Methodological note

GUIDANCE ON QUARTERLY SECTOR ACCOUNTS IN THE CONTEXT OF THE COVID-19 CRISIS

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Background

The COVID-19 outbreak is impacting the organisation of the statistical process. It also makes necessary appropriate statistical methods to assess the effect of the outbreak and its corresponding policy measures.

Quarterly Sector Accounts (QSA) for the euro area and the European Union aim at helping policy makers to understand economic developments and to improve economic governance by showing how economic agents behave and interact. In the context of the COVID-19 outbreak, they will be a valuable tool to understand short term trends and to evaluate whether specific policies were successful or not.

Covering all institutional sectors of the economy and the whole range of current and capital accounts, the compilation of QSA relies on a wide range of sources and methods and many of them may need to be adapted in the context of the outbreak. At the same time, QSA are impacted by methodological choices that data compilers will have to make when recording interventions in the economy by different economic agents. Solutions to the above mentioned issues are being progressively discussed in the statistical community. Eurostat and other international organisations have already issued a number of statistical guidance notes.

The purpose of this note is twofold. First, it aims to help sector accountants to navigate through already available guidance notes by summarising the aspects that are impacting the compilation of QSA, harmonising statistical and recording approaches. Some of the guidance may be directly applicable by QSA compilers, while other guidance will serve more as an informative source of the merits and limitations of solutions applied in statistical products that serve as an input to the QSA compilation process. Obviously, the applicability of certain guidance depends on the set up of the QSA compilation process in each NSI. Second, this note aims at identifying specific challenges that the COVID-19 outbreak will present to compilers of QSA statistics.

The note is structured as follows. First, the existing statistical guidance on data sources and statistical methods is presented and the challenges for the compilation of QSA are outlined.

Then, the note presents the existing guidance of methodological aspects of national accounts, showcasing the impact on sector accounts. The challenges regarding the consistency of sector accounts with other datasets are also discussed. Last, good practices of data transmission and communication recommended by Eurostat are outlined with a specific focus on issues related to QSA.

Note: The note should be considered as provisional. It may be further updated when more information will become available from QSA compilers on national situations and specific challenges. The same applies to guidance notes of other statistical domains reviewed here. Consequently, amendments of related guidance notes may also bring changes to this note.

Guidance on data sources and statistical methods

The level of data processing performed by QSA compilers varies among NSIs. In some NSIs, QSA compilers receive data sources that have been already adjusted to ESA 2010 concepts and treated for missing units, while in other NSIs, QSA compilers need to work directly with raw data sources.

The collection of data becomes more challenging as normal data sources might not be available. There are already guidance notes addressing the impact on data sources during COVID-19 outbreak and the corresponding need to develop appropriate estimation methods for several statistical domains: quarterly national accounts ([1]), government finance statistics ([2]), short-term business statistics ([3]), trade in goods ([4]) and harmonised index of consumer prices ([5]).

These notes discuss the decrease of data availability that can translate into undesirable under-coverage and lack of comparability. Reduced data availability requires actions by NSIs, described in several guidance notes ([3])([4]) and acknowledged in the "ESS strategic communication during the COVID-19 crisis" ([6]). These actions involve: enforcing communication with data providers, establishing new ways of data collection, focusing on statistical units that continue on their economic activity and designing follow-up actions for non-respondents.

The NFSA values are based on information collected from two main sources: administrative registers and statistical sources (censuses and surveys) that may be affected differently by the COVID-19 outbreak. In case that usual data sources are not available, or will be available late for compilation, **new data sources** are proposed by several guidance notes; for example, administrative records not used previously (VAT declarations, e-invoicing data, other tax data, social security declarations…), data from internet, website activity or online services, data from the press, data from mobile operators, mobile money transactions, credit card payments, traffic statistics, energy consumption data, etc. However, the readiness of NSIs to incorporate these sources varies significantly across the EU. In addition, for some very important data sources such as VAT statistics, some NSIs warned about the lower quality of their estimates and an eventual delay in their transmission ([1]).

If no other data sources are available, **estimation and/or imputation techniques** need to be

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([1]) Guidance on quarterly national accounts (including flash) estimates
([2]) Draft note on statistical implications of some policy measures in the context of the COVID-19
([3]) Guidance on estimation and imputation of missing data for short-term business statistics
([4]) Guidance on the compilation of statistics on intra-EU trade in goods
([5]) Guidance on the compilation of the HICP
([6]) ESS strategic communication during the COVID-19 crisis

used. Estimation methods need to take into account whether the non-response was due to inability of a unit to respond or the fact that is stopped its economic activity (either permanently or temporary). In the annex attached to this document, a synoptic overview of on estimation and/or imputation techniques is provided, based on the methodological guidance provided by Eurostat for different statistical domains.

As conclusion, in the case of missing data, it is necessary to apply imputation techniques even considering methods not typically used. Ideally any new imputation methods should be tested, as much as possible, before they are applied. In order to make the users aware about the quality of the data, the values should be flagged appropriately (e.g. "e-estimated", "p-provisional", "u-unreliable", etc.) and metadata should be provided.

Guidance on methodological issues in national accounts relevant to quarterly sector accounts

Compilers of QSA statistics will be challenged not only by missing data sources and the need to develop appropriate estimation/imputation methods where necessary, but also by the recording of policy measures designed to address the consequences of the COVID outbreak in the economy. This section provides an overview of the main issues and recording recommendations of relevant guidance notes. For further details on the recording and reasoning depending on national circumstances, QSA compilers shall refer to the texts of the original notes. Notes should be considered provisional; they can be amended as more information becomes available.

The "Draft note on statistical implications of some policy measures in the context of the COVID-19" crisis provides overview of major active policy measures by EU governments in order to mitigate the economic and social impact of the shutdown of businesses enforced across the EU due to the COVID-19 pandemic. It also gives guidance on treatment of such measures in national accounts. The table below only provides a summary of the recommended options with the reference to sector accounts transactions. For more details on the discussion please refer directly to the note. The following range of cases is considered in detail:

1. **Employment related measures** - government support for keeping employees on the payroll despite an enforced reduction of working hours; support for small businesses and self-employed. Various measures can be enforced across countries leading to different recording possibilities.

Type of government support schemes	Recording in sector accounts
SUGGESTED RECORDING OPTIONS	
Support to businesses who retain their employees despite reduced or zero hours, market producers	As subsidies on production: • S13 D.39 payable • S11/ S12/ S1M D.39 receivable • S11/ S12/ S1M D.1 payable continues to be recorded in full amount
Support to employees by direct payments to households to compensate for reduced or zero working hours where social benefits are paid outside social insurance (even if payable by the intermediation of social insurance	As social assistance benefits in cash: • S13 D.623 payable • S1M D.623 receivable
	As current transfers:

Type of government support schemes	Recording in sector accounts
institutions for practical reasons)	• S13 D.75 payable • S1M D.75 receivable
	As current transfers (alternative recording): • S13 D.75 payable • S11/ S12/S1M D.75 receivable • S11/ S12/S1M D.75 payable • S1M D.75 receivable
	Alternative recording to reflect the fact that even if support payments are made directly to employees, the employers also profit from them by avoiding bankruptcies. Such payments could be seen as a collective measure to support labour market as a whole. In this context current transfer from S13 to employers reflects a compensation by government for a government order to stop production. Then another D.75 transfer from employer to households would reflect a compensation by the employer for the order to employees to stay at home. This recording has the advantage of recognizing two transfers supporting the income of both corporations and households.
Non-market producers, government units with no fall in output	Continuing recording of compensation of employees (D.1)
Non-market producers, government units with fall in output enlisted in similar short hours support schemes as those described above for market producers	Same treatment recommended as for market producers
OTHER RECORDING OPTIONS	
Support to employees by direct payments to Households to compensate for reduced or zero working hours *(Only in case where payments are made to participants of the social insurance schemes and financed by social contributions; the scheme envisages such payments to avoid unemployment, while employees in fact retain their relationship with employers.)*	As social security/insurance benefits: • S13 D.621/D.622 payable • S1M D.621/D.622 receivable Limited recording option!
Support to employees by direct payments to Households to compensate for reduced or zero working hours <u>where social benefits are paid outside social insurance</u> (even if payable by the intermediation of social insurance	As capital transfers D.99: Not recommended! S13 transfers are meant to support

Type of government support schemes	Recording in sector accounts
institutions for practical reasons)	households income not wealth

2. **Fiscal policy related measures** - deferral of tax deadlines, postponing the submission deadlines for tax declarations, suspension of late payment interest on unsettled tax obligations and suspension of tax debt enforcement.
3. The accrual principle of recording implies that taxes/ social contributions should be recorded in the period when the economic activity generating the tax liability took place.

Type of government support schemes	Suggested recording in sector accounts
Accrual based on time-adjusted cash method	The time-lag used for time-adjusted cash should be reviewed accordingly to changed payment deadlines
Accrual based on assessments and tax declarations	No impact to recording method; the coefficient for uncollectible amounts may need to be adapted to reflect higher risks of insolvencies.
Waiving of taxes for certain time periods	No accrual of revenue can be considered for waived amounts in these periods

4. **Other measures** - loan, guarantees and equity/capital injections into corporations. Here it is expected that for most of such schemes already available statistical rules in the Manual on Government Deficit and Debt are applicable.

In addition, the ISWGNA guidance on "COVID-19: How to Record Government Support to Employers, Self-employed and Households" considers the treatment of government employment related measures in a similar way to Eurostat's note summarized above. The Eurostat guidance note should be followed by NFSA compilers. However, the ISWGNA paper highlights the impact of different recording options on sector accounts aggregates and provides theoretical considerations from SNA 2008 and labor statistics perspectives, which are useful to take note of.

Another draft guidance note "On the statistical implications of deferred salaries in the context of the COVID-19 pandemic" considers recording in the accounts of certain type of changes affecting compensation of employees by corporations to address the impact of crisis. **It should be noted that the principles that this guidance provide are still under discussion in the technical groups**. The recording impacts compensation of employees (D.1), and employers' social contributions (D.12/D.611 and D.612) for all subsectors of the total economy In particular:

1. **Temporary reduction/ deferral of salaries with legally motivated promise to pay them later**: ESA 2010 p. 20.94 states: (…) Compensation is recorded on an accrual basis, at the time the work is done, and not at the time the wage is due for payment or paid. Compensation of employees in such case is considered as unconditional obligation of employer. Thus, accrued salaries should be fully recorded in the period when work done. Amounts payable in the future are to be reflected on employers' balance sheet as AF.89, Accounts payable.

2. **Temporary deferral of the employee appraisal cycles, which includes deferring promotions:** does not change the compensation of employees.

3. **Deferred bonuses:** Bonuses are conditional to certain circumstances (performance of employee, employment status etc). Such exceptional conditional payments, in line with ESA 2010 p. 4.12(a), should be recorded when they become unconditional.

The recording of deferred and waived interest payments are discussed by the draft guidance note on "*Guidance on deferred and waived interest payments of households in the context of the COVID-19 crisis*". **It should be noted that the principles that this guidance provides are still under discussion in the technical groups.** The main principles of the draft guidance are as follows:

- **Deferred interest payments** – according to ESA 2010 paragraph 4.50, interest is recorded on an accrual basis, independently of their payment. Thus deferred interest payments should be recorded accrued, and added to the principal of the loan until paid (in the Financial account). Financial Intermediation Services Indirectly Measured (FISIM) between households and financial institutions should also be recorded in the normal way.

- **Waived interest payments** – The situation where interest payments are waived, i.e. they do not have to be paid later, is not mentioned explicitly in ESA 2010. In general, the accrual recording of interest should be applied is this case as well. A capital transfer (D.99) of the same amount should be recorded in the same period from the financial institution to the customer, in order to remove the accrued interest from the financial stock positions at the end of the period. FISIM should be recorded in the normal way, like in the case with deferred interest described above.

- **Government financial support** – Government financial support to financial corporations, to provide an incentive for them to postpone or waive interest payments of households (in the form of loans, interest rate subsidies, and/or guarantees) should be recorded in accordance with the appropriate rules of ESA 2010 and the Eurostat *Manual on Government Deficit and Debt*.

The recording of non-market output is discussed in the "*Guidance on non-market output in the context of the COVID-19 crisis*". The main principle is that deviating from the conventional sum of costs approach for output in current prices because of temporary changes in activity is not justified; the legal requirement of ESA 2010 in this respect should continue to be followed. The sectors concerned are S.13 and S.15, as the output (P.1) of these sectors is impacted.

The compilation of QSA statistics is expected to be impacted by challenges in the rest-of-the-world (RoW) accounts. The note "*Some considerations on the possible impact of the Covid-19 crisis on Balance of Payments statistics*" by the ECB and "*Ensuring continuity in the production of external sector statistics during the COVID-19 lockdown*" by IMF, discussed the impact of the COVID-19 lockdown on the main data sources used to compile external sector statistics. The notes acknowledge that it can be necessary to use a different approach when collecting and disseminating external sector statistics, e.g. compilers may have to use alternative sources, make temporarily estimates and refine the imputation methods used. Different balance of payments components can be affected, such as goods and services, remittances, other current transfers and capital account transactions. Compilers of external sector statistics will need to refine their estimation and imputations methods early enough. If statistical methods are revised later on, counterpart sectors can be affected, and sector accounts will be prone to big future revisions.

Specific transactions that could be prone to revisions later and have an impact on key indicators in QSA statistics can among others be:

- Import and export of goods and services (P.6/P.7) – delays in processing and compiling data can occur and the level of details and quality may also be impacted, having an adverse impact also on other variables and sectors through the balancing process.

- Compensation of employees (D.1) – seasonal workers have been unable to travel across borders which can affect wages etc.

- Property income (D.4) – lower profits in foreign affiliates can have an impact on dividends and reinvested earnings.

- Remittance flows (D.75) – lockdowns measures have caused many migrants to lose their job. A fall in remittances can have a relatively big impact on gross disposal income for households for small countries that normally receive remittances.

Challenges for QSA compilers

Unprecedented challenges for statistical production posed by COVID19 crisis have been identified for several statistical domains and will equally impact QSA production in particular for quarters 2020Q1 and 2020Q2:

- disruptions in availability of standard data sources;

- disruptions of economic relationships that pose difficulties for estimations;

- a wide range of new national policy measures to support the economy but limited availability of information about them to reflect appropriately in the statistics;

- resulting problems with quality and reliability of macroeconomic aggregates and potentially significant data revisions;

- at the same time, there is an increased need for statistical information for assessing impact of the crisis and policy measures.

Sector accountants may be exposed to these problems in many different ways while incorporating inputs from different statistical domains into an integrated picture of economic processes broken by institutional sectors.

One of the challenges in the production of QSA statistics for periods impacted by the COVID-19 crisis is the absence of full information and data on government measures. QSA are often based on estimation and trends, which have changed remarkably in the first two quarters. Therefore, estimations may be based on partial information only and notable revisions in subsequent periods are likely. It is important to flag such cases appropriately, e.g. using a "provisional" flag or even "unreliable", and documenting cases in metadata reports. Good practices on flagging and metadata, as discussed in the last section of this note, will raise awareness to users of the higher uncertainty with data, calling for a more careful approach when using provisional QSA data.

Achieving consistency can very challenging at all times, but this can even be more difficult under the COVID-19 lockdown. Timely co-ordination between national accounts domains becomes even more crucial to ensure symmetric coverage of the crisis' impact in the accounts. Small cracks can easily become more visible during a crisis and to avoid this it is important that compilers of different tables communicate any data change, alternative data sources, new estimation, and imputation methods. Communicating any changes in data in advance will make it easier for compilers to react and estimate the qualitative and quantitative effect it might have

on data, see recommendations 16 & 17 on pages 52-53 of the handbook on the "*Consistency of ESA 2010 based national accounts — 2020 edition*".

It can expected that vintage-related discrepancies will be higher due to the COVID-19 lockdown. In accordance with the ESA 2010 TP, sector accounts are transmitted later than QNA, which means that sector accounts are generally based on more revised source data, e.g. GFS and BOP. If data are revised significantly due to delays in data collection or new data becoming available since the compilation of QNA, countries should seriously consider a new transmission of updated QNA data aligned with sector accounts and other statistical collections used as input to the compilation of QSA, e.g. GFS and BOP. Improved co-ordination on methodological choices is required to reflect impact of government support measures to other sectors of economy in a uniform manner. Any information on exceptional inconsistencies and breaks should be communicated in advance to Eurostat (metadata report – detailed and technical explanation) and users in general (metadata, press releases etc.)([7]).

Input data should be subject to quality controls and compilers of QSA should pay special attention on consistency check on data. Compilers should perform numerical consistency and plausibility checks between QSA and other related tables to assure consistency. The balancing process in the production of QSA ensures that multiple data sources are combined and confronted towards producing the accounts of all sector of the economy. It is essential that produced output corresponds to the actual economic phenomena observed during the COVID outbreak.

In this context, close cooperation with financial accountants is needed to ensure that similar methodological treatment is applied and the same data sources are used wherever relevant (e.g. deferred interest, dividends). This will also allow to limit the differences observed for net lending/net borrowing in non-financial and financial accounts.

QSA compilers may be confronted with challenges when dealing with the following cases:

- How to deal with dividend suspension or delaying payment
- Deferral of VAT payments (which will also make administrative data sources less usable)
- Deferral of payment of social contributions
- This link between input (intermediate consumption) and output (production) is interrupted. Fixed costs have still to be payed even if businesses are closed. This makes it very difficult to estimate value added.

Eurostat publishes 2 key indicators on households: gross household saving rate and gross investment rate, expressed as the ratio of gross saving and gross fixed capital formation respectively over gross disposable income([8]). The economic reality in each country, the type of measures designed in each country and the recording options are expected to impact on the developments observed for reference period 2020Q1 onwards. To ensure cross-country comparability, it is important that similar measures are recorded in the same way across countries.

Similarly, for non-financial corporations (NFCs) emphasis is given on gross investment rate and profit share, expressed as the ratio of gross fixed capital formation and operation surplus

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([7]) See guideline 24 of the handbook on ESA 2010 cross-domain consistency
([8]) adjusted for the change in net equity of households in pension funds reserves

respectively over the gross value added of the sector. Government support schemes may take many different forms corresponding to different options of their recording in ESA 2010 terms and resulting in different impact on the operating surplus of NFCs.

Compilers are invited to consult Eurostat (ESTAT-SECTOR-QUERY@ec.europa.eu) on cases raising recording difficulties for specific national measures if not covered by available methodological notes, in order to develop harmonized recording guidance.

Seasonal adjustment

Seasonal adjustment of series incorporating data for quarters from 2020Q1 onwards will pose challenges to data compilers. In its "ESS guidelines on seasonal adjustment, Eurostat, 2015" has provided already guidance for "treatment of outliers at the end of the series and at the beginning of a major economic change" (Chapter 2.8). In addition, Eurostat published "*Guidance on time series treatment*". The guidance proposes that both statistical criteria and economic information are used to make decisions on how to model the outliers. The following table summarises

Reference period	Type of outlier
2020Q1	- Additive outlier (AO), if trend-cycle not affected → impact on the irregular component - Level shift (LS), if impact on the trend-cycle expected → impact on the trend cycle
2020Q2 onwards	Verify AO in 2020Q1 with new information. Options: - Transitory change (TC) → impact on irregular component or - LS or - Keeping the AO The full shape of the outlier needs to be modelled when future observations become available. This will likely be complex and may need to go beyond TC or LS. It is possible, for instance, that there will be a "stronger" additive effect in the second quarter 2020 before it starts normalizing (the "U-shaped" pattern).

Recommendations on QSA data transmission and metadata

Eurostat's regular estimates are based on the legally required transmissions of national data that are due eighty-five days (T+85) after the end of each quarter for euro area countries and three months (T+3M) for non-euro area countries. Those transmission cover the whole Table 801 as per the transmission programme. Following the expiry of all derogations in 2020, these estimates are, in principle, already based on a full datasets from all EU Member States.

While all NSIs and Eurostat have confirmed their commitment to respect the usual release schedule and provide users with these important data, the NSIs have informed about the challenges related to the COVID-19 outbreak affecting the compilation of NFSA data. Those challenges may be more considerable especially for 2020Q2 when the unavailability of data may be higher due to the lockdown measures.

Eurostat has issued "*Guidance on publication and transmission of national accounts data and metadata*", where best practices for the use of flags, transmission of metadata and communication are presented. The note provides also specific guidance on ESA 2010 data and metadata reporting for non-financial sector accounts.

In addition to the standard metadata template used by the QSA compilers, Eurostat will also circulate a specific metadata template to record the impact of COVID-19 on QSA data, with special focus on key variables/indicators of the households and business sectors.

Guidance on the use of confidentiality status (CL_CONF_STATUS) flags and observation status (CL_OBS_STATUS) is provided on the SDMX website. The "Observation status" code list has a heterogeneous character as it mixes concepts which are not always mutually exclusive. In case data compilers are satisfied with one flag per observation value, they are invited to apply the recommended hierarchy.

Annex: Estimation and imputation techniques for missing data sources

The following table presents the main estimation techniques proposed for different statistical domains in the context of COVID, as well as their main characteristics and applicability in the current context. These methods are largely based on the Handbook on Methodology of Modern Business Statistics, which explains the main methods for imputations and the Guidelines on the use of estimation methods for the integration of administrative sources, which recommends how to apply those methods in the case of administrative sources.

Method	Description
• **Deductive Imputation**	• The missing value is derived **from other observed values**, on the assumption that those observed values are correct. • This method should be applied when possible.
• Nearest neighbour, random hot deck, sequential hot deck, or predictive mean matching	• The missing value is estimated as the observed value **of another statistical unit**, the donor. • There are different techniques to apply donor imputation (nearest neighbour, random hot deck, sequential hot deck, or predictive mean matching). • It can be applied when deductive imputation is not possible.

• **Non parametric approaches**	• One option is following a two-step approach:
	  ○ 1st step imputing the values (not fulfilling all the restrictions) and
	  ○ 2nd step applying a minimization criterion in order to fulfill restrictions that were still missing.
	• The other option is applying a model that directly takes into account all the restrictions

• **Cold deck donor imputation** • **Model based imputation using parametric models** • **Imputation using longitudinal data**	• They could be used only with great caution • The reason is that the COVID-19 outbreak may have altered the existing parameters of those models.
• **ARIMA forecasts**	• The time series are analyzed as an autoregressive integrated moving average (ARIMA) model, and the value for a later period is forecasted applying the parameters of the model and assuming the error is equal to zero. • This method can provide good results in some cases, eg highly seasonal (but regular) series in normal circumstances. However, in this moment, this method is NOT RECOMMENDED since the forecast does not take into account the impact of the COVID-19 outbreak.
• **Carry-forward and other naïve methods**	• The **Carry-forward** and other **naïve methods** include simple estimations, such as the previous observed value or, in highly seasonal series, the previous year's value or the last observation plus the average seasonal change of the last years • NOT RECOMMENDED for the transactions that are expected to be highly impacted by the COVID-19 outbreak as this method is assuming that no changes happened.