

INTERNATIONAL MONETARY FUND

Update of the Quarterly National Accounts Manual: An Outline

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August 2013**

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SUMMARY

This paper presents the changes envisaged for the update of the *Quarterly National Accounts Manual: Concepts, Data Sources, and Compilation*, published by the IMF's Statistics Department in 2001. An update of the manual is required in view of the many developments in the compilation of quarterly national accounts that have taken place since 2001, and also to make the manual fully consistent with the international statistical standards resulting from the adoption of the *2008 System of National Accounts*. This paper proposes the new structure for the manual, illustrates the main issues identified for the update, and describes the work plan and timeline of the update process.

I. INTRODUCTION

1. The IMF's Statistics Department (STA) plans to undertake an update of its publication *Quarterly National Accounts Manual: Concepts, Data Sources, and Compilation* (Bloem and others, 2001; hereafter, the *QNA Manual*). The purposes of this paper are to outline a new structure for the manual, to illustrate the main issues identified for the update, and to describe the work plan and timeline developed for the update process.
2. The first edition of the *QNA Manual* was published in May 2001. The manual is mostly aimed at compilers of Quarterly National Accounts (QNA), but it is also of interest to advanced users of QNA data. The manual is focused primarily on the compilation of quarterly Gross Domestic Product (GDP). It discusses data sources for the compilation of GDP and provides guidance and recommendations on statistical techniques widely used in the QNA compilation process, such as benchmarking, seasonal adjustment and chain-linking. The *QNA Manual* is fully consistent with the *1993 System of National Accounts (1993 SNA)*.
3. The main reason for updating the *QNA Manual* at this stage is to improve and expand the content of the manual in the light of the many developments in data sources, statistical techniques, and other aspects of the QNA methodology that occurred over the last decade since the *QNA Manual* was published. In addition, an update of the manual is also required to take into account the changes resulting from the adoption of the *2008 System of National Accounts (2008 SNA)*.
4. There will be minimal changes to the structure of the *QNA Manual* compared to the previous edition. The changes to the structure will involve rearranging the sequence of chapters and renaming some chapters to better reflect their content. Other changes to the structure will entail streamlining the material that was previously presented in annexes. However, there will be some key changes to the technical content of the *QNA Manual* which will be explained later in this paper.
5. As in the previous edition, the *QNA Manual* will focus on data sources and methods to calculate quarterly estimates of GDP using the three approaches (production, expenditure, and income). Quarterly national accounts follow the same principles, accounting framework, structure and definitions that apply to the annual accounts and therefore, like the annual accounts, are expected to cover the full sequence of accounts and balance sheets by institutional sectors of the *2008 SNA*. In practice, however, QNA are much less comprehensive than annual accounts because of data and resource constraints.
6. In the light of the increased importance given to the sectoral accounts (for example in the context of the G-20 Data Gaps Initiative), the *QNA Manual* will present an overview of quarterly non-financial and financial accounts and balance sheets by institutional sectors. This overview will provide a useful basis for extending the accounts beyond GDP for the total economy, but will not present the level of detail on the full sequence of quarterly sectoral accounts.

7. This paper is structured as follows. Section II presents a revised structure of the manual. Section III explains the main issues identified for the update and sets out the actions to be taken to improve and expand the content of the manual based on these issues. Finally, Section IV provides an outline of the work plan envisaged for this update, including a timetable for implementation.

II. STRUCTURE OF THE REVISED MANUAL

8. Table 1 outlines the revised table of contents proposed for the update. The updated manual will be composed of 12 chapters (the current edition has 11 chapters). Three chapters will be new (Chapters 5, 9, and 10); the remaining nine chapters will be updated versions of the existing chapters with improved and additional content (the next section will clarify the main changes identified for the update). Main topics covered by each chapter are indicated in the table.

9. The updated manual can ideally be divided into four parts:

- a. The first part introduces the **basic principles and concepts** of QNA and lays out **strategic issues** for their implementation (Chapters 1-2). Chapter 1 defines the scope and role of QNA and discusses the links between QNA, annual accounts and short-term statistics. Chapter 2 deals with managerial and organizational issues and suggests main steps in establishing and maintaining a QNA system;
- b. The second part deals with **data sources** (Chapters 3-4). Chapters 3 will review the high-frequency sub-annual indicators that are commonly used by countries to compile quarterly GDP by industry, by type of expenditure, and by income category. Chapter 4 will discuss the main sources to compile other main aggregates of non-financial and financial accounts and balance sheets by institutional sectors at the quarterly frequency;
- c. The third part illustrates **basic methods** that are specifically intended for the quarterly compilation of national accounts (Chapters 5-8). Chapter 5 is the first of the new chapters proposed. It is an overarching chapter that will introduce specific QNA compilation techniques that will be discussed in further detail in the subsequent chapters. Chapters 6 to 8 will discuss in detail the statistical techniques commonly used for compiling QNA, namely benchmarking and reconciliation procedures, seasonal adjustment, and chain-linking techniques;
- d. The fourth part discusses **advanced methods** for improving the accuracy, reliability and timeliness of the quarterly estimates (Chapters 9-12). This part will include two new chapters. Chapter 9 will provide a framework to develop a system of supply and use tables for compiling and validating estimates of

quarterly GDP and other main quarterly aggregates. Chapter 10 will illustrate best practices to fill data gaps for calculating preliminary estimates of quarterly GDP shortly after the reference period, which are commonly known as early or “flash” estimates. Chapter 11 will explain how to measure unfinished output as work-in-progress in the QNA. Finally, Chapter 12 will emphasize importance of setting up a sound and coordinated revision policy of QNA data and explain ways to monitor the reliability of GDP estimates using revisions analysis.

Table 1: Revised Table of Contents

Chapter title	Main topics covered
1. Introduction	Scope and role of QNA; Links to ANA and short-term statistics; Issues arising from the 2008 SNA; Outline
2. Strategic issues in Quarterly National Accounts	Steps for compiling QNA; Organizational Issues
3. Sources for GDP and its Components	Data sources to compile GDP by industry, by type of expenditure, and by income category
4. Sources for other Components of the 2008 SNA	Data sources to compile other components of quarterly non-financial and financial accounts and balance sheets by institutional sector
5. Specific QNA Compilation Issues	Introduction to specific techniques for compiling QNA; Time of recording; Seasonality; Data compilation systems
6. Benchmarking and Reconciliation	Benchmarking methods; Quality of benchmarking; Reconciliation procedures; Software
7. Seasonal Adjustment	Seasonal adjustment methods; Treatment of calendar effects; Identification of outliers; Quality of seasonal adjustment; Software
8. Price and Volume Measures	Volume estimates at previous year’s prices; Chain-linking techniques; Contributions to GDP growth from chain-linked measures
9. Supply and Use Tables for Quarterly GDP Compilation	Compilation of quarterly SUT; Use of annual SUT as a validation tool for quarterly aggregates
10. Early Estimates of Quarterly GDP	Missing information; Time series models; Trade-off between timeliness and accuracy
11. Work-in-progress	Work-in-progress in QNA; Worked examples for crops, livestock and construction activities
12. Revisions	Revision policy of QNA data; Real-time database and revisions analysis

III. MAIN ISSUES FOR THE UPDATE

10. This section discusses the main issues identified for the update and sets out the actions to be taken in revising the *QNA Manual* based on these issues. They are classified in four groups. First, changes in the *2008 SNA* that require consequential changes in the *QNA Manual* are noted. Second, new developments in QNA compilation are discussed and proposed to broaden the scope of the manual. Recent methodological advances in the areas of benchmarking, seasonal adjustment, and chain-linking with an impact on the *QNA Manual* are highlighted. Finally, some topics from the *QNA Manual* that require further elaboration and clarification are presented.

A. Issues arising from the *2008 SNA*

11. The changes from the *1993 SNA* that are relevant for the *QNA Manual* update are those related to the scope of transactions and the production boundary (*2008 SNA*, Annex 3.C) and those related to the extension of the concept of assets and capital formation (*2008 SNA*, Annex 3.D). Compared to the previous edition, the *2008 SNA* has added some details on the specific methods used in the quarterly compilation: for example, a presentation of chain-linking techniques for quarterly indices is now included and the specific section dedicated to quarterly accounts has been expanded (*2008 SNA*, 18.33-18.44).

Actions to be taken: Chapter 1 will outline all changes made in the *2008 SNA* that have an impact on the QNA. Chapters 3 and 4 on data sources will be amended to reflect the new boundaries (both production and asset boundaries) defined by the *2008 SNA*. Furthermore, refinements to national accounts methodology arising from the *2008 SNA* will be elaborated and further clarified in relation to their application at the quarterly frequency. Specifically, the *QNA Manual* will elaborate the changes impacting on GDP.

B. New Developments in QNA

12. The main purpose of this update is to take into account and incorporate in the manual a number of developments that have taken place in recent years in the compilation of QNA. We have identified four areas of the QNA methodology where substantial progress has been achieved: (i) reconciliation procedures; (ii) supply and use tables (SUT) for quarterly GDP compilation; (iii) early estimates of quarterly GDP; and (iv) real-time database and revisions analysis of QNA data.

Reconciliation Procedures

13. With the growing use and implementation of quarterly SUT and quarterly accounts by institutional sectors, the compilation of consistent quarterly estimates satisfying both low-frequency benchmarks and accounting identities at the quarterly level has become more and more challenging for compilers. Reconciliation procedures are useful to restore both temporal and contemporaneous consistencies in the quarterly data. They differ from

benchmarking methods, which make quarterly series consistent only with temporal benchmarks.

14. Although the *QNA Manual* notes the problem of satisfying accounting relationships between variables on a quarterly basis (*QNA Manual*, 6.46), reconciliation (or multivariate benchmarking) methods are considered “too complex and demanding to be used in QNA.” However, recent works¹ in the specialized literature as well as practical application by countries have shown that systems of quarterly series subject to both temporal benchmarks and cross-sectional constraints can be reconciled using standard algebra procedures that require low computational costs and limited efforts for implementation.

Actions to be taken: Chapter 6 on benchmarking will be expanded to cover reconciliation procedures for quarterly series subject to both annual benchmarks and quarterly constraints in terms of cross-sectional consistency. A review of alternative options for reconciliation will be presented based on the available literature and the most suitable approach for QNA purposes will be identified and recommended.

Supply and Use Tables for Quarterly GDP Compilation

15. The *QNA Manual* emphasizes the advantages of using SUT for quarterly GDP compilation. A SUT framework is recommended as the most efficient framework for filling data gaps and reconciliation of conflicting data (*QNA Manual*, 2.26). In addition, the manual suggests that countries that have developed a compilation system of national accounts estimates based on annual SUT use them systematically as a basis for QNA estimation (*QNA Manual*, 2.29).

16. Recent country experience shows that SUT have been used for compiling quarterly GDP in two ways: (i) as a compilation tool to calculate detailed quarterly estimates of output, expenditure, and income components of GDP, or (ii) as a validation tool to assess the coherence of independently-derived quarterly estimates of main aggregates. The former approach is followed by countries where SUT represent the methodological framework behind both annual and quarterly compilation systems (for example, the Netherlands). Quarterly GDP is derived from the aggregation of detailed estimates coming out from the quarterly SUT. On the other hand, countries relying on two different and well-established compilation systems of national accounts (one based on SUT at the annual frequency and one based on a more aggregated system based on short-term indicators at the quarterly frequency) tend to use the available annual SUT to verify the coherence of the quarterly main aggregates (Australia and Italy are two examples).

¹ See Di Fonzo and Marini (2011); Quenneville and Fortier (2012).

17. Despite the fact that a SUT framework represents an ideal approach for both quarterly and annual GDP compilation, the characteristics of quarterly data certainly demands a compilation work of increased complexity. First, the presence of seasonal effects makes the balancing process of supply and use categories of each individual product more difficult with quarterly data than with annual data. From country experience it is still unclear whether it is best to work with seasonally adjusted or unadjusted data when compiling SUT at the quarterly level. Second, as the temporal dimension is crucial in QNA, the movements between each element of SUT from one quarter to another have to be preserved when discrepancies from the accounting relationships of the tables are eliminated (or reduced). Finally, the *QNA Manual* will advise on the optimal sequence of application of typical QNA techniques such benchmarking, seasonal adjustment and chain-linking when they are used in a SUT framework.

Actions to be taken: Chapter 9 will focus on SUT for quarterly GDP compilation. Practical guidance and recommendations will be given on using SUT for both compiling and validating quarterly GDP estimates, based on country experience and further research conducted on this topic.

Early Estimates of Quarterly GDP

18. Timeliness of QNA data is fundamental. Nowadays, prompt information about the most recent development of quarterly GDP represents a necessary input for policy makers and stakeholders. National and international governing bodies have been urging statistics agencies to increase timeliness of QNA data in recent times. As a result, many countries have started the dissemination of early (or flash) estimates of quarterly GDP within a short time lag from the end of the reference quarter (between 20 and 45 days).

19. Early estimates are generally less reliable than later estimates, because the information set available at the time of publication is incomplete and has to be integrated with imputations. To fill in data gaps, countries adopt a wide range of techniques from basic assumptions (i.e. replicate the last available observation) to sophisticated forecasting models. The accuracy of the various assumptions and the quality of now-casting models should be carefully assessed so that to minimize the future revisions and, consequently, to increase the reliability of GDP data. This area should be further expanded and investigated in the *QNA Manual*.

Actions to be taken: Chapter 10 will provide guidance and recommendations on the methodology to calculate early estimates of quarterly GDP. This chapter will replace the current Chapter VI on “Mechanical Projections”, which covers simple mechanical projections based on past trends.

Real-time Database and Revisions Analysis

20. Revisions analysis is a powerful tool for monitoring the reliability of quarterly GDP estimates. A preliminary step in conducting studies on revisions is to develop and maintain a real-time database of published estimates (also known as revisions triangle). Once a real-time database is created, descriptive statistics of revisions can be used to quantify and summarize revisions made to preliminary estimates at different stages. From this analysis compilers can derive valuable information on the magnitude and directions of GDP revisions, identify weaknesses in the compilation process and implement the necessary improvements.

21. In recent years, the OECD has developed an internationally agreed conceptual framework for the calculation and presentation of revisions analysis statistics (McKenzie, 2006). Despite its recognized importance, to date only a few national statistics offices from advanced economies have established real-time database and regularly conduct revisions studies of quarterly GDP (for example, U.K and Italy). More efforts are required by international agencies to promote the regular use of revisions analysis in the QNA production process, and the update of the *QNA Manual* represents a good opportunity to increase visibility of such an important tool for monitoring data quality.

Actions to be taken: Chapter 12 will provide guidance to perform revisions analysis of QNA data, in accordance with the conceptual framework developed by the OECD.

C. Methodological Advances in Statistical Techniques

22. Research on statistical techniques used in QNA has seen a remarkable increase since the publication of the manual. Certainly, this activity has led to significant progress in improving the quality of QNA data. Statistical offices, central banks, and international organizations have played an important role by setting up task forces on specific-QNA topics, organizing international conferences, and promoting innovation through research projects and studies. This section notes the most significant progress originating from this work in the areas of benchmarking, seasonal adjustment, and chain-linking.

Benchmarking

23. The *QNA Manual* recommends the Denton proportional method for benchmarking.² This method returns quarterly series that are consistent with annual benchmarks and, at the same time, are as close as possible to the quarter-to-quarter movements shown by indicator

² In particular, it recommends the Proportional First Differences (PFD) variant of the benchmarking method proposed by Denton (1971).

series. In extrapolation³, the *QNA Manual* proposes an enhancement to the original Denton formula to adjust for a possible bias between the indicator series and the target ANA variable. This enhancement is based on a forecast of the next annual benchmark-to-indicator (BI) ratio. The update of the *QNA Manual* will review the recommendation on benchmarking along two lines: (i) propose a regression-based model for benchmarking, and (ii) refine the enhanced formula for extrapolation.

24. A general framework for benchmarking is the regression-based model proposed by Dagum and Cholette (2006). The *QNA Manual* presents the Cholette-Dagum model in the annex, but the method is considered less suitable for QNA purposes than the proportional Denton method (see *QNA Manual*, 6.A1.43). Recent studies, however, have shown that the Cholette-Dagum method is superior to the proportional Denton method in extrapolation and provides similar results in interpolation. By estimating a linear regression model between the annual series and the indicator, the Cholette-Dagum method guarantees an optimal forecast of the next annual BI ratio for the current year with no annual benchmark and generally provides more accurate extrapolations than the Denton method.

Actions to be taken: Chapter 6 will propose that the Cholette-Dagum regression-based benchmarking method be used for improving accuracy of QNA extrapolations.

25. The *QNA Manual* suggests a shortcut expression to calculate the solution of the enhanced benchmarking problem in extrapolation (*QNA Manual*, p.93); however, the exact solution is not provided. Di Fonzo and Marini (2012) derived the expression for the exact solution and found that extrapolations are more accurate than those obtained with the shortcut formula proposed in the *QNA Manual*.

26. The enhanced Denton proportional benchmarking method using the exact formula has been implemented in a macro for Excel (XLPBM), developed by the Real Sector Division of STA. XLPBM is particularly suited for QNA compilation systems based on Excel spreadsheets. XLPBM is presently being used in the technical assistance and training activities on the QNA conducted by the Statistics Department.

Actions to be taken: Chapter 6 will present the exact solution of the Denton proportional benchmarking method enhanced for extrapolation and recommend using the XLPBM macro for Excel for its usage.

³ Extrapolation refers to the case when the annual benchmark for the year is not yet available and quarterly data have to be extrapolated using only information from the quarterly indicator. Interpolation is the process of adjusting quarterly values to match given annual benchmarks.

Seasonal adjustment

27. Recently, significant steps forward to improve the application of seasonal adjustment methods in the production of official statistics have been made in the European Union (EU). Eurostat, the statistical office of the European Commission, and the European Central Bank (ECB) established task forces formed with participants from EU member countries to develop recommendations for a coordinated policy of seasonal adjustment of QNA (Eurostat and ECB, 2002 and 2008). Eurostat has also developed guidelines on seasonal adjustment (Eurostat, 2009), with the support and contributions of experts from the international scientific community working on this topic.

28. Recommendations on seasonal adjustment in the *QNA Manual* will be reviewed and updated in the light of the results and conclusions of the work undertaken in the EU. It has to be considered, however, that the existing recommendations in the *QNA Manual* were used as a basis to prepare the EU guidelines and recommendations and therefore they are already consistent with them to a large extent. The most important changes in the QNA recommendations concern (i) the preadjustment phase and (ii) the seasonal adjustment strategy to minimize revisions.

29. Preadjustment is necessary to remove deterministic effects from the series before entering the seasonal adjustment filtering procedure. The regression approach with ARIMA (AutoRegressive Integrated Moving Average)-based error modeling, commonly known as RegARIMA, is recommended in the EU guidelines as the preferred one for preadjustment to eliminate calendar effects (trading days, Easter, or leap year), outliers, and other deterministic effects from the series. RegARIMA models turn out to be also useful in forecasting and, consequently, to produce flash estimates. RegARIMA models are available and very well integrated in the commonly used seasonal adjustment software, which also offer user friendly automatic options to identify such effects and test their statistical significance. The *QNA Manual* notes that RegARIMA models can be used for model selection and outlier detection, but gives more emphasis to ad-hoc preadjustment procedures available in the X-11 algorithm, such as the extreme value adjustment procedure (p. 8.25) and the estimation of trading days and Easter effects based on ordinary least-squares OLS regression analysis of the irregular component (8.28).

Actions to be taken: Chapter 7 on seasonal adjustment will recommend the use of RegARIMA modeling as the preferred framework to conduct the preadjustment phase, including detection, test and removal of any deterministic effects prior to the application of seasonal adjustment filters.

30. With regards to revisions, the *QNA Manual* notes that a concurrent adjustment strategy⁴ is theoretically preferable to incorporate new information into the estimates as early as possible (p. 8.42). However, it warns that potential gains from a concurrent approach may vanish if the seasonal component is unstable, the size of the irregular components is large, and the original unadjusted data are subject to frequent revisions. In such cases, the use of one-year ahead forecasts of the seasonal factors is to be preferred (current adjustment). To limit the amount of revisions from concurrent adjustments, the EU guidelines recommend that options and models of seasonal adjustment should be re-specified on an annual basis while parameters may be estimated concurrently, except where a known or unusual event requires intervention. This practice, commonly known as partial concurrent adjustment, is currently followed by many countries and has proved to suit well the characteristics of the QNA production cycle and to limit the frequency and size of revisions to GDP estimates.

Actions to be taken: Chapter 7 will recommend the use of a partial concurrent adjustment as the recommended strategy of seasonal adjustment in QNA in order to balance the trade-off between incorporating new information in the seasonal adjustment process and limiting the frequency and size of revisions.

31. Finally, it has to be noted that the U.S. Census Bureau officially released in July 2012 an updated version of its seasonal adjustment software: the X-13ARIMA-SEATS program. This software replaces the previous X-12-ARIMA implementation, which was described in great detail in the *QNA Manual*. The most innovative feature of X-13ARIMA-SEATS is the addition of a version of the ARIMA model-based seasonal adjustment program SEATS, developed at the Bank of Spain (Gomez and Maravall, 1997). The availability of X11 and SEATS filters in a common program represents a great advantage for compilers, who may compare a common set of diagnostics of the two alternative seasonal adjustment procedures and decide which method best suit the characteristics of the series.

Actions to be taken: Chapter 7 will illustrate the main functionalities and new features of the X-13ARIMA-SEATS software.

Chain-linking

32. The *QNA Manual* is fully consistent with the *2008 SNA* with regards to price and volume measures.⁵ Chain indices are recommended to calculate price and volume changes.

⁴ In a concurrent seasonal adjustment strategy models, filters, and regression parameters are re-identified and the associated factors re-estimated every time new or revised data become available

⁵ Both the *1993 SNA* and *2008 SNA* recommend a Fisher-type index to calculate volume changes of GDP (see *1993 SNA* 16.73; and *2008 SNA* 15.180). Given the practical difficulty to calculate Fisher indices, the *SNA* recognizes that Laspeyres volume indices and Paasche price indices provide an acceptable alternative to Fisher indices in national accounts.

The *2008 SNA* includes a discussion on the calculation of annually chained quarterly indices (*2008 SNA*, 15.45-15.55), drawn from chapter IX on price and volume measure in the *QNA Manual*. Quarterly chain indices should be calculated using the one-quarter overlap (QO) technique, combined with benchmarking to remove any resulting discrepancy between the quarterly and annual data. When Laspeyres-type volume measures are used, the annual overlap (AO) technique is considered a second-best alternative. In this case, the AO technique results in quarterly data that aggregate exactly to the corresponding direct annual data.

33. Practical experience from countries that have introduced chain-linking in QNA suggests a modification of these recommendations. The superiority of the QO technique is theoretically grounded, because it provides the smoothest transition between the fourth quarter of one year and the first quarter of the next year. Nevertheless, when Laspeyres-type volume measures are used there are several practical reasons why the AO technique should be preferred over the QO technique:

- a. The QO technique requires the calculation of quarterly data at the prices of the same year and at the prices of the previous year, while the AO technique requires only estimates at the prices of the previous year;
- b. Volume estimates at the prices of the same year are usually not published, and therefore users are not able to replicate the calculation of chain-linked measures of national accounts or, more importantly, calculate chain-linked estimates of different aggregations;
- c. To preserve consistency with the annual data, the QO technique requires an additional step of benchmarking. This certainly increases the computational burden for compilers. In addition, by using benchmarking the original changes from the QO technique are all adjusted to fit the given annual totals;
- d. As both the *QNA Manual* and the *2008 SNA* recognize, the AO technique may give similar results to the QO technique in many circumstances. It can be shown that the two techniques differ for an annual factor which is related to the difference between the quantity weights in the fourth quarter and the quantity weights in the corresponding year, which tend to be stable for GDP and other main aggregates of QNA;
- e. Following a general principle of consistency in the *SNA*, the same method should be used to derive annual and quarterly volume estimates. When Laspeyres-type indices are used, the AO technique for quarterly data corresponds to the method used for chain-linking annual data.

Actions to be taken: Chapter 8 will suggest that the AO technique is used for chain-linking Laspeyres-type volume indices and (implicit) Paasche-type price indices. The QO technique with benchmarking will remain the preferred technique for Fisher-type indices.

34. With the lack of additivity of chain indices, the calculation of contributions of components to percentage change in the aggregate assumes a key role for the economic analysis of QNA data. Contributions to percentage change measures are additive and thus allow cross-sectional analysis, such as explaining the relative importance of GDP components to overall GDP volume growth. The *QNA Manual* presents formulae for calculating contribution to percentage change according to different aggregation formula used.

35. With the introduction of chain-linking in national accounts in many countries, the practical difficulty of calculating additive contributions from quarterly data has emerged. Countries have adopted different practices based on the aggregation formula used, but no standard method has emerged clearly.

Actions to be taken: Chapter 8 will review the available formulae for calculating contribution of components to the aggregate change, providing examples using artificial data and recommending the best formula when either Fisher-type or Laspeyres-type indexes are used.

D. Improved Presentation of Topics

36. **Use of administrative data.** Further discussion and clarification are needed on the use of administrative data for compiling QNA. Administrative data have become essential in both advanced countries, where statistical agencies are facing major budget cuts for conducting statistical surveys, and developing countries, where administrative data are often the only source available at the quarterly level. Administrative data offers several advantages but there are also challenges that have to be addressed when they are used in the production of QNA data, such as the lack of timeliness and classification problems.

Actions to be taken: Chapter 3 will broaden the section on the use of administrative data sources, documenting the experience from countries which have successfully introduced administrative data in the production of QNA and providing best practices.

37. **Work-in-progress.** The *QNA Manual* dedicates a chapter on this topic, which clarifies how work-in-progress is calculated in the *SNA* context, presents the main differences with the business accounting practice and discusses special issues in relation to recording work-in-progress for agriculture. In the last years, the Real Sector Division has provided technical assistance on the work-in-progress methodology in a number of member countries. In particular, work-in-progress models have been developed for agriculture crops, livestock, and construction activities. Taking stock of this experience, the chapter will be expanded to

provide further guidance and clarification on data sources and assumptions for estimating work-in-progress in the quarterly accounts.

Proposed action: Chapter 11 will provide more examples of the work-in-progress methodology drawing from practical experience of some countries.

IV. OUTLINE OF THE UPDATE PROCESS

38. The *QNA Manual* update will be coordinated and carried out by the Real Sector Division of STA. An internal team has been created to conduct the update work. The team is composed of economists working in the division with specialized skills in the QNA methodology and practical experience in the compilation of annual and quarterly national accounts. As described in this paper, the team has already completed key preliminary steps for the update: the content of the *QNA Manual* has been fully reviewed, a new table of contents has been developed, and main issues for the update have been identified.

39. The update work will consist of three main steps. First, the available material on the topics covered in the manual will be reviewed and carefully scrutinized. Up-to-date information on the advances in QNA compilation will be obtained from the inventories of sources and methods nowadays published by many compiler agencies. Further, particular care will be given to conclusions derived from the work of international task forces (some of these have been mentioned in the previous section). Second, empirical research will be conducted on those topics for which further investigation is needed to compare alternative options and provide recommendations to compilers. In the previous section some research areas have been already indicated, such as benchmarking and chain-linking. The final step consists of drafting the new chapters based on the investigation work conducted.

40. During the update process, STA intends to establish a fruitful collaboration with all parties interested in the update of *QNA Manual*. This outline paper will be posted on a webpage created for the *QNA Manual* update (see below). STA will inform statistical agencies, central banks, and other international organizations of the creation of the webpage. All of them will be invited to send comments and suggestions on the new structure of the manual, the main issues identified and the proposed actions. Additionally, countries will be encouraged to transmit any technical contributions that they consider relevant for improving the content of *QNA Manual*.

41. The webpage for the *QNA Manual* update has been created on the IMF website. This webpage will serve as the primary point of information during the *QNA Manual* update process and will be the place where draft chapters will be posted for consultation. Draft chapters will be made available as soon as they are prepared.⁶ Comments and suggestions on

⁶ Chapters will be posted as they become available, with no particular order.

the draft chapters should be sent to the mailbox stareqnam@imf.org. Depending on the length and complexity of the chapter, a window of between 4 to 8 weeks after the date of posting on the website will be given for comments and suggestions. IMF will also conduct regional seminars to discuss the main issues and guidance of the revised manual before its finalization.

42. Table 2 outlines the main steps of the update process and the suggested timeline for implementation. It is planned to post the first drafts of chapters on the website by September 2014. These drafts will be revised subsequently based on the comments and suggestions received. Revised chapters will be posted on the website for additional comments by June 2015. Final versions of chapters will be prepared based on this final round of consultation. A pre-publication draft of the manual is expected to be ready by March 2016.

Table 2: Tentative Timeline for the Update

Phase	Implementation dates
First draft of chapters posted on IMF.org for comments and suggestions (chapters posted as they become available)	By September 2014
Draft chapters revised based on consultation	By March 2015
Second drafts of chapters posted on IMF.org for comments	By June 2015
Final revision of all chapters	By December 2015
Pre-publication draft of the updated <i>QNA Manual</i> on IMF.org	March 2016

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