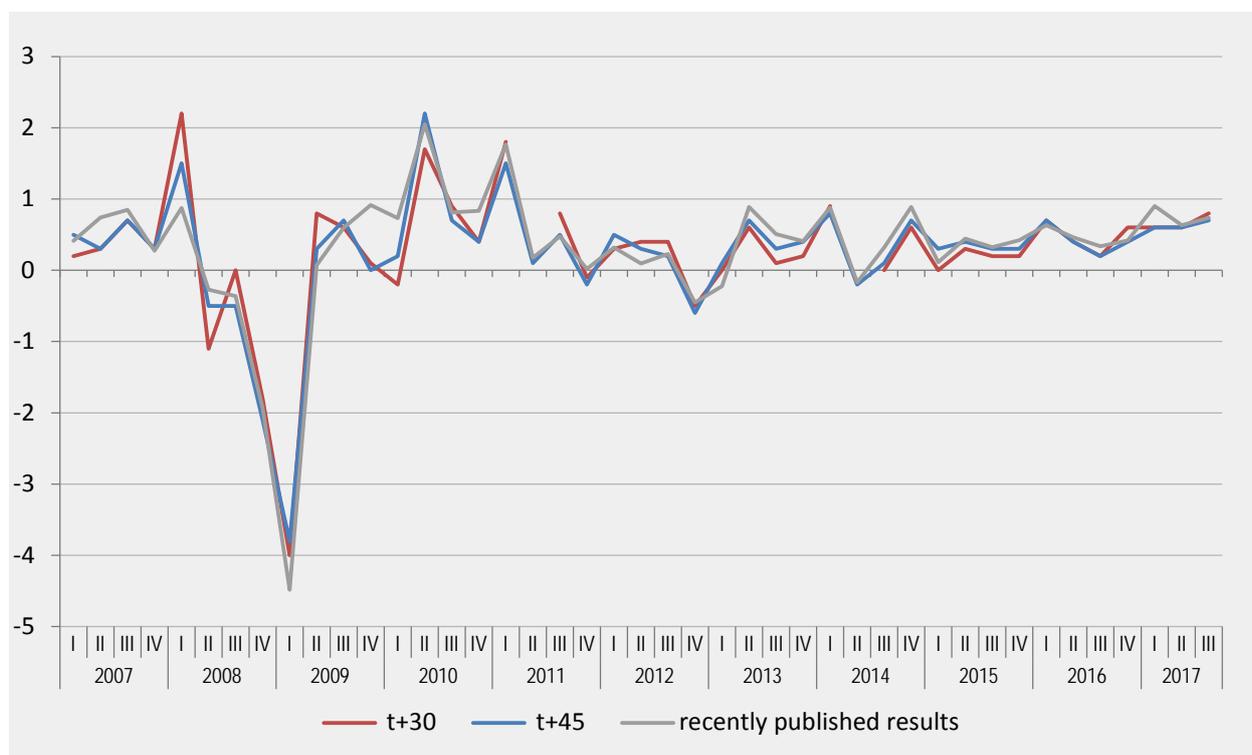
The long-term data set

The long-term analysis shows that the first quality acceptance criterion, the mean average revision, is fulfilled. The mean revision of 0.03 ppt between t+30 and t+45 is in the range of −0.05 and +0.05 ppt. Also, there are no more than 66.7% revisions in the same direction. Nevertheless, a slight bias towards upward revisions is observable as almost half of all revisions are upwards. As mentioned there is usually a trade-off between accuracy and timeliness, thus the revisions between t+30 and the first revised figures of a quarter at t+135 days are higher. In this case, the mean average revision of 0.08 ppt is outside the range of the first quality acceptance criterion. It should be stated, though, that the mean average revision of 0.06 ppt between t+45 days and t+135 days is also beyond the threshold of ± 0.05 ppt.

The second quality acceptance criterion, the mean absolute revision, is not fulfilled for the flash estimates. The MAR of the t+30 estimates is about twice as high as the thresholds set by the Task Force. This applies to both, the MAR of 0.21 ppt between t+30 and t+45 (threshold 0.10 ppt) and the MAR of 0.26 ppt between t+30 and t+135 (threshold 0.13 ppt). In comparison, the MAR of 0.10 ppt between t+45 and t+135 is significantly smaller and within the range of the second quality criterion.

Table 2: Revisions to year-on-year GDP t+30 growth of Germany at t+45 and t+135 days, 2005Q3–2017Q2 (percentage points of GDP growth)

	t+30 to t+45	t+30 to t+135	t+45 to t+135
n	46	45	47
MR	0.03	0.08	0.06
MAR	0.21	0.26	0.10
= 0	17%	20%	47%
‹ 0	37%	33%	13%
› 0	46%	47%	40%

German GDP flash estimates and revisions during the financial and European crisis 2008 – 2010

The performance of flash estimates is especially crucial during crises, recessions and upswing periods. It can be expected that revision rates are higher at turning points of the economy. At the beginning of the European and financial crisis by the end of 2008, the first downturn of economic growth was estimated at t+30 days to be −1.3% (Table 3). This first estimate was revised by −0.3 ppt two weeks later at t+45 with the first official release. The final result published in 2014 was −1.9%. The following recession in the first quarter of 2009 was first overestimated a little (−6.8%, with the most recent result being −6.6%). The subsequent recovery and upswing after the crises in the beginning of 2010 was underestimated quite severely, the first estimate showing only a moderate growth rate of 1.1%, which was already revised to 1.7% two weeks later when more data was available and it was first released. The final growth rate published for the first quarter of 2010 is 2.6%, which is more than twice as much as the first t+30 estimate. Economic growth for the second quarter of 2010 was first underestimated, too, and revised upwards later.

	t+30	t+45	Last published	t+30 to last published	t+45 to last published
	%	%	%	Percentage points	
2008-Q1	2.5	1.8	2.1	-0.4	0.3
2008-Q2	2.1	3.1	3.1	1.0	0.0
2008-Q3	1.6	1.3	1.1	-0.5	-0.2
2008-Q4	-1.3	-1.6	-1.9	-0.6	-0.3
2009-Q1	-6.8	-6.7	-6.6	0.2	0.1
2009-Q2	-6.7	-7.1	-7.9	-1.2	-0.8
2009-Q3	-5.0	-4.7	-5.6	-0.6	-0.9
2009-Q4	-1.6	-1.7	-2.4	-0.8	-0.7
2010-Q1	1.1	1.7	2.6	1.5	0.9
2010-Q2	3.7	4.1	4.7	1.0	0.6

The revisions of the quarters during the European and financial crises are the highest among the GDP flash estimate revisions. This is also the case for the revisions between t+45 and t+135. If these outliers (fourth quarter of 2008 to second quarter of 2010) are left out from the long-term analysis, the results of the flash estimate at t+30 days improve slightly. The mean revision between t+30 and t+45 is 0.02 ppt and the mean absolute revision rate is 0.19 ppt. Assuming that revisions are generally higher in years of recessions and booms, it can be concluded that the GDP flash estimates perform well at t+30 days and that the results are even reliable during times of greater fluctuations of the economic cycle.

The mid-term data set

Looking at the mid-term data set, the results of the flash estimate improved significantly. The mean revision and the mean absolute revision rates are both lower than in the long-term perspective. The mean revision rate between t+30 and t+135 is now even in the range of ± 0.05 ppt of the first quality acceptance criterion. The bias towards upward revisions is still observable, though. The mean absolute revision between t+30 and t+45 as well as between t+30 and t+135 are lower, too, but still higher than the threshold of the second quality acceptance criterion. The revision rates between t+45 and t+135 also improved significantly.

Table 4: Revisions of year-on-year GDP growth rates for Germany at t+45 and t+135 days, 2011Q3–2017Q2 (percentage points of GDP growth)

	t+30 to t+45	t+30 to t+135	t+45 to t+135
n	23	22	23
MR	0.02	0.04	0.03
MAR	0.14	0.16	0.06
= 0	17%	18%	61%
‹ 0	30%	36%	13%
› 0	52%	45%	26%

One reason for the overall improvements is that the flash estimates for the period of the European and financial crises are outside the sample. This should also be considered when looking at the test calculation performed by the Task Force "GDP Flash estimates at t+30 days" for the EU and euro area aggregates. The Task Force compiled flash estimates for the years 2012 to 2015. The mean revision rate was around zero and the mean absolute revision around 0.05 ppt for the EU and 0.06 ppt for the euro area. Looking at the German estimates for only these few years, the mean absolute revision of 0.15 ppt between t+30 and t+45 is still higher than the European results. With the reduced amount of years and the comparable time span of the European test calculations, German flash estimates are not within the range of the second quality acceptance criterion, either.

The short-term data set

The GDP flash estimates under ESA 2010 methodology were performed eleven times and include only few data points. Compared to the mid-term analysis it can be stated that the mean revision increased to 0.08 ppt, i.e. is higher than the defined threshold of 0.05 of the first quality acceptance criterion. On the other side, the revisions between t+30 and the revised figures one quarter later at t+135 are surprisingly lower and with 0.05 ppt exactly on the threshold value. The mean absolute revision decreased only slightly by 0.01 ppt compared to the mid-term perspective and is still above the threshold of the second quality acceptance criterion. Compared to the first revision of the quarter at t+135 days it's striking that not only t+30 estimates but also t+45 results were on average more revised. It raises the question if estimating GDP flash results has become more difficult after the implementation of ESA 2010, possibly because of methodological changes which require the use of more volatile and/or less reliable source data. This could be analyzed further in the future, when more estimates are available.

Table 5: Revisions of year-on-year GDP growth rates for Germany at t+45 and t+135 days, 2014Q3–2017Q2 (percentage points of GDP growth)

	t+30 to t+45	t+30 to t+135	t+45 to t+135
n	12	11	11
MR	0.08	0.05	0.05
MAR	0.13	0.16	0.07
= 0	25%	27%	55%
‹ 0	8%	9%	9%
› 0	67%	64%	36%

5.2.3   Conclusions on the quality of the German GDP flash estimates at t+30 days

The quality assessment of the German GDP flash estimate at t+30 days was carried out for different time spans including different phases of the economic cycle. The longest observation period comprises more than 50 observation points. Compared to the test calculation done by the European Task Force, which covers the years 2012 till 2015, this is more than three times the size of the sample.

In the quality assessment of the German GDP flash estimate, it is obvious that the second quality acceptance criterion, the mean absolute revision, is not fulfilled for any of the three data sets. The first quality acceptance criterion, the mean revision, however, is fulfilled in almost all test calculations. The analysis of the three different time spans shows that the quality of the German flash estimates increased slightly over time. Without the impact of the financial and European crisis, the improvements are less significant.

6 Conclusions and the way forward

Policymakers and other users rely on both accurate and timely data on economic growth. GDP flash estimates give an earlier picture of the economic situation than regular GDP estimates. They are produced as soon as possible after the end of the quarter in accordance with the same concepts as regular national accounts estimates. Flash estimates therefore differ from forecasts, nowcasts or leading indicators, as they give a coherent picture of the whole economy, respect the accounting rules and focus on actual data for the past. They are based on a less complete set of source data than regular estimates, though, due to the more timely calculation. It is therefore crucial to check the reliability of the flash estimates, as there is a trade-off between timeliness and accuracy.

In Germany, first flash estimates at t+30 days were compiled in 2002. The German model for flash estimates consists of three independent pillars: the expert approach, the econometric approach and the final reconciliation. The expert approach and the econometric approach calculate in total four GDP results which can, but do not necessarily differ. Out of these estimates one GDP result is reconciled. Since 2016, the results are sent to Eurostat under embargo to compile EU and euro area aggregates. The German flash estimates at t+30 days are also used to support the in-house calculations of the traditional quarterly GDP calculation at t+45. The results, however, are not published nationally. One of the reasons is the lower accuracy of the estimates which does not fully meet the European quality criteria set by the Task Force "GDP flash at t+30 days".

To analyse the quality of early GDP flash estimates the Task Force has determined thresholds for the revisions of the first estimate. In order to control for bias in the estimates, the early results should on average not be revised by more than ±0.05 percentage points in one direction. The scope of revisions – measured as the mean absolute revision – should on average be less than 0.10 ppt when compared to the t+45 days results, and less than 0.13 ppt compared to t+60 days. For German GDP flash results, the mean revision lies within the bandwidth of the quality criterion defined by the Task Force. On contrary, the mean absolute revision is about twice as high as the European threshold of 0.10 ppt.

As the estimation of GDP flash estimates at t+30 days is continuously developed further in Germany, the quality of the flash estimates is also improving. This is also due to the fact that more and more basic data is available earlier. This implies on the one hand that the compliance of the quality criteria should be reviewed from time to time, as new data on revisions becomes available. On the other hand, it could be worth looking at the possibility of flash estimations performed at an even earlier point of time. Therefore, Germany is about to launch a new feasibility study on GDP flash estimates to be compiled within ten days after the end of the reference quarter. At this time, two months of the quarter are already available for some indicators, and the data base is close to the one at t+30 days. The results of the study are expected in 2020. If the German GDP flash results of the estimation at t+30 days will be published nationally before that, still has to be decided.

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