Fiscal Space Profiles of Countries in Eastern and Southern Africa

Fiscal Space Projection Exercises - USER GUIDE

October 2017

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Client: UNICEF ESARO

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Ecorys consultants Gabriele Pinto, Andrea Dijkstra, Dafina Dimitrova, Oskar de Roos and Marius d'Hond provided valuable advice and useful discussions on the development of the Excel workbook. Nkandu Chilombo (UNICEF-Lusaka) provided particularly valuable and important advice on the Excel workbook. The writer is solely responsible, of course, for errors of fact, logic and judgment in the present document and in the Excel workbook it discusses.

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Abbreviations and Acronyms

CPI	Consumer-price index
GDP	Gross domestic product
IDS	*International Debt Statistics* (World Bank publication)
IFS	*International Financial Statistics* (IMF publication)
IMF	International Monetary Fund
SDR	Special Drawing Rights
WDI	*World Development Indicators* (World Bank)

Preface

In its reports to UNICEF offices in various eastern and southern African economies, Ecorys recommended that UNICEF could continually formulate quantitative fiscal projections and use them in its dialogue with governments and other stakeholders, in support of its advocacy for expenditure beneficial to children. These projections would cover not only future current and capital expenditure needs in the areas of education, health, social projection, nutrition, child protection, and water and sanitation, but also the main components of the overall "fiscal space", that is, the funding for this expenditure. Not only should UNICEF project the expenditure required in coming years to meet children's needs, it should also be in a position to discuss how governments could sustainably mobilize the financial resources for this expenditure. Quantitative projections of this kind should enable UNICEF to engage in more effective dialogue with all parties involved.

In these same reports, Ecorys set out a methodology for formulating such fiscal-space projections. In this methodology, quantitative economic and demographic programming assumptions regarding the future evolution of (1) child-relevant expenditure needs and (2) the main fiscal accounts would be applied to historical country data to calculate multiannual fiscal projections, under projected policy programs. Sensitivity analysis could be applied to consider alternative policy programs. This analysis could then be used to draw tentative conclusions regarding the adequacy of the fiscal space. UNICEF could "bring this to the table" in its dialogue with the government and other stakeholders.

Ecorys developed an Excel projection exercise for each of the economies on which it reported. While there are some differences among these exercises, these are mainly the consequences of different national circumstances. The methodology is essentially the same for all the economies. Ecorys recommends that each UNICEF office develop a projection exercise with a methodological approach broadly similar to the one Ecorys developed.

In order to help UNICEF do this, Ecorys drafted this User Guide. This document comprises two main segments. The first (Part A) is a general description of the methodological approach that Ecorys developed. This discussion is intended for anyone with an interest in the topic. The second (comprising Parts B, C, and D) is a technical description of the Excel projection exercises. This discussion is intended for analysts who plan to develop or work with projection exercises of the kind Ecorys recommended.

Projection exercises in Excel were developed for several eastern and southern African economies. The projection exercises are deliverables under Ecorys' contract with UNICEF for National Political Economy Analysis and Fiscal Space Profiles of countries in the Eastern and Southern Africa Region.

The workbooks and user guides were developed by a team of Ecorys staff and consultants, headed by Ecorys Project Director Ivo Gijsberts and including consultants Paul Beckerman and Oskar de Roos of Ecorys. Other Ecorys staff who have worked on these projection exercises have included Andrea Dijkstra, Dafina Dimitrova, Alessandro Ramella Pezza, Marius d'Hond and Gabriele Pinto of Ecorys, who provided research support and valuable advice on the Excel workbook and present document.

The team that developed the Excel workbook and the present user guide wish to thank UNICEF staff throughout Africa for advice and support. They particularly wish to thank Mr. Nkandu Chilombo, who provided invaluable advice on data bases and on the structure of the Excel file during the pilot exercise for Zambia. They wish also to thank the various government officials, officials of international agencies based in Africa, and representatives of various non-government and private entities for generously taking time to meet with the missions and for their assistance with data issues.

The participants in the production of the various Excel workbooks and this user guide are solely responsible for any errors of fact and judgment. Like any complex spreadsheet exercise subject to frequent revision, the projection workbooks cannot be guaranteed to be completely error-free. The writer would be grateful to be informed about errors that users detect.

A. Introduction

1. The fiscal-space projection exercises

1. This User Guide consists of a general introduction to and a technical manual for the fiscal-space workbooks that Ecorys developed for the eastern and southern African economies in its work program with UNICEF. The work program is a consulting assignment with UNICEF under the National Political Economy Analysis and Fiscal Space Profiles Project. The basic purpose of the National Political Economy Analysis and Fiscal Space Profiles Project is to develop a set of recommendations for UNICEF in its advocacy work with governments. These recommendations are intended to help UNICEF improve its ability to persuade governments to sustain *appropriate* expenditure-flow levels for programs that matter for children. (See Terms of Reference UNICEF ESARO National Political Economy Analysis and Fiscal Space Profiles of countries in the Eastern and Southern Africa region for a detailed description of the Project objectives.).

2. The present document is intended to be "living," in the sense that it is subject to revision, not only as the fiscal-space workbooks evolve, but as users indicate their needs. Anyone who has ever worked with spreadsheet "models" knows it is often difficult to understand the workings of complex spreadsheets developed by others, even those with substantial documentation. This User Guide is written in full awareness of this reality. (Reader comments would accordingly be much appreciated).

3. For present purposes, a government's "priority" expenditure is defined as the annual expenditure flows considered essential for children's welfare. For each economy, the fiscal-space workbook is a year-by-year projection exercise that addresses the question of whether the country government possesses and will continue to possess adequate "fiscal space" to fund its government's "priority" expenditure flow. To be clear, the expression "priority" should not be taken to mean that such expenditure should always be "prioritized" over other expenditure. The point of the nomenclature is simply to identify expenditures of specific interest to UNICEF.

4. For most economies, priority expenditure comprises total government recurrent and non-recurrent expenditure on education, health, and social protection. For some economies, other expenditure categories, including nutrition, child protection, and water and sanitation, are also included with priority expenditures. All government expenditure not categorized as "priority" in a specific country exercise is classified (by definition) as "non-priority." It is important to recognize that for certain government-expenditure accounts there is a degree of arbitrariness in the classification as priority or non-priority (Section 3 below discuss this point).

5. In any year, the "fiscal space" is defined as the flow of financial resources a government has available to apply to pay for the expenditure flow defined as "priority." As explained in Section 4 below, the fiscal space is the sum of the government's tax and non-tax revenue, the government's grants, and the government's net external financing flows, *less* the sum of non-priority and interest expenditure.

6. The projection exercise is a programming exercise intended to determine whether future fiscal-space flows are likely to be able to cover future priority-expenditure requirements. Section 2 describes this in greater detail.

7. This user guide is intended to serve for any of the country exercises that have been developed under the Ecorys consultancy. To keep the focus specifically technical, however, the user guide makes use of an illustrative exercise for a hypothetical economy, called the "Republic of East Africa." (The Excel-based projection exercise is called EAFS.xlsm.).

8. In this Introduction, Section 2 describes the projection exercise's basic purpose. Section 3 discusses the composition of priority and non-priority expenditure. Section 4, drawn from ECORYS' Case Study Report on Zambia to UNICEF (ECORYS 2016), describes the exercise's methodological framework. Section 5 describes the sensitivity-analysis procedure used to determine the consequences of different policy changes for the feasibility calculation. Section 6 describes the Excel workbook's overall structure.

2. The projection exercise's basic purpose

9. The core of each workbook is a medium-term fiscal-projection exercise, with year-by-year projections running five years into the future. The exercise is set up to answer the following question. Suppose the population under fifteen is projected to grow over this period at a given rate. Suppose the analyst carrying out the exercise believes these children will require a quantitatively specified priority-expenditure flow to ensure they receive adequate education, health and basic economic protection. Suppose further that the analyst has formulated a multi-year macroeconomic and fiscal program, encompassing:

(1) government plans for non-priority expenditure;
(2) assumptions regarding the evolution of the world economy;
(3) a macroeconomic "program," encompassing the evolution of such variables as real GDP, the price level, and the exchange rate;
(4) plans for external financing, including grants and loans for budget support and capital programs; and
(5) policy-makers' plans for net internal government borrowing.

Together, these assumptions would imply projected revenue and external-financing flows, as well as projected non-priority expenditure flows. The exercise determines whether, after taking account of these projected resource flows, the government would also have to undertake an unfeasibly large amount of borrowing in internal financial markets to cover the full amount of the priority-expenditure flow. ("Net" internal borrowing is "net" in at least two senses. First, it is the flow of net government borrowing less government deposits in domestic accounts. Second, the net borrowing is gross borrowing less repayment.) The "net-internal-borrowing" flow is, for present purposes, the "fiscal gap" associated with a given set of programming assumptions. The Excel workbook is set up to calculate the required amount of internal borrowing – that is, the fiscal gap – for each projection year, and to show the results in tables and charts. (Over any year, "net internal borrowing" refers to the sum of (1) gross borrowing less repayment in domestic financial markets, *plus* (2) withdrawals less gross deposits into any domestic deposit accounts, *plus* (3) gross sales less purchases of domestic financial assets.).

10. If the additional internal borrowing required is "too large," or would lead to a rapid and persisting increase in the ratio of outstanding government internal debt to GDP, the analyst might conclude that the required priority-expenditure flow and the multi-year macroeconomic and fiscal program, taken together, would be financially unfeasible. If the government attempted to carry out such a program, the internal-financing shortfall would force the government to adjust expenditure, revenue, or external financing to fit the available internal financing. Criteria for determining that the additional

borrowing flow is “too large” are somewhat arbitrary, but the general idea is that the government must recognize two limitations: first, that internal financial markets can provide only a limited amount of financing without affecting credit flows to commercial and productive purposes, and, second, the government must be careful to ensure that its internal debt not grow unsustainably (as a percentage of GDP).

11. The overall recommendation of the Ecorys consultancy regarding fiscal-space analysis is that, if a UNICEF country office develops and maintains a projection exercise of this kind, it should be in a better position to engage in dialogue with the national government and other stakeholders regarding the most appropriate policy program to sustain an adequate expenditure flow in areas relevant to children’s welfare.

12. The general point of the projection exercise is to show *all* the fiscal accounts relevant to policy-makers’ decision-making imperative, in a construction that shows their interrelationships. Thus, if UNICEF recommends a quantitatively specified expenditure program over coming years, the projection shows all the fiscal accounts that, *together*, constitute the fiscal space underlying that program.

13. The focus of the fiscal-space analysis is the expenditure flows in the priority sectors that flow through the fiscal accounts.[1]

3. Priority expenditure

14. As noted in Section 1 above, for most economies, expenditure defined as “priority” typically includes total government expenditure on education, health, and social protection. It may also include government expenditure on nutrition, child protection, and water and sanitation. For any given economy, the composition of priority expenditure is, inevitably, somewhat arbitrary. On the one hand, even if expenditure classified as “priority” is taken to include a very broad range of expenditure categories, expenditure classified as “non-priority” would still include expenditure that matters for children’s welfare. (For example, road construction and maintenance, which would be considered non-priority expenditure under the definition used for the projection exercise, can have important positive consequences for children’s access to education and health services.) On the other hand, even if expenditure classified as “priority” is taken to encompass a very narrow range of expenditure categories, it would still encompass some kinds of expenditure are unrelated, or only loosely related, to children’s welfare. (For example, many kinds of health expenditure mainly serve older people’s needs. In this regard, however, it is important to remember that expenditure directed to the health needs of older people is likely to free resources within families that can then be spent on children’s welfare.).

15. The arbitrariness of the priority-expenditure composition is important to bear in mind when considering whether to open up fiscal space for priority expenditure by reducing non-priority expenditure. To be sure, analyses of the present kind can be carried out with different priority-expenditure compositions. All the same, the methodological approach described here would still work in essentially the same way.

[1] While it would be possible to carry out the kind of analysis this chapter describes using an enhanced set of accounts incorporating expenditure outside the official budget accounts, it is likely to prove challenging to identify and incorporate *all* relevant expenditure programs and funding sources. In any case, in most economies, the government’s capacity to influence accounts outside the official budget accounts is likely to be limited.

16. It is also important to bear in mind that the present fiscal-space discussion concerns only the expenditure carried out by government within its budget. In most economies, government education and health expenditure plainly constitutes the bulk of the total resources provided for education and health. Much of the government education and health expenditure is in categories that only the government carries out, or could carry out. Nevertheless, in most economies, non-governmental expenditure in these sectors is also significant. International agencies and non-government entities generally provide substantial resources to these sectors outside the government budget.

17. Ideally, the priority and non-priority accounts considered in the analysis would be defined in "functional" rather than "institutional" terms. That is, for example, a defence ministry's expenditure on education or health clinics for armed-forces personnel would be defined, functionally, as education and health expenditure, not, institutionally, as defense expenditure. Unfortunately, for most economies, executed expenditure data are available only in institutional but not functional classifications. Where functional-classification data are available, they should be used to define priority and non-priority expenditure flows; where only institutional-classification data are available, they may be regarded as a reasonable approximation.

18. The analyses carried out thus far suggest that UNICEF needs to consider whether it should always recommend the highest possible flow of financial resources to priority sectors. As an advocate for expenditure that benefits children, UNICEF would have a stake in ensuring that the government directs an adequate flow of financial resources to infrastructure investment. This would enhance the economy's real growth rate, which should increase government revenue in the medium term, thus enhancing the fiscal space for priority expenditure over the medium term.

4. The methodological framework

19. For the fiscal-space analysis, for any recent or future year, priority expenditure and its fiscal space are projected using the standard fiscal accounting "identity." This identity states that total expenditure (comprising current, non-interest, interest, and capital expenditure) less the sum of total revenue and external grants is equal to the overall government deficit, which is in turn equal to the net flow of external and internal financing. If total expenditure is broken down into the three categories of (1) priority and (2) non-priority non-interest expenditure and (3) interest expenditure, this identity can be rearranged for any year as follows:

Priority expenditure
=
Tax and non-tax revenue
+ External grants
- Non-priority expenditure
- External debt service
- Internal interest expenditure
+ External debt disbursements
+ Net internal financing flows

The "below-the-line" accounts taken together constitute the fiscal space for the priority-expenditure flow.

20. For a retrospective analysis – that is, for analysis of fiscal performance in historical years – this structure can be applied directly to show how the recorded below the line flows (the retrospective fiscal space) combined finance the priority expenditure flows. For projection analysis, the

accounting identity is applied in a different way. For each projection year, the various priority-expenditure flows are projected on the basis of programming assumptions, encompassing the various determinants of recurrent and non-recurrent expenditure in the education, health and social-protection categories. Similarly, the below-the-line accounts, *except for the net internal financing flows*, are projected on the basis of programming assumptions. The total net internal financing flow for each year is then calculated residually, to ensure that the accounting identity is satisfied.

21. For a projection year, this net internal financing flow is the fiscal-space "gap", that is, the difference between the projected priority-expenditure flow and the fiscal space. If this gap is "too large," then the programming assumptions, taken together, would be considered unfeasible. The criteria for "too large" include the limits on the government's capacity to borrow in domestic financial markets and the implied increase in the government's debt-GDP ratio.

22. The projection exercise is formulated by applying various assumptions, together constituting a "scenario," to the historical database. Each scenario comprises programming assumptions for the projection years, covering:

- world economic conditions;
- basic macroeconomic variables;
- merchandise exports and imports;
- tax and non-tax revenue;
- external grants to the government;
- government expenditure in the priority and non-priority categories; and
- external and internal debt.

23. For each scenario, some of the assumptions lines are set as simple numbers (growth rates, percentages of GDP, etc.). Many of the assumptions, however, are constructed from other assumptions. For example, the growth rates of *real* GDP and of the price level are numbers that the analyst chooses for any given scenario. It is straightforward to combine these assumptions into an assumed growth rate for *nominal* GDP.

5. Sensitivity analysis

24. For each country, a set of assumptions constituting a "base scenario" is used to make an initial calculation of the likely fiscal gaps over future years. Once this base scenario is in place, the projection exercise can then be used to carry out sensitivity analysis to determine the consequences of different policy programs. The sensitivity analysis consists of defining a set of alternative scenarios, with assumptions varying from the base scenario, and then comparing the projection results of each alternative scenario with those of the base scenario. The point is simply to determine the magnitudes of the changes that would result from the alternative policy programs.

6. The structure of the projection workbook

25. Section C.1 discusses the workbook's structure in technical detail, but some readers may find the following broad summary helpful.

26. This workbook is structured to produce a set of output tables (in the worksheet /Results). This worksheet shows the historical data and projections for each scenario. The /Results worksheet is calculated from the historical data and projections (in the worksheet /Projections). The /Projections

worksheet formulates the projections, in national-currency units, by applying the programming assumptions (in the /Assumptions worksheet) to the historical data (in the /Data worksheet). The /Results worksheet shows the historical data and projections in the same format as the /Projections worksheet, but allows the user to choose from a menu of units of account (for example, U.S. dollars, per cent of GDP, and so on.

27. These four worksheets -- /Data, /Assumptions, /Projections, and /Results – are the workbook's working core. The workbook's other worksheets, in effect, work in close connection with these, as described in Part C below.

7. Organization of this User Guide

28. The remainder of this User Guide is organized as follows. Part 0 immediately following describes what a user needs to know to get started. Part C describes the workbook's methodological basis. Part D summarizes a projection exercise and sensitivity analysis for the Republic of East Africa. Appendix I provides the details of the projection exercise and sensitivity analysis exercise. Appendix II discusses certain Excel features that the EAFS.xlsm workbook uses.

B. “Getting started”

29. This Part mentions several matters the user may find helpful before starting.

30. After opening the workbook, the user should “enable” its macros. (If the workbook is linked with other workbooks, as it may be for various purposes, it is necessary to choose whether to update the links. In general, it is best *not* to update the links with any other workbook unless that other workbook is open. See Section 8 below.).

31. While working with the workbook, it is advisable to save frequently and to maintain backup copies of the file. That is, it is a good idea to keep a copy of the file that is known to work well in a separate archive. This copy would then be available in the event a damaging mistake is made while working with the workbook.

1. Language, cell addresses, worksheets

32. Titles and other text in the workbook can be set in English, Spanish, French, or Portuguese (using the Excel “Choose” function, discussed in Appendix II). The language for each worksheet is selected at the cell “A1.”.

2. Documentation

33. The worksheet “Documentation” contains a summary of the main points.

34. The worksheet “WorkbookFlowChart” shows the broad flow of the calculation procedure (see Section A.6 Above).

3. Summation checks and other checks

35. The workbook includes several summation and other checks. Each is set in such a way that it equals zero if whatever is being checked is correct. (Thus, for example, the checks in the /Data, /Projections, and /Results worksheets that the fiscal-accounts identity is satisfied shows the value of the difference between the above- and below-the-line balance-of-payments sums.) In the /Data, /Assumptions, /Projections, /Results and /Charts worksheets (see Section C.1 Below), cell K1 shows the sum of all such checks on that worksheet. This sum should equal to zero or very close (machine error may introduce some minor discrepancies in some calculations).

36. In addition, cells E1:G1 provide a “semaphore” reading. If cell G1 is green, all checks *in the whole workbook* would equal zero. If cell E1 is red, there is an error somewhere in the workbook, requiring examination and debugging. The various summation checks are likely to be helpful in pinpointing the problem.

4. The initial projection year

37. At any moment, the workbook has an ***initial projection year***. Figures for all years before this year are ***historical data***, while figures for this and all subsequent years are ***projections***. The initial projection year is set for the entire workbook in cell Assumptions!L5. The analysts who maintain this workbook would increase the initial projection year by one, one time each year. The change would take place sometime within the first six months of the year that will become the new initial projection year, at a moment when data for the preceding year become available. The formulas for historical data and for projections would be changed then for the year that changes from a projection to historical data.

5. Macros

38. The macro “saver” (shortcut ctrl-shift-S) allows the user to save the workbook with the cursor placed at convenient places on the various worksheets.

6. Excel techniques used in the workbook

39. The workbook makes use of several advanced Excel features, including macros (see Section 5), “logical” (or Boolean) functions, and others. Technical information about Excel features may be found in the on-screen “help” or in Microsoft technical guides. For convenience, Appendix II briefly describes some of these features.

7. Circularities

40. Under the methodology and calculation procedures the projection workbooks use, there is no reason for circularities to appear.[2] If a circularity does emerge as the result of a user error, the workbook will almost assuredly fail to calculate completely. In this case, the workbook should be debugged to remove the circularity.

8. Links with other workbooks

41. Cells in any Excel workbook may be drawn from another workbook, by means of formulas linking cells in one worksheet to cells in another. Care must be taken, however, when working with one workbook when the other is not open, since changes may then misalign the links.

9. Maintaining the workbook

42. If the exercise is used from time to time in periodic policy exercises, the top “upkeep” priority is to ensure that the “data” bases are kept up to date. Note that this includes not only incorporating the latest data, but also ensuring that older historical data are consistent with revisions and corrections in the original databases. The next “upkeep” priority is to ensure that the assumption settings remain appropriate for current circumstances. Thus, for example, suppose it is the year

[2] A circularity is an instance in which the formula in one cell includes a second cell and the formula in the second cell directly or indirectly includes the first cell. Excel and other spreadsheet programs are sometimes able to carry through calculations using iteration when circularities are present, but this cannot always be assured.

2016, and the exercise projects inflation of 3 per cent for the year. If consumer prices have already risen 4 per cent since the preceding December, this assumption should be revised (unless deflation is deemed likely before the year's end).[3]

[3] The user may wish to keep a "scenario" with the earlier assumption, to make it possible to determine the consequences of the higher inflation rate by comparing the results based on the new assumptions with those based on the old assumptions.

C. The structure of the workbook and worksheets

1. The overall structure of the workbook EAFS.xlsm

43. The workbook EAFS.xlsm is structured to produce a set of output tables, in the worksheet /Results (blue tab). This worksheet shows the historical data and projections for each scenario. Summarizing broadly, the /Results worksheet is calculated from the historical data and projections in the worksheet /Projections (green tab). In the /Projections worksheet, the data and projections are set out in national-currency units. The /Results worksheet shows the historical data and projections in the same format as the /Projections worksheet, but allows the user to choose from a menu of units of account (for example, U.S. dollars, per cent of GDP, and so on.).

44. The historical data in the /Projections worksheet are taken from the worksheet /Data (yellow tab), and the projections are calculated by applying the assumptions in the /Assumptions worksheet to the historical data. The /Data worksheet is compiled from the country-source data sheets.

45. The worksheet /Scenarios (red tab) sets out the assumptions that vary among the base and alternative scenarios. The assumptions in the /Assumptions worksheet are set according to the scenario chosen in the /Scenarios worksheet. (Part C explains in detail how these worksheets operate.) A separate worksheet, /Charts (blue tab), is used to set up charts from the /Results. (The charts lie in worksheets to the right of the /Charts worksheet.) A separate worksheet, /Assumptions Notes (red tab), lists the assumptions and provides brief explanations for them.

46. The /Results worksheet sets out the recent and projected annual fiscal accounts in the structure shown at the beginning of Section A.4 above. It also sets out the corresponding summary fiscal accounts in the more conventional format showing expenditures, revenues, and the overall financing of the deficit. Next, it sets out the government's internal and external debt stocks corresponding to the fiscal-accounts flows. This worksheet also sets out the projected national-expenditure accounts and the projected flows of exports and imports of goods and non-factor services. Finally, this worksheet sets out the key assumptions for the external and internal macroeconomic variables that "drive" the results.

47. The tables in the /Results worksheet are calculated from the /Projections worksheet. The /Projections worksheet combines historical data from the /Data worksheet with programming assumptions from the /Assumptions worksheet to calculate projections. The analyst using the workbook is asked to provide the historical data in the /Data worksheet and the programming assumptions in the /Assumptions worksheet.

48. The /Data worksheet is structured to draw historical data from country-source database worksheets (orange tabs), supplemented by data from the World Bank's *International Debt Statistics* (/ExtDebt) and the World Bank's World Development Indicators (/WDI).

49. There are several reasons for having the workbook compile country-source data into the /Data worksheet, rather than pass them directly from the database worksheets to the /Projection worksheet. First, since the database worksheets are in the formats in which the data sources make them available, it is easier to update them in those formats. The second is that in certain instances the /Data worksheet may calculate adjustments and corrections to the data drawn from the data-

base worksheets. Third, since the /Data worksheet lists the data, as work proceeds on setting up the projection workbook, it is relatively easier to see which data are missing, incomplete, or estimated. A fourth reason for having a single worksheet to compile the data is that it allows the data, assumptions, projections, and results worksheets for different countries to be similar.

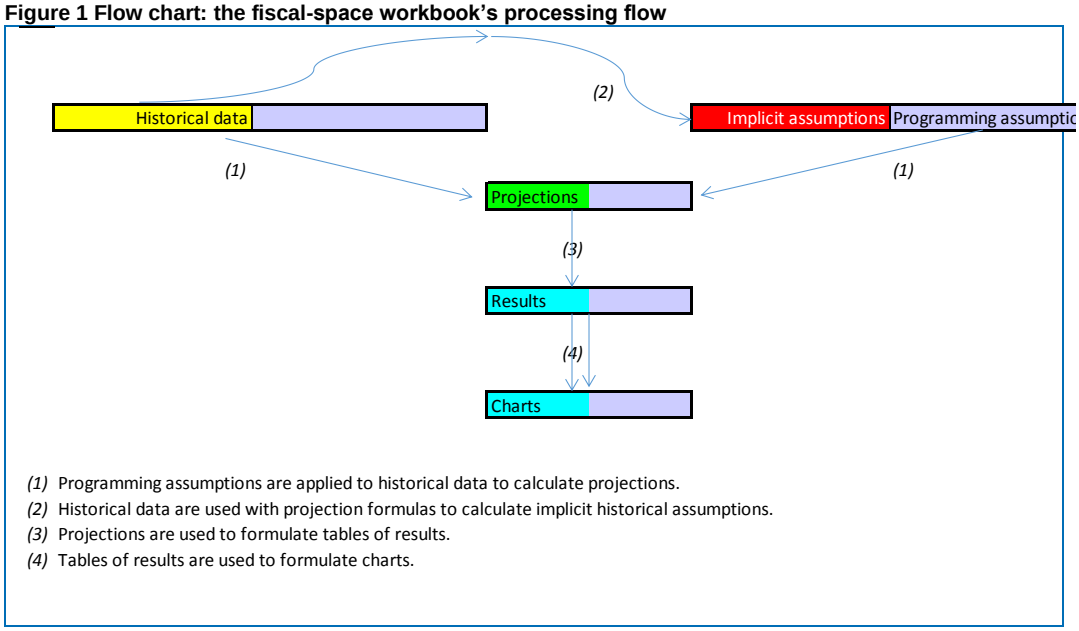
50. The /Data, /Projections, and /Results worksheets are each structured in several "blocks," which are set vertically in the three worksheets. Lines at the top of the /Data, /Projection and /Results worksheet show priority expenditure for each year, and then the various components of the fiscal space that effectively fund that priority expenditure. The lines directly below this presentation (with titles in yellow shading) present the budget figures in the conventional structure, showing the "above-the-line" accounts, ("expenditure less revenue equals the overall deficit") and the "below-the-line" accounts (the overall deficit equals the sum of net external and net internal financing"), The lines below that show the accumulated net debt stocks. The lines below that give the main macroeconomic aggregates on which the fiscal flows are based.

51. The /Charts worksheet sets out the figures of the /Results worksheet in ways that make it possible to display them in charts.

52. The lines for which historical data are required in the /Projections worksheet are indicated by sequential numbers in that worksheet's Column B. These numbers are drawn from the numbers in the /Data worksheet. Lines for which the analyst would set assumptions in the /Assumptions worksheet are indicated by sequential numbers in that worksheet's Column B.

The flow chart in Figure 1 shows the workbook's processing flow.

Figure 1 Flow chart: the fiscal-space workbook's processing flow



53. In addition to the /Results and /Charts worksheets, the /Contribution Analysis and /Indicators worksheets show additional results. (They are essentially supplements to the /Results worksheets).

2. Worksheets that make up the workbook EAFS.xlsm

54. The workbook EAFS.xlsm comprises the following worksheets:

Table 1 EAFS.xlsm worksheets

Name	Content		Worksheet type
Results	Output tables (in units of account of choice)		Results
Scenario Results	Summary projection results of different scenarios		Results
Contribution Analysis	Contribution analysis of output tables		Results
Indicators	Macroeconomic indicators		Results
Charts	Results set up as input for charts		Results
Projections	Projections calculated from data and assumptions		Projections
Assumptions	Values of programming assumptions		Assumptions
Assumptions Notes	Notes describing the scenarios		Assumptions
Scenarios	Specific assumptions for scenarios		Assumptions
Data	Data required for the projection		Data
WDI	World Development Indicators (World Bank)		Country data
CPI	Consumer price index		Country data
ExchR	Exchange rate		Country data
Prodn	National accounts - production		Country data
GovExp	Government expenditure		Country data
NatExp	National accounts - expenditure		Country data
ExtDebt	External debt		Country data
External	Balance of payments		Country data
Fiscal	Fiscal accounts		Country data
Mapping	Presentation of results		Chart
Expenditure	Presentation of results		Chart
Fiscal Space	Presentation of results		Chart
Documentation	General documentation		Documentation
WorkbookFlowChart	Flow chart describing the workbook's processing flow		Documentation

55. There are six basic types of worksheet. (1) The ***results*** worksheets (with blue tabs) present the main results in table format. (2) The ***data*** worksheets (orange and yellow tabs) contain historical data. (The /Data worksheet is the workbook's basic data worksheet. The other data worksheets, with orange tabs, are from country sources, and "feed" the /Data worksheet.) (3) The programming assumptions are set out in the ***assumptions*** worksheet (/Assumptions, red tab). (4) The ***projection*** worksheet (/Projections, green tab) applies the assumptions to the base-year data to calculate the projections. In addition, the workbook includes (5) ***charts*** (pink tabs) constructed from the figures in the /Charts worksheet, and (6) several worksheets containing various kinds of ***documentation*** (black tabs).

56. In all worksheets, each column corresponds to the same year. (This makes it easier to read formulas involving cells in different worksheets).

57. The sections remaining in Part C are as follows. Section 3 discusses the worksheets with tables embodying the projection ***results***. Section 4 introduces the /Projections, /Assumptions, and /Data worksheets and describes their general interrelationships. (These three worksheets are the workbook's working core.) Section 5 describes the /Data worksheet in more detail. Section 6 discusses the various lines of assumptions in the /Assumptions worksheet. Section 7 discusses the /Projections worksheet in more detail.

58. Certain worksheets (/Scenarios, Scenario Results) are used for the sensitivity analysis. These are discussed in Section 0 below and then in Part D.

3. Output worksheets (/Results, /Charts)

59. It is useful to look at the /Results worksheet first, because the purpose of the /Data, /Assumptions and /Projections worksheets is to produce the results presented in the /Results worksheet.

60. The worksheet ***/Results*** presents the projection results in several tables "stacked" vertically. In these tables, the column headings are years and the row headings are variable descriptions. The top part of this worksheet is the basic table of results, the "Central Government Financial Accounts." This is the fiscal-accounts table, structured with the projected priority-expenditure flows on top, followed by the remaining fiscal accounts, which effectively "fund" the priority expenditure (see Section A.4 above). This table is followed below by the summary fiscal accounts in the conventional format (titles in yellow shading), showing revenue less expenditure equal to the government surplus/deficit, followed by the net deficit financing flows. The table immediately below shows the external and internal debt. (These three tables are quantitatively consistent with one another).

61. Three tables of macroeconomic aggregates follow below. The fiscal projections are based on these values. The first of the three tables lists the basic macroeconomic variables, including the gross domestic product (GDP), the GDP deflator, the consumer price index (year-average and December values), the exchange rate (national currency per U.S. dollar, year-average and December values), the population, the population fifteen years and under, and the headcount poverty incidence. These values are used to calculate the fiscal projections. The second of the three tables shows exports and imports of goods and non-factor services, in millions of U.S. dollars. The third table shows the national-expenditure accounts as percentages of GDP.

62. Table 2 shows the contents of the /Results worksheet. (The year-by-year projection lines are hidden to enable the table to fit, so the table shows only averages over the years 2017-2021).

Table 2 Republic of East Africa: Fiscal-accounts projections (per cent of GDP), 2015-2021

REPUBLIC OF EAST AFRICA:				Average	
FISCAL PROJECTION EXERCISE RESULTS	Calendar Year:	2015	2016	2017-2021	2021
	Scenario	0			
	Initial projection year:	2017			
GENERAL-GOVERNMENT FINANCIAL ACCOUNTS:	Per cent of GDP				
(A) Total priority non-interest expenditure		5.7	5.7	7.3	8.5
Total education expenditure		3.8	3.9	4.6	5.2
Total health expenditure		2.0	1.8	2.7	3.3
Priority recurrent expenditure:		4.7	5.0	4.7	4.5
Recurrent education expenditure:		3.0	3.4	3.2	3.2
Expenditure on education staff		2.1	2.4	2.4	2.4
Non-staff recurrent education expenditure:		0.9	0.9	0.8	0.7
Recurrent education expenditure on goods and services		0.2	0.2	0.2	0.2
Other non-staff recurrent education expenditure		0.7	0.7	0.6	0.6
Recurrent health expenditure:		1.7	1.6	1.4	1.3
Expenditure on health staff		0.9	0.1	0.1	0.1
Non-staff recurrent health expenditure:		0.9	1.5	1.3	1.2
Recurrent health expenditure on goods and services		0.4	0.2	0.2	0.2
Other non-staff recurrent health expenditure		0.5	1.3	1.1	1.0
Priority non-recurrent expenditure:		1.0	0.7	2.7	4.0
Non-recurrent education expenditure:		0.8	0.5	1.4	2.0
Non-recurrent health expenditure:		0.2	0.2	1.3	2.0
(B) Tax and non-tax revenue (excl. external grants) (+):	Per cent of GDP	14.5	14.8	15.5	15.7
Tax revenue:		13.6	13.8	14.4	14.6
Income tax:		4.5	4.7	5.0	5.1
Personal income tax		1.3	1.3	1.4	1.4
Company tax		2.4	2.5	2.6	2.7
Other income tax		0.9	0.9	1.0	1.0
Value-added tax:		4.7	4.7	4.8	4.8
Value-added tax on internal transactions		2.7	2.8	2.8	2.8
Value-added tax on imports		1.9	1.9	2.0	2.1
Specific taxes					
Customs and excise duties:		1.0	1.0	1.0	1.0
Customs duties		0.8	0.8	0.9	0.9
Excises		0.2	0.2	0.2	0.1
Export duties		0.0	0.0	0.0	0.0
Other tax revenue		0.1	0.1	0.1	0.1
Non-tax revenue (excl. external grants) (+)		0.9	1.0	1.1	1.1
(C) External grants (+):	Per cent of GDP	0.1	0.0	1.5	1.5
External grants for current expenditure:		0.0	0.0	0.5	0.5
External grants for capital expenditure (projects):		0.0	0.0	1.0	1.0
(D) Total non-priority non-interest expenditure (-):	Per cent of GDP	-9.4	-9.3	-8.4	-7.8
Non-priority recurrent expenditure:		-7.0	-6.8	-6.2	-5.8
Non-priority expenditure on staff		-2.0	-2.0	-2.0	-2.0
Non-staff recurrent non-priority expenditure:		-4.9	-4.7	-4.1	-3.7
Recurrent non-priority expenditure on goods and services		0.0	-1.3	-1.1	-1.0
Other non-staff recurrent non-priority expenditure		0.0	-3.5	-3.0	-2.7
Non-priority non-recurrent expenditure		-2.4	-2.5	-2.2	-2.0
(E) External-debt disbursements (+):	Per cent of GDP	7.2	3.2	2.2	2.0
External-debt disbursements (+) (US$ millions):		*$1,512.3*	*$697.8*	*$578.0*	*$600.4*
(F) External debt service (-):	Per cent of GDP	-8.2	-4.3	-3.0	-2.7
External interest expenditure (-)		-1.1	-1.3	-1.1	-1.0
External interest expenditure (-) (US$ million)		*-$224.5*	*-$275.4*	*-$292.0*	*-$311.5*
External debt repayments (-)		-7.2	-3.1	-1.9	-1.7
External debt repayments (-) (US$ million)		*-$1,497.8*	*-$679.5*	*-$497.0*	*-$508.4*
(G) Net internal financial flows (incl. internal interest) (+):	Per cent of GDP	1.6	1.3	-0.5	-0.2
Net internal-debt flow (+):		2.7	2.5	0.7	0.8
Internal interest expenditure (-)		-1.1	-1.1	-1.1	-1.0
Discrepancy (+)		-0.1	0.0	0.0	0.0

continues

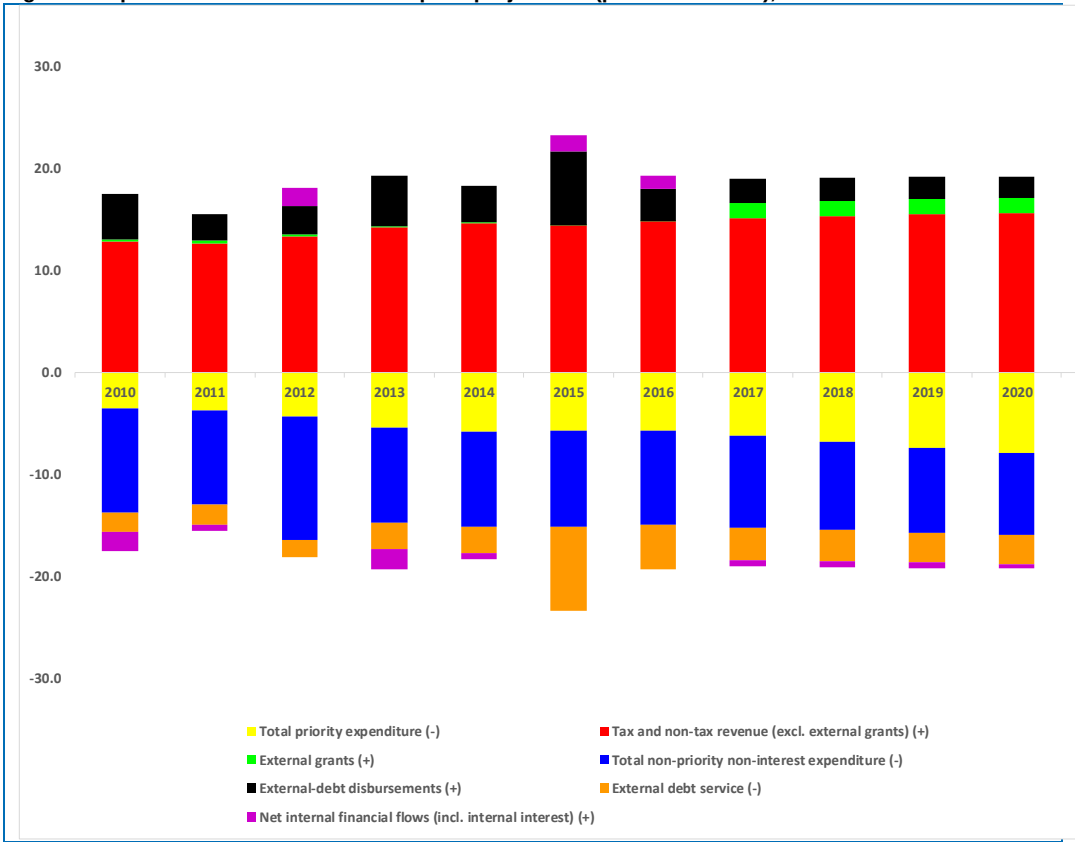
Table 2 Republic of East Africa: Fiscal-accounts projections (per cent of GDP), 2015-2021 (concluded)

REPUBLIC OF EAST AFRICA:				Average	
FISCAL PROJECTION EXERCISE RESULTS	Calendar Year:	2015	2016	2017-2021	2021
	Scenario	0			
	Initial projection year:	2017			
Revenue and grants	Per cent of GDP	**14.5**	**14.9**	**17.0**	**17.2**
Expenditure:		**-17.3**	**-17.4**	**-17.9**	**-18.3**
Recurrent expenditure:		**-13.8**	**-14.2**	**-13.1**	**-12.3**
Non-interest recurrent expenditure		-11.7	-11.8	-10.8	-10.2
Interest		-2.1	-2.4	-2.2	-2.0
Non-recurrent expenditure:		**-3.4**	**-3.2**	**-4.9**	**-6.0**
Discrepancy		**-0.1**	**0.0**	**0.0**	**0.0**
Surplus (deficit):		**-2.8**	**-2.6**	**-1.0**	**-1.1**
Primary surplus (deficit)		-0.6	-0.2	1.3	1.0
Interest		-2.1	-2.4	-2.2	-2.0
Financing:		**2.8**	**2.6**	**1.0**	**1.1**
Net external financing		0.1	0.1	0.3	0.3
Net internal financing		2.7	2.5	0.7	0.8
External and internal debt	Per cent of GDP	**45.1**	**44.3**	**38.7**	**35.9**
Net debt:		**45.1**	**44.3**	**38.7**	**35.9**
External debt		**34.7**	**32.1**	**27.0**	**24.2**
External (US$ millions)		*$7,159.2*	*$6,950.5*	*$7,181.0*	*$7,355.3*
Internal:		**10.5**	**12.2**	**11.7**	**11.6**
Internal debt		10.5	12.2	11.7	11.6
Internal deposits (-)		0.0	0.0	0.0	0.0
MACROECONOMIC AGGREGATES:					
Gross domestic product (US$ million)		**$20,902.8**	**$21,970.8**	**$26,809.6**	**$30,365.3**
Gross domestic product at 2016 prices and exchange rate (US$ million)		**$20,601.7**	**$21,970.8**	**$26,758.8**	**$30,307.7**
Gross domestic product (national currency - millions)		**9,638,842.1**	**10,362,313.9**	**12,794,005.8**	**14,483,154.8**
GDP deflator		**99.2**	**100.0**	**101.4**	**101.3**
Consumer prices (year-average)		100.0	101.6	103.0	103.0
Consumer prices (December)		101.4	103.2	109.0	113.2
Exchange rate (year-average)		461.1	471.6	477.2	477.0
Exchange rate (December)		466.6	477.9	477.2	477.0
Population (millions)		21.6	22.0	23.1	23.9
Population under fifteen (millions)		10.1	10.3	10.9	11.2
Headcount poverty incidence		41.0%	41.0%	37.2%	34.9%
NET EXPORTS OF GOODS AND NON-FACTOR SERVICES (US$ MILLION):		**-$8,352.2**	**-$8,629.2**	**-$11,434.5**	**-$13,536.6**
EXPORTS OF GOODS AND NON-FACTOR SERVICES		**-$2,231.3**	**-$2,278.6**	**-$3,200.0**	**-$3,848.4**
Merchandise exports:		**$2,822.2**	**$2,947.3**	**$3,552.4**	**$4,079.7**
Non-factor services receipts		**$2,344.9**	**$2,582.3**	**$3,112.4**	**$3,574.4**
IMPORTS OF GOODS AND NON-FACTOR SERVICES		**-$6,120.9**	**-$6,350.5**	**-$8,234.5**	**-$9,688.2**
Merchandise imports:		-$5,053.5	-$5,225.9	-$6,752.3	-$7,928.1
Non-factor services payments:		**-$1,067.5**	**-$1,124.6**	**-$1,482.2**	**-$1,760.1**
Insurance and freight payments for merchandise imports		-$345.5	-$355.9	-$489.0	-$593.9
Ohter non-factor services payments		-$722.0	-$768.7	-$993.2	-$1,166.2
	Per cent of GDP:				
GROSS DOMESTIC PRODUCT (NATIONAL CURRENCY):		**100.0**	**100.0**	**100.0**	**100.0**
Total consumption:		**81.1**	**80.7**	**83.2**	**84.3**
Non-government consumption		70.2	69.7	72.3	73.6
Government consumption:		10.9	11.0	10.8	10.7
Central-government consumption		5.6	5.9	5.7	5.6
Consumption of other governments		5.2	5.1	5.1	5.1
Total investment:		**23.5**	**23.0**	**22.6**	**22.4**
Gross fixed capital formation		23.6	22.4	22.4	22.4
Net increase in inventory stocks		-0.1	0.6	0.3	0.0
Net exports of goods and non-factor services:		**-4.6**	**-3.7**	**-5.8**	**-6.7**
Exports of goods and non-factor services		24.7	25.2	24.8	25.2
Imports of goods and non-factor services (-)		-29.3	-28.9	-30.6	-31.9
Per-capita non-government consumption at 2016 prices and exchange rate		**$669.9**	**$697.0**	**$836.5**	**$934.1**
Growth rate		***2.2%***	***4.0%***	***6.0%***	***5.7%***

Source: Worksheet EAFS.xlsm/Results.

63. Figure 2 presents the summary fiscal-accounts projections in a stacked-bar chart. Note that in this chart each year's above- and below-the-line "stacks" must be equal. The blue part of each stack, immediately below the abscissa, shows total priority expenditure. The elements of the chart above the abscissa *contribute* to the fiscal space, while the elements of the chart above the abscissa *subtract from* the fiscal space.

Figure 2 Republic of East Africa: Fiscal-space projections (per cent of GDP), 2017-2021



Source: EAFS.xlsm workbook.

64. In the /Results worksheet, the unit of account of the fiscal accounts can be set in the (yellow-shaded) cell A7:

Table 3 Units of account for the tables of the /Results worksheet

Unit	Values to place in the "yellow-shaded" cells"
National currency	1
US$ million	2
Per cent of GDP	3
US$ million at base-year prices and exchange rate	4
Per-capita U.S. dollars at base-year prices and exchange rate	5
Per-child U.S. dollars at base-year prices and exchange rate	6

65. For example, if "1" is placed in cell A7, the fiscal-accounts table is presented in national-currency units. It is often useful to set out the projection results using different units of account. For example, consider the government's expenditure. For different purposes, it is likely to be useful to examine the historical and projected totals (1) in national currency, (2) in millions of U.S. dollars, (3) as percentages of GDP, (4) in real terms, (5) in *per- capita* real terms (that is, the total real amounts to be spent *per capita*), and (6) in *per- child* real terms (that is, the total real amounts to be spent *per child*). For example, it may be of interest to know whether an expenditure flow that is projected to grow in national currency and as a percentage of GDP would also increase in real *per-capita* or *per-child* terms.[4]

[4] The values in the /Projections worksheet are in national-currency units. The /Results worksheet changes the units of account by multiplying each figure drawn from the /Projections table by an appropriate coefficient for each year. The coefficient for each year is on the /Results worksheet's line 7. The value placed in cell A7 is the index argument in each year's CHOOSE function on line 7. The remaining arguments in each function are the calculated coefficients that multiply

66. The non-government consumption figure is given at the bottom of this table in *per-capita* dollars at the price level and exchange rate of the exercise's base year (the year before the initial projection year). Depending on the context and circumstances, a growth rate of real *per-capita* non-government consumption that is negative or very low should be taken to imply that the projection might not be feasible.[5]

67. The /Charts worksheet gives the input figures used in the formulation of the charts. The figures in this worksheet are drawn from the /Results worksheet. The charts themselves are on (pink) tabs to the right of the worksheet. Since the input figures are drawn from the "Results" worksheet, the units of accounts of some of the charts change when the units of account in the corresponding tables in the "Results" worksheet are changed.

4. Projections, /Assumptions, and /Data worksheets

68. The /Projections, /Assumptions, and /Data worksheets constitute the workbook's working core. The /Projections worksheet is the workbook's central "calculation engine." It applies the assumptions listed in the /Assumptions worksheet to the base-year data compiled in the /Data worksheet. As explained in Section 3 above, the /Results worksheet then rewrites the results calculated in the /Projections worksheet in different units of account, and the /Charts worksheet sets out some of the output from the /Results worksheet so they can be presented in charts.

69. For each projection year, the /Projections worksheet calculates the internal borrowing flow required to ensure that the fiscal-accounts identity is satisfied. If, in any year, the central government is projected to have a "very large" internal-borrowing requirement (that is, more than it would likely be able to cover in internal financial markets), or if the projected internal-debt stock is rising rapidly as a percentage of GDP, this would indicate that the projected fiscal accounts would not be feasible.

70. If the central government is projected to have a *negative* internal-borrowing requirement, this would amount to a projection that the government would be paying down its internal debt or increasing its deposits. If the negative internal-borrowing flow is "very large," it would indicate that it would be possible to program higher expenditure, lower revenue flows, or a smaller flow of programmed borrowing.

71. The /Projections, /Assumptions, and /Data worksheets all have columns of formulas that run from several years before to several years after the initial projection year:

a) In the /Data worksheet, the figures for the years prior to the projection period constitute the historical data base;
b) In the /Assumptions worksheet, the figures for the projection years are the various assumption settings that make up the projection scenario – that is, the various "state-of-the-world" assumptions, macroeconomic programming assumptions, and policy assumptions applied to the base-year data to calculate the projections;
c) In the /Assumptions worksheet, the figures for the years prior to the projection period are the implicit values of the assumptions implied by the data base;

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the values in the /Projections worksheet. (A similar CHOOSE functions on line 91 carries out the conversions for year-end stock values).

[5] To evaluate a projected growth rate of per-capita real non-government consumption, it is helpful to note that annual growth rates of 3.5, 4.6 and 6.9 per cent imply that it would double in 20, 15 and 10 years respectively. These figures are calculated by solving $(1+g)^n = 2$ for "n," where "g" is the (decimal value of) the growth rate.

d) In the /Projections worksheet, the figures for the years prior to the projection period are simply brought in from the data base;

e) The projections are calculated in the /Projections worksheet's projection years.

72. For example, consider the line of nominal-GDP figures for *all* years in the /Projections worksheet. If the year is less (i.e., earlier) than the initial projection year, the cell gives the actual historical value for the nominal GDP, taken from the database. The /Assumptions worksheet includes the nominal-GDP growth rate calculated from the historical GDP data. If the year is equal to or greater than the initial projection year, the /Projections worksheet gives a value equal to the preceding year's GDP multiplied by the product of $(1 + g_y)$ and $(1 + g_P)$, where g_y and g_P are the assumed growth rates of real GDP and the GDP deflator, respectively. These values are given in the /Assumptions worksheet.

73. The "work" involved in formulating an analysis and projection consists, broadly speaking, of two steps. The first is to set up the /Data worksheet, drawing on data from international and national sources. The second is to set programming assumptions in the /Assumptions worksheet. These steps are discussed in Sections 5 and 6 following.

5. The /Data worksheet and country-source data sheets

74. The /Data worksheet compiles the historical data from international and national sources. These data are placed in the workbook in their customary formats, as separate worksheets (with orange tabs). The /Data worksheet draws from these data sources and places the data in the format required by the projection exercise. The /Data worksheet is organized in six sections "stacked" from top to bottom, with the main data categories.

75. The data lines that must be filled in are sequentially numbered in the worksheet's Column B.[6] Lines in the /Data worksheet other than those numbered are calculated by addition or subtraction from the lines that must be completed.

76. The /Data worksheets draws from the country-source data worksheets, obtained from each economy. The data sheets in the EAFS.xlsm workbook are intended as typical of sub-Saharan economies, but of course each economy will have its own databases and these may have different structures from those presented here. For the Republic of East Africa, eight worksheets contain historical data for the years 2010-2016: (1) the World Bank's "World Development Indicators" (/WDI); (2) the consumer-price-index series (/CPI); (3) the exchange-rate series in national-currency units per U.S. dollar (/ExchR); (4) the national-accounts production-side data (/Prodn); (5) the government-expenditure data in an institutional-economic classification (/GovExp); (6) the national-accounts expenditure-side data (/NatExp); (7) the balance-of-payments data (/External); and (8) the central government's financial accounts (/Fiscal).

77. In the /Data worksheet, the government budget sets the basic organizing framework, as described in Section A.4 above. The data-compilation process may be discussed in the six data categories:

[6] When completing or updating the data base, it may help to change the font color of the sequential numbers on the lines that are filled in, so the analyst can keep track of which data she has obtained and which data remain to be found or estimated.

78. ***(A)*** **"Priority" expenditure flows**, shown in the sectoral components of (1) education and (2) health expenditure. Education and health expenditure are further sub-classified into the economic categories of (a) recurrent and (b) non-recurrent expenditure. Recurrent expenditure is still further sub-classified into the economic categories of (i) staff remuneration, (ii) current goods-and-services expenditure, and (iii) other non-interest recurrent expenditure. *Staff remuneration and current goods-and-services expenditure are government-consumption expenditure in the national-expenditure accounts, while other recurrent expenditure is non-consumption, non-interest recurrent expenditure.* (Interest expenditure is discussed below, with the discussion of external and internal debt.) These economic categories of expenditure under each institutional classification are required by the projection exercise, which applies different techniques to project them.

79. In this part of the /Data worksheet, the sequentially numbered lines are drawn from the country-source data worksheets. The other lines are calculated through addition and subtraction as appropriate. (They can be used to check the /Data worksheet calculations against the totals in the data sources.) For the Republic of East Africa, the education and health expenditure flows are drawn from the /GovExp worksheet.

80. ***(B)*** **Tax and non-tax revenue** data are structured in the categories of (1) income tax, including company taxes; (2) value-added tax on internal and external transactions; (3) excises and other indirect taxes; and (4) revenue collected on external transactions excluding VAT. (Value-added tax (VAT) revenues are sub-classified into those coming from internal transactions and those based on imports, since these are projected in different ways.) Non-tax revenue flows are sub-classified into those based on mining and those coming from non-mining sources. For the Republic of East Africa, the revenue data are drawn from the /Fiscal worksheet.

81. ***(C)*** **External-grants** data are classified into project and "budget-support" grants. These data are drawn from the /Fiscal worksheet.

82. ***(D)*** Non-interest non-priority expenditure data are shown in the economic categories of staff remuneration; current goods-and-services expenditure; non-consumption, non-interest expenditure; and non-recurrent expenditure. For the Republic of East Africa, the overall expenditure data in each economic category are drawn from the /Fiscal worksheet, and **non-priority expenditure** in each economic category is then calculated as the difference between *total* expenditure and *total priority* expenditure under that under that category.

83. ***(E)*** The government's **external-debt disbursement** flows are shown in the aggregate – that is, not broken down into categories. These data are drawn from the /Fiscal worksheet.

84. ***(F)*** Similarly, the government's **external debt-service (interest and repayment)** flows are shown in the aggregate – that is, not broken down into categories. These data are drawn from the /Fiscal worksheet.

85. ***(G)*** The **net internal financing** flow is then calculated residually. (This calculation is checked against the corresponding figure in the /Fiscal worksheet).

86. The /Data worksheet shows the government's year-end external debt stocks for each year. These data are drawn from the /ExtDebt worksheet. The /Data worksheet also shows the government's year-end internal debt stocks for each year.

87. The /Data worksheet includes “debt-reconciliation” calculations, showing the differences each year between (i) the net flows (disbursement less repayment) and (ii) the differences between the year-end debt stocks. For external debt, these reconciliations are calculated in U.S. dollars (with the flows converted from the national-currency data using the average exchange rate and the stocks converted at the year-end exchange rate). The reconciliations generally show non-zero results, for several reasons. Some of the external debt is denominated in currencies other than the U.S. dollar, and cross-exchange-rate movements would affect the reconciliation calculation. The average exchange rate is likely to differ somewhat from the actual conversion rates of the debt flows. Various other factors influence the reconciliation calculation.

88. The budget data provided in the /Data worksheet are complemented by three additional groups of data (1) basic macroeconomic variables, (2) U.S.-dollar flows of exports and imports of goods and non-factor services, and (3) the national-expenditure accounts.

89. The basic macroeconomic data comprise the (i) nominal and (ii) real gross domestic product (GDP), (iii) the GDP deflator, the (iv) annual-average and (v) December consumer-price indices (CPIs), the (vi) annual-average and (vii) December exchange rates (national currency per U.S. dollar), the growth rates of (viii) overall population and (ix) population under sixteen years of age, and (x) the poverty incidence. The historical data are drawn from various data worksheets, including the /CPI, /ExchR, /Prodn, and /WDI data worksheets. The national-expenditure accounts data are drawn from the /NatExp worksheet).

90. The government-consumption account is sub-classified into central and non-central government components. The non-central government component is calculated by subtracting the figure for central-government consumption expenditure (staff remuneration and current goods and services, from the budget data) from the national-accounts figure for total government consumption.

6. The /Assumptions worksheet

91. The /Assumptions worksheet contains the programming assumptions used to generate the projections. The full array of assumptions, taken together, constitute a scenario (see Section 4 above). The scenario comprises (1) quantitative plans for the evolution of the priority and non-priority expenditure flows; (2) a program for the “context,” comprising external and internal economic performance and their consequences for the revenue flows; and financing flows, including grants and external lending. In effect, the projection exercise evaluates this scenario for its *financial* feasibility. Or, put another way, the idea is to evaluate whether the priority-expenditure plan would be financially feasible in the programmed context.

92. Most of the assumptions this projection exercise uses are:

f) percentages of GDP;
g) real or nominal growth rates;
h) real or nominal rates of return; and
i) elasticities of one variable with respect to another.

Nearly all the assumptions set up in the EAFS.xlsm workbook fall into one of these categories.

93. Many of the assumptions in this exercise have what may be described as “default,” or “neutral” values. Thus, for example, the default or neutral value for the elasticity of the demand for intermediate-goods imports with respect to real GDP would be one. This is because, all other things

being equal, if the value of this assumption were greater (less) than one for many future years, the projected ratio of intermediate-goods imports to GDP would tend to increase (diminish). An assumed value different from one would therefore tend to make the projection produce a deteriorating (improving) balance of payments. On the other hand, all other things being equal, a value of one would tend to preserve the ratio of intermediate-goods imports to GDP. *In general, where an assumption line has default or neutral values, it is generally best to use them, unless there are specific reasons for choosing different values.*

94. Generalizing very broadly, the default or neutral value for an assumption set as a percentage of GDP would be the value it had in the year immediately preceding the initial projection year. Generalizing again very broadly, the default or neutral values for many real growth rates is likely to be the assumed real-GDP growth rate, while the default or neutral value of a nominal growth rate is likely to be the assumed nominal-GDP growth rate. This is because these growth rates would tend to preserve the ratio of the variable in question to GDP. Generalizing yet again very broadly, the default or neutral value of the elasticity of a variable with respect to real or nominal GDP is likely to be one, since that value would preserve the ratio of the variable in question to GDP.

95. The default or neutral growth rate of a *real* export or import price is likely to be zero. Equivalently, the default or neutral growth rate of a *nominal* export or import price would generally be the world U.S.-dollar inflation rate. If an economy maintains a floating exchange rate, for example, the default or neutral assumption could be that the *real-effective* exchange rate would have a growth rate of zero. If an economy maintains a fixed nominal exchange rate, on the other hand, the default or neutral assumption would be that the *nominal* exchange rate would have a growth rate of zero.

96. The assumption lines are numbered sequentially (in Column B). The worksheet also shows some implicit assumptions, “backed out” from the calculations in the /Projections worksheet.

97. The /Assumptions worksheet is organized in six sections “stacked” from top to bottom, with the main assumptions categories.

98. ***(A)*** The first set of assumptions comprises ***external “state-of-the-world” variables***. The external state-of-the-world variables are the growth rates of (i) the world-trade volume, (ii) the U.S.-dollar price level, as well as (iii) the six-month, U.S.-dollar London InterBank Offer Rate. These variables are projected as programming assumptions [assumption lines 1-3]. (The IMF and the World Bank maintain institutional projections of these variables, as well as projections of the evolution of specific commodity prices. Analysts may prefer to use these instead of, or as alternatives to, their own projection assumptions).

99. The assumed ***growth rate of the world trade volume*** would amount to the analyst’s appreciation of the world economy’s future prospects. Directly or indirectly, it would affect the projected growth rate of the economy’s export volume. In general, stronger world economic performance would help the economy earn, rather than having to borrow, its way to its real growth.

100. Like the price level in any economy, the ***growth rate of the world U.S.-dollar price level*** is rather more a concept than anything genuinely measurable. Nevertheless, the U.S. GDP deflator and the World Bank’s Manufacturing Unit Value index are generally regarded as reasonable proxies for what people “roughly mean” by the world U.S.-dollar price level. Assumptions regarding the future growth rates of these indices may therefore be taken as “proxies” for the growth rate of the world U.S.-dollar price level.

101. Finally, ***the London Interbank Offer Rate***, or LIBOR, is the interest rate banks operating in the London financial markets offer for one-month, three-month, six-month and one-year placements in various currencies. (The British Bankers Association compiles the LIBOR daily by obtaining daily quotes from a panel of banks. The daily composite values are published at 11:00am through the Reuters news agency.) LIBOR has been used throughout the world as an interest-rate reference basis. That is, many loan contracts promise that future interest payments will be made at an interest rate equal to the prevailing LIBOR plus a specified "spread." The basic reason the projection exercise requires a LIBOR assumption is that certain loan contracts, particularly those involving private lenders, use it as a reference basis. (Since the 1980s, interest payments at a rate equal to LIBOR plus a spread have become conventional for loans provided by "commercial" financial entities. Such payments are frequently scheduled twice annually, for the last days of the months of February and September, using the LIBOR rate of six months earlier).

102. For some economies, it may be useful to include assumptions for crude-oil import prices and for export prices of specific commodities, such as mining exports. World crude-oil prices have proven highly volatile and notoriously difficult to predict over the years. For the kinds of projection exercise under discussion here it may be perfectly adequate simply to assume that the ***growth rate of the world crude-oil price*** is closely related to the growth rate of the world U.S.-dollar price level. World minerals prices have also proven volatile and difficult to predict. Again, it may be perfectly adequate simply to assume that the ***growth rates of the world prices for such commodities as copper, zinc and nickel*** be closely related to the growth rate of the world U.S.-dollar price level.

103. ***(B)*** The second set of assumptions consists of growth rates of ***basic macroeconomic variables***. These include the real and nominal gross domestic product (GDP), the price level, the exchange rate, and the population, with different versions and combinations of these variables [assumption lines 4-10]. For example, different aspects of the projection exercise make use of real GDP, *per-capita* real GDP, nominal GDP in national currency, and GDP in dollars, so the projection exercise calculates them all.) This group of assumptions also includes the growth rates of exports and imports of goods and non-factor services [assumption lines 11-17], and several assumptions necessary to complete the projections of the national-expenditure accounts [assumption lines 18-20].

104. If assumptions are given for the growth rate of real GDP ("y") and the GDP deflator ("p"), the growth rate of nominal GDP ("Y") would be the "combined" growth rate of real GDP and of the GDP deflator,

$$g_Y = [(1 + g_y)\ (1 + g_p)] - 1\ ,$$

where g_Y is equal, by definition, to $(Y/Y_{-1}) - 1$.

105. The projection exercise takes the assumptions for the growth rates of (i) real GDP, (ii) December consumer prices, (ii) the December average exchange rate, (iv) the population and (v) the population under fifteen years of age as the "key" assumptions defining the macroeconomic program. It then calculates the other growth rates – of nominal GDP, GDP in dollars, year-average consumer prices, etc. – on the basis of these key assumptions.

106. In particular, the projection exercise makes use of the year-average and December consumer price index values, and of the year-average and December exchange rates. It must therefore calculate their projections consistently. The "year-end" exchange rate is taken to be the December month average, *not* the datum for the final day of the year. There are two reasons. The first is to ensure that it is consistent with the "year-end" consumer price index, which can only be the *average*

index for December.[7] The second is that month-end, and especially year-end, exchange rates are apt to be "outliers," because, in many economies, many "special" exchange transactions take place on such days for reasons not typical of other days in the month.

107. The exercise calculates year-average consumer-price and exchange rate values by taking the twelve-month averages of the *monthly*-average exchange rates. The monthly exchange-rate figures are calculated from the December figures, interpolating the values between the December values so that they grow at the same monthly rate.

108. This worksheet calculates the growth rates of merchandise exports and merchandise imports from the growth rates of the volumes and the respective world prices [assumption lines 11-14]. It also includes assumptions for growth rates of the values of non-factor service exports and non-factor service imports excluding insurance and freight related to merchandise imports [assumption lines 15-16]. In addition, it includes a line of assumptions for the ratio of insurance and freight charges to the free-on-board costs of merchandise imports [assumption line 17].

109. The basic macroeconomic assumptions also include three assumptions necessary to complete the projections of the national-expenditure accounts [assumption lines 18-20]. These are (1) consumption expenditure by governments other than the central government, (2) overall gross fixed capital formation, and (3) the net increase in inventory stocks, all as percentages of GDP.

110. ***(C)*** The third category of assumptions are those relevant for ***tax and non-tax revenue*** [assumption lines 21-32]. Most of, though not all, these assumptions are elasticities. In general, for a revenue line "y" that depends on an economic variable "x," if g_y and g_x represent their respective growth rates and η represents the elasticity of "y" with respect to "x," the formula used for the growth rate of "y" is:

$$g_y = 1 + g_x)^{\eta} .$$

The assumptions for most of the tax-revenue lines are, as indicated in the list, elasticities of this kind:

TAX REVENUE:
Elasticities of...
Personal income tax with respect to nominal GDP
Company-tax revenue with respect to nominal GDP
Other income-tax revenue with respect to nominal GDP
Specific tax revenue with respect to nominal GDP
Customs revenue with respect to merchandise-imports value
Excise revenue with respect to merchandise-imports value
Exports-duty revenue with respect to merchandise exports value
NON-TAX REVENUE:
Elasticities of...
Non-tax revenue with respect to nominal GDP

[7] Consumer-price indices are, in general and throughout the world, calculated on the basis of surveys taken during the "central" days of each month – from the 10th to the 20th of the month, for example.

111. Value-added tax (VAT) revenue is projected in a different way. If R represents the revenue flow, τ represents the tax rate, and Z represents the relevant base of the tax, the formula used for the revenue flow is:

$$R = c \tau Z,$$

where "c" represents the collection efficiency of the tax. The collection efficiency would be a value between 0 and 1, which indicates the amount of tax collected in relation to the theoretical maximum. For example, suppose that a value-added tax of τ is levied on internal transactions. Exemptions and administrative limitations imply that it this tax would be collected on only a proportion "c" of overall GDP. The assumptions having to do with value-added tax on internal transactions and on the value of merchandise imports [assumption lines 28-31] are the rate (τ) and the collection-efficiency ("c") values. These could be assumed to vary over the projection period.

112. ***(D)*** The fourth category of assumptions concerns ***external grants*** [assumption lines 33-34]. The flows of project and budget-support grants are projected as percentages of GDP.

113. ***(E)*** The fifth category of assumptions concerns the ***non-interest government-expenditure flows*** [assumption lines 35-49]. These assumptions are set out in the functional sectoral categories of (1) education, (2) health, (3) social protection, and (4) all other non-interest expenditure (non-priority expenditure). Within each sectoral category, there are assumptions for the growth rates of expenditure under the four economic sub-categories: (a) staff remuneration, (b) current goods and non-factor services, (c) other current (non-consumption) non-interest expenditure, and (d) non-recurrent expenditure.

114. In each sector, the growth rate of staff remuneration is calculated by combining two assumptions, the growth rates of the sectoral staff (number of persons) and of their average pay. Default choices would be, first, that the staff would grow at the same rate as the overall population (the number of school-age children for education), and, second, that the average pay rate would grow at the same rate as per-capita nominal GDP.

115. In a sector that policy-makers intend to prioritize, the staff would grow faster than the population growth rate. The assumed average pay rate would be a matter of what is known about the government's policy stance. In a sector in which a large part of the staff is retiring and being replaced with younger workers, the average pay rate could be assumed to grow at a relatively slower rate. On the other hand, in a sector in which a large proportion of the staff is receiving promotions, the average pay rate could be assumed to grow at a relatively faster rate.

116. In each sector, the growth rate of expenditure on current goods and services would also be calculated by combining two assumptions, the growth rates of real expenditure on goods and services and the year-average consumer-price index. The growth rate of real expenditure on goods and services can be set equal to the growth rate of the staff size, on the reasoning that these two rates *ought* to be about the same, since the use of real goods-and-services (including such things as electrical light and water services for offices) ought to grow with the number of people using them.

117. In each sector, the growth rate of non-consumption, non-interest expenditure could be calculated by combining two assumptions, the growth rates of real non-consumption, non-interest expenditure and the year-average consumer price index. As a "default" assumption, the growth rate of real non-consumption, non-interest expenditure could be set equal to the growth rate of the population (child population for the education sector).

118. Finally, in each sector, the non-recurrent expenditure flow could be set as a percentage of GDP. The percentage in each year could be set at the same percentage as in historical years.

119. ***(F)*** The sixth and last category of assumptions concerns the ***external and internal debt flows*** [assumption lines 50-53]. The assumptions for the external and internal debt are for each of these categories of debt taken as a whole.[8] The first two assumptions are the average interest rates on the external and internal debt, respectively. The assumptions following are for external-debt repayments as a percentage of the previous year-end external debt stock and for external-debt disbursements as a percentage of total non-recurrent government expenditure.

120. ***The worksheet /Assumptions Notes provides notes on the assumptions.*** This worksheet is intended to be incorporated in reports. It is intended to facilitate discussion of the programming assumptions.

121. To conclude this section, several general observations about programming assumptions may be helpful.

122. ***Some of the assumptions should be formulated differently for years nearer to the present – "inner" projection years -- than for years further from the present – "outer" projection years.*** Thus, for example, suppose it is mid-2018 and a projection exercise is being carried out with 2018 as the initial projection year. It may be possible to estimate external-debt disbursements for the year 2018 relatively closely at this moment, from a knowledge of the government's on-going programs with external lenders. The current estimate of such disbursements should then be used as the assumption for 2018. Disbursements after 2018, on the other hand, might be harder to project. It may be easiest simply to base an assumption for their values on assumed growth rates for the external-debt *debt stock*. Similarly, at the present moment a reasonable estimate for the flow of merchandise imports might be available for 2018. This estimate could be used for 2018, but values for years after 2018 might then be based on default values for the relevant elasticities.

123. For some assumption lines, it may be advisable to make assumptions for "inner" projection years based on current estimates and then set assumptions for "outer" years in such a way that they evolve toward default values. Thus, for example, suppose intermediate-goods imports are expected to surge in the current year (the initial projection year 2018) because import liberalization, in such a way that their value could be approximated by setting the elasticity of the volume of intermediate imports with respect to real GDP to (say) 1.5. It may then be reasonable to assume that after (say) five years this elasticity would decline to one. The elasticity for 2018 could be set at 1.5, the elasticity for 2021 (five years hence) could be set at 1, and values for the elasticity in years in between, η_t, could be set using the formula:

$$\eta_t = \eta_{t-1} [1/1.5]^{(1/5)},$$

which would reduce the elasticity gradually from 1.5 to one.

124. ***"Sensitivity analysis" is one of the projection exercise's more obvious applications.*** Broadly speaking, it would be natural to try out scenarios characterized by different states of the world and basic macroeconomic programs, and to try out scenarios characterized by different policy

[8] It would be straightforward to revise the workbook so that the external and internal debt are projected in categories by creditor – for example, with a breakdown showing assumptions for debt from the World Bank, the African Development Bank, Eurobonds, etc.

programs in the context of a given state of the world and basic macroeconomic program. Section 0 below discusses the basic principles of sensitivity analysis.

7. The /Projections worksheet

125. The /Projections worksheet combines the data and the assumptions into the medium-term projections. The /Projections worksheet is organized in "blocks," similar to those in the /Data worksheet.

126. ***(A)*** For the education and health sectors, the projections are formulated by applying the relevant assumed growth rates to the historical database.

(1) The growth rate of staff remuneration is the growth rate calculated by combining the assumed growth rates of (a) the number of persons on staff and (b) their average pay rate.

(2) The growth rate of current expenditure on goods and services is the growth rate calculated by combining the assumed growth rates of (a) the number of persons on staff and (b) the price level.

(3) The growth rate of the "other" (non-consumption) current expenditure is calculated by combining the assumed growth rates of (a) the population and (b) the price level.

(4) Non-recurrent expenditure in each sector is projected by applying the assumed percentage of GDP by the projected nominal GDP.

127. ***(B)*** The various tax and non-tax revenue flows are taken to depend on the assumed elasticities and on the relevant underlying variables. The value-added tax is calculated by applying the assumed VAT rate, the assumed collection efficiency, and the value of the VAT base flow (see Section 6 above).

128. ***(C)*** External grants are projected by multiplying the assumed percentages of GDP by the projected values of GDP.

129. ***(D)*** Non-priority expenditure is projected in the same way as education and health expenditure.

130. ***(E)*** External debt disbursements are projected by multiplying the assumed percentages of GDP by the projected values of GDP.

131. ***(F)*** External-debt repayment flows are projected as an assumed percentage of the preceding December debt stocks. External-debt interest flows are projected by applying assumed interest rates to the year-average debt stock.

132. ***(G)*** Each projection year's internal-debt flow is projected as the residual account, so its value is the amount necessary "to close" that year's fiscal accounts. The interest is assumed to be paid, at the assumed rate, on the preceding year's year-end debt stock.

133. The lower part of the /Projections worksheet shows the macroeconomic values on which the fiscal projections are based.

134. The national expenditure accounts projection in this part of the worksheet displays the aggregate-expenditure accounts projection for each year. The familiar national-expenditure accounts identity, with some of the detail the projection exercise requires, is:

Total consumption:
- Non-government consumption (C)
- Government consumption (G)
  - Central-government consumption (G1)
  - Sub-national government consumption (G2)

+ Gross investment (I+V):
- Gross fixed capital formation (I):
  - Non-government gross fixed capital formation (I-J)
  - Government gross fixed capital formation (J)
    - Central govt. gross fixed capital formation (J1)
    - Sub-natl. govt. gross fixed capital formation (J2)
- Net increase in inventory stocks (V)

+ Net exports of goods and non-factor services (X-Q)
- Exports of goods and non-factor services (X)
- (-) Imports of goods and non-factor services (-Q)

≡ Gross domestic product (Y)

The basic approach taken by this aspect of the projection exercise is to calculate projection values for all the accounts in the list above except non-government consumption. For any projection year, non-government consumption can then be determined residually, using the identity:

$$C = Y - [G + I + V + X - Q)].$$

The result for non-government consumption can then be evaluated, and used to gauge whether all the other projections, taken together, would be feasible, in the simple sense of whether they would allow non-government consumption to grow adequately.

135. Of the national-expenditure accounts components shown in the listing above, gross domestic product is one of the “basic” projection variables; exports and imports of goods and non-factor services come from the international-trade projections; and government consumption and investment come from the fiscal projections. In the EAFS.xlsm, the fiscal-accounts projections cover only the central government. This is why assumptions must be set for the projection line in the listing above having to do with sub-national governments. Consumption and capital-formation expenditure by government other than the central government are set as percentages of GDP. In addition, the increase in inventory stocks is projected as an assumed percentage of GDP.

136. For projection years, it is usually best to assume that the net increase in inventory stocks will be zero, or a relatively small percentage of GDP, unless there is a very specific reason to believe otherwise.

137. Once the nominal flow of non-government consumption has been calculated for any projection year, it is straightforward to determine the real per-capita flow, by deflating this nominal flow using the projected (year-average) consumer price index and then dividing that value by the projected population.[9]

[9] The growth rate of per-capita real non-government consumption is, or should be, a feasibility indicator for any macroeconomic projection exercise. A growth rate that is too low would imply that the program should be considered not feasible.

8. The /Contribution Analysis worksheet

138. For the historical years, and to some extent for the projection years, further insight can be obtained by exploiting the budget identity to carry out a "contribution analysis." Since the priority-expenditure flow is identically equal to the sum of the various fiscal-space components, the growth rate of the real per-child year-over-year priority-expenditure flow can be analysed as the sum of the real per-child contributions from the fiscal-space components.

139. The "contribution analysis" may be understood as follows. Suppose three variables X, Y and Z are related through the "identity":

$$Z \equiv X + Y.$$

Let ΔX represent $X - X_{-1}$, ΔY represent $Y - Y_{-1}$, and ΔZ represent $Z - Z_{-1}$, and let g_X, g_Y, and g_Z, represent the growth rates $\Delta X/X_{-1}$, $\Delta Y/Y_{-1}$, and $\Delta Z/Z_{-1}$ respectively. Since $\Delta Z \equiv \Delta X + \Delta Y$,

$$\Delta Z/Z_{-1} \equiv (\Delta X/Z_{-1}) + (\Delta Y/Z_{-1}).$$

Further rearranging leads to:

$$\Delta Z/Z_{-1} \equiv (X_{-1}/ X_{-1}) (\Delta X/Z_{-1}) + (Y_{-1}/Y_{-1}) (\Delta Y/Z_{-1}),$$

or

$$\Delta Z/Z_{-1} \equiv (X_{-1}/ Z_{-1}) (\Delta X/X_{-1}) + (Y_{-1}/Z_{-1}) (\Delta Y/Y_{-1}).$$

Thus

$$g_Z \equiv [(X_{-1}/ Z_{-1}) g_X] + [(Y_{-1}/Z_{-1}) g_Y],$$

where $[(X_{-1}/ Z_{-1}) g_X]$ and $[(Y_{-1}/Z_{-1}) g_Y]$ are the respective "contributions" of X and Y to the growth of Z.

140. Table 4 shows that real per-child priority expenditure has grown relatively rapidly over the years 2011-2016, especially in 2012 and 2013. Tax and non-tax revenue contributed steadily and, in some years, significantly to the overall growth of the fiscal space. The contributions of the remaining elements of the fiscal space were highly variable.

Table 4 Republic of East Africa: Contributions of fiscal-space components to the real per-child growth rate of priority expenditure, 2011-2016

REPUBLIC OF EAST AFRICA:						
FISCAL PROJECTION EXERCISE: CONTRIBUTION ANALYSIS *Calendar Year:*	2011	2012	2013	2014	2015	2016
Scenario: 0						
Initial projection year: 2017						
US$ per child at prices and exchange rate of 2016						
Contribution analysis:						
Growth rates:						
Total priority non-interest expenditure:	**6.5%**	**16.4%**	**26.0%**	**8.7%**	**3.2%**	**4.1%**
Participation in the growth of total priority expenditure:						
Total education expenditure	1.3%	8.3%	30.5%	7.7%	2.9%	4.8%
Total health expenditure	5.2%	8.0%	-4.6%	1.0%	0.3%	-0.7%
Contribution to the growth of total priority expenditure:						
Tax and non-tax revenue (excl. external grants) (+)	6.9%	12.0%	22.2%	15.8%	4.7%	18.8%
External grants (+)	0.6%	-1.0%	-2.0%	-0.8%	-0.3%	-0.4%
Total non-priority non-interest expenditure (-)	16.6%	-69.0%	62.0%	-7.0%	-4.7%	-5.8%
External-debt disbursements (+)	-48.6%	2.8%	50.0%	-23.6%	68.6%	-68.0%
External debt service (-)	-4.4%	5.7%	-20.0%	0.4%	-104.7%	64.2%
Net internal financial flows (incl. internal interest) (+)	**35.3%**	**65.9%**	**-86.3%**	**24.0%**	**39.6%**	**-4.6%**
Growth rates:						
Total priority non-interest expenditure:	**6.5%**	**16.4%**	**26.0%**	**8.7%**	**3.2%**	**4.1%**
Total education expenditure	2.7%	17.3%	62.9%	12.3%	4.4%	7.3%
Total health expenditure	10.4%	15.5%	-8.9%	2.7%	1.0%	-1.9%
Overall fiscal space:						
Tax and non-tax revenue (excl. external grants) (+)	1.9%	3.5%	7.2%	6.0%	1.8%	7.5%
External grants (+)	9.9%	-16.0%	-42.2%	-35.9%	-20.3%	-42.9%
Total non-priority non-interest expenditure (-)	-5.8%	27.2%	-22.4%	4.1%	2.9%	3.6%
External-debt disbursements (+)	-39.0%	4.0%	78.3%	-26.1%	111.6%	-54.0%
External debt service (-)	8.5%	-10.9%	50.3%	-0.8%	241.0%	-44.7%
Net internal financial flows (incl. internal interest) (+)	**-64.8%**	**-366.2%**	**-209.5%**	**-67.1%**	**-365.0%**	**-16.4%**
Per cent of total priority expenditure:						
Total priority non-interest expenditure:	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Total education expenditure	48.1%	48.5%	62.8%	64.8%	65.6%	67.6%
Total health expenditure	51.9%	51.5%	37.2%	35.2%	34.4%	32.4%
Overall fiscal space:						
Tax and non-tax revenue (excl. external grants) (+)	345.7%	307.4%	261.7%	255.2%	251.8%	259.9%
External grants (+)	6.6%	4.7%	2.2%	1.3%	1.0%	0.5%
Total non-priority non-interest expenditure (-)	-253.8%	-277.3%	-171.0%	-163.7%	-163.2%	-162.3%
External-debt disbursements (+)	71.5%	63.9%	90.4%	61.5%	126.0%	55.7%
External debt service (-)	-52.1%	-39.9%	-47.6%	-43.4%	-143.5%	-76.2%
Net internal financial flows (incl. internal interest) (+)	**-18.0%**	**41.2%**	**-35.8%**	**-10.8%**	**27.8%**	**22.4%**
Per cent of GDP:						
Total priority expenditure:	**3.7%**	**4.3%**	**5.4%**	**5.8%**	**5.7%**	**5.7%**
Total education expenditure	1.8%	2.1%	3.4%	3.7%	3.8%	3.9%
Total health expenditure	1.9%	2.2%	2.0%	2.0%	2.0%	1.8%
Overall fiscal space:	**3.7%**	**4.3%**	**5.4%**	**5.8%**	**5.7%**	**5.7%**
Tax and non-tax revenue (excl. external grants) (+)	12.7%	13.4%	14.3%	14.7%	14.5%	14.8%
External grants (+)	0.2%	0.2%	0.1%	0.1%	0.1%	0.0%
Total non-priority non-interest expenditure (-)	-9.3%	-12.1%	-9.3%	-9.4%	-9.4%	-9.3%
External-debt disbursements (+)	2.6%	2.8%	4.9%	3.5%	7.2%	3.2%
External debt service (-)	-1.9%	-1.7%	-2.6%	-2.5%	-8.2%	-4.3%
Net internal financial flows (incl. internal interest) (+)	**-0.7%**	**1.8%**	**-2.0%**	**-0.6%**	**1.6%**	**1.3%**
Per-child expenditure (U.S. dollars at 2016 prices and exchange rate):						
Total priority non-interest expenditure:	**$70.90**	**$82.51**	**$103.92**	**$112.99**	**$116.61**	**$121.40**
Total education expenditure	$34.14	$40.05	$65.22	$73.23	$76.47	$82.05
Total health expenditure	$36.76	$42.46	$38.70	$39.76	$40.14	$39.36

Data source: Workbook EAFS.xlsm.

9. Sensitivity analysis

141. The lines in the /Assumptions worksheet and their projection values taken together constitute a "scenario." In effect, the projection exercise tests each scenario, calculating the projected internal financing flow implied by the scenario's component assumptions. If the internal financing flow is feasible, then the scenario may be deemed financially feasible.

142. For the projection exercise, the "base scenario" is, as the name implies, the scenario that is used as the base for comparisons with other scenarios. In general, the base scenario can be set out on different criteria: it could be (1) the scenario whose assumptions are set to default values; (2) the scenario that the analyst believes most probable (or least improbable); (3) the scenario corresponding to the government's current medium-term macroeconomic program.

143. Once the base scenario is set out, alternate scenarios may be set by varying specified assumptions lines in the /Assumptions worksheet. Once this is done, each alternate scenario's key results, including the net internal financing flow, can be compared with the corresponding base-scenario results. The comparison of each scenario and the comparative results constitute a "sensitivity analysis."

144. Two worksheets, /Scenarios and /Scenario Results, are used to facilitate sensitivity-analysis work. ***In the /Assumptions worksheet, the scenario is selected in the cell named "Scenario" (L4). The base scenario has the number "0," and alternative scenarios are designated sequentially starting with "1."*** Assumption lines that change according to the scenario are indicated by green shading. The values in these lines are drawn from the listing in the top part of the /Scenarios worksheet. The cells in this part of the /Scenarios worksheet are CHOOSE functions, which draw from assumption values set further down for each scenario. Thus, at any moment, the values in each of the cells at the top of the /Scenarios worksheet are the assumptions corresponding to the scenario number.

145. The /Scenario Results worksheet presents summary results from all scenarios. In this worksheet, each column corresponds to a specified scenario. Summary results for all scenarios are then shown below. While it is possible to calculate this worksheet manually, it is best and certainly easiest to calculate it using the macro "Scenario."[10]

146. Part D below describes the broad results of a sensitivity analysis for the hypothetical Republic of East Africa. Appendix I describes the sensitivity analysis in greater detail.

[10] This macro proceeds through the scenarios one by one, setting the cell "Scenario" first to "0," then to "1," "2" and so on. With each such setting, the projections are calculated. Each time it sets a scenario, the macro goes to the worksheet /Scenarios, where it copies the contents of ScenarioResults!I9:I30 (which contains the formulas for the summary results) as values to the columns to the right in the worksheet. (If scenarios are added to the exercise, the worksheet /Scenarios and the macro, "Scenarios" must be adjusted accordingly).

D. Sensitivity analysis for the republic of East Africa

147. This Part summarizes the results of an Excel-based fiscal-space projection exercise and sensitivity analysis for the hypothetical Republic of East Africa. Appendix I describes the results of the projection exercise and sensitivity analysis in more detail.[11]

148. In its discussion of the base scenario, Appendix I describes the component assumptions lines (see Table 6 in Appendix II) and then the projection results (Table 7 in Appendix II). Among the key programming assumptions, the real-GDP growth rate is assumed to remain at 6.6 per cent over the projection period. Most of the remaining programming assumptions are intended as "neutral" – that is, non-controversial, base-line assumptions that would produce no significant changes in the fiscal structure as the real economy grows. The results of the base scenario would then provide a basis of comparison with alternative scenarios incorporating some assumptions that differ from those of the base scenario.

149. Under the base scenario, priority expenditure would average 7.3 per cent of GDP over the years 2017-2021. Over these same years, in real terms, total priority expenditure would average US$184.50 per child at 2016 prices and exchange rate. Under the base-scenario assumptions regarding tax and non-tax revenue, external grants, non-priority expenditure, and external- and internal-debt stocks and flows, the projected priority-expenditure flows would produce a fiscal-space financing "gap" that would have to be covered with internal financing. The required internal-financing flow would average 0.7 per cent of GDP, which would be relatively small, and probably within the capacity of internal financial markets (especially in view of the assumed real-GDP growth rate). In this scenario, total government (external and internal) debt would conclude 2021 at 35.9 per cent of GDP. No less important, the figure would be on a declining trend.

150. Appendix 1 then describes several alternative scenarios. In general, these scenarios should be considered illustrative, in the sense that they describe the likely consequences of possible policy *approaches*. Scenario 1, for example, shows that an improvement in the value-added-tax administration could significantly reduce the fiscal-space gap. Scenario 2, on the other hand, suggests that significant additional staff hiring in education and health would significantly increase the gap. Scenario 3 suggests that a combination of improvement in the value-added tax administration could "fund" an increase in education and health staffing levels. Scenario 4 considers the effect of a higher real-GDP growth rate.

The tables immediately following summarize the four alternative scenario results, and show how their results compare quantitatively with the base scenario.

[11] An Excel file incorporating a projection exercise of this kind is one of the deliverables of the ECORYS consulting assignment for UNICEF. It is intended either to be used itself, or to serve as a model for a similar exercise that UNICEF could develop and apply.

Scenario 1 Enhanced VAT administration

Results	Scenario 0	Scenario 1	Variation
Average tax and non-tax revenue/GDP, 2017-2021	14.38	15.08	**0.69**
Average priority expenditure/GDP, 2017-2021	7.35	7.35	
Avg priority exp. per child (USD at 2016 prices and exch. rate), 2017-2021	$182.35	$182.35	
Net internal debt flow/GDP, 2017-2021	0.67	-0.11	**-0.78**
Total government debt/GDP, 2021	35.87	32.28	**-3.59**

Scenario 2 Increased priority expenditure

Results	Scenario 0	Scenario 2	Variation
Average tax and non-tax revenue/GDP, 2017-2021	14.38	14.38	
Average priority expenditure/GDP, 2017-2021	7.35	7.65	**0.30**
Avg priority exp. per child (USD at 2016 prices and exch. rate), 2017-2021	$182.35	$190.14	**$7.79**
Net internal debt flow/GDP, 2017-2021	0.67	1.02	**0.34**
Total government debt/GDP, 2021	35.87	37.45	**1.58**

Scenario 3 Increase priority expenditure and enhanced VAT administration

Results	Scenario 0	Scenario 3	Variation
Average tax and non-tax revenue/GDP, 2017-2021	14.38	15.08	**0.69**
Average priority expenditure/GDP, 2017-2021	7.35	7.65	**0.30**
Avg priority exp. per child (USD at 2016 prices and exch. rate), 2017-2021	$182.35	$190.14	**$7.79**
Net internal debt flow/GDP, 2017-2021	0.67	0.24	**-0.44**
Total government debt/GDP, 2021	35.87	33.86	**-2.00**

Scenario 4 Higher real GDP growth

Results	Scenario 0	Scenario 4	Variation
Average tax and non-tax revenue/GDP, 2017-2021	14.38	14.39	**0.01**
Average priority expenditure/GDP, 2017-2021	7.35	7.34	**-0.01**
Avg priority exp. per child (USD at 2016 prices and exch. rate), 2017-2021	$182.35	$183.11	**$0.76**
Net internal debt flow/GDP, 2017-2021	0.67	0.61	**-0.06**
Total government debt/GDP, 2021	35.87	35.30	**-0.57**

151. What matters about the projection exercise is not so much its specific assumptions and results as the point that UNICEF could use this or a similar exercise in its dialogue with policy-makers and with other stakeholders in the public finances. By continually maintaining an up-to-date historical data base and trying out different assumptions, UNICEF analysts should be able to bring quantitative analysis “to the table” as they participate in the ongoing conversation about expenditure policy in particular and overall fiscal and macroeconomic policy more generally.

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Appendix I: Details of the fiscal-space sensitivity analysis

1. This Appendix describes the details of the base-scenario projection exercise for the hypothetical Republic of East Africa summarized in Part D above. It then describes the results of a sensitivity analysis, which compare the results of alternative scenarios with the results of the base scenario.

2. The base-scenario programming assumptions are intended to be relatively simplified, to make the calculation relatively easy to carry out and to understand. Before proceeding to describe the base-scenario assumptions, several general explanatory points may be noted.

a) The assumptions are "programming" assumptions. They are not intended, and should not be understood, as *forecasts*, but rather as plausible possibilities for planning purposes. In particular, the growth rates of government expenditure are intended as plausible policy settings.

b) In general, the aim for the base scenario is to set programming assumptions that are "neutral." Thus, for example, the Republic of East Africa's merchandise export volumes are assumed to grow at the same rates as the world trade volume, so its exports maintain the same share of the world trade volume. The value of the Republic of East Africa's merchandise imports is assumed to grow at the same rates as GDP, so merchandise imports maintain the same percentage of GDP. For recurrent expenditure, the assumption that staff sizes will grow at the same rate as the population would be neutral in a similar sense. So is the assumption that government wage rates would grow at the same rate as per-capita nominal GDP.

c) The elasticities that help determine the government's revenue performance are taken to be unitary for the base scenario. This is also a "neutral" assumption. In general, it is inadvisable to apply econometric point estimates based on historical data for these values, for at least two reasons. The first is that future elasticities are likely to be different from historical elasticities. The second is that, say, if the elasticity of a given revenue line with respect to nominal GDP is assumed to exceed (be less than) one, the projected revenue flow would rise (diminish) indefinitely as a percentage of GDP.

d) It is straightforward to set programming assumptions that adjust gradually over the projection period, using "geometric" adjustment formulas. This may be useful for several different assumption lines. For example, most of the assumptions are set as growth rates. These can be assumed to rise or diminish gradually from their initial projection values toward their final projection values. Another way to use a gradual adjustment would be for the elasticity of a given revenue line with respect to nominal GDP to take on an initial value somewhat different from one, but then gradually adjust toward a long-term value of one.

3. For the base scenario, the programming assumptions are as follows:

Table 5 Republic of East Africa: Programming assumptions for the projection exercise

(A) World economic conditions (1-3):
(1) The growth rate of the world trade volume rises gradually from its estimated 2016 value of 2.8 per cent to a 2021 value of 6 per cent.
(2) The growth rate of the U.S.-dollar world price level rises gradually from its estimated 2016 value of 1.8 per cent to a 2021 value of 2 per cent.
(3) The London Interbank Offer Rate rises gradually from its 2016 value of 1.1 per cent to a 2021 value of 1.5 per cent.
(B) Basic macroeconomic variables (4-10):
(4) The growth rate of real GDP remains at 6.6 per cent over the projection years.
(5) The GDP deflator grows at the same rate as the year-average consumer price index.
(6) The December-December growth rate of the consumer price index (CPI) declines gradually from 1.7 per cent in 2016 to 2 per cent in 2021.
(7) The December-December growth rate of the U.S. dollar exchange rate grows at a rate (approximately) equal to the differential of the economy's and world inflation rates.
(8) The overall population growth rate declines gradually from 1.8 per cent in 2016 to 1.6 per cent in 2021.
(9) The growth rate of the population under fifteen years of age declines gradually from 1.8 per cent in 2016 to 1.6 per cent in 2021.
(10) The headcount poverty incidence declines gradually from 41 per cent in 2016 to 34.9 per cent in 2021.
Exports and imports of goods and non-factor services (11-17):
(11) The export volume grows at the same rate as the world trade volume.
(12) Export prices grow at the same rate as the world U.S.-dollar price level.
(13) The import volume grows at the same rate as real GDP.
(14) Import prices grow at the same rate as the world U.S.-dollar price level.
(15) Non-factor service exports grow at a rate equal to the combined growth rates of the world trade volume and the world US$ price level.
(16) Non-factor service imports excluding insurance and freight charges for merchandise imports grow at a rate equal to the combined growth rates of real GDP and the world US$ price level.
(17) Insurance and freight charges rise gradually from 6.8 per cent of the value of merchandise imports in 2016 to 7.5 per cent in 2021.
National-expenditure accounts (18-20):
(18) Consumption expenditure by government entities outside the central government remains at 5.1 per cent of GDP over the projection period.
(19) Gross fixed capital formation remains at 22.4 per cent of GDP over the projection period.
(20) The net increase in inventory stocks declines gradually from its estimated 2016 value of 0.6 per cent to a 2021 value of 0 per cent.
(C) Tax and non-tax revenue (21-32):
(21) The elasticity of personal income tax with respect to nominal GDP declines from 1.6 in 2016 to 1 in 2021.
(22) The elasticity of company-tax revenue with respect to nominal GDP declines from 1.6 in 2016 to 1 in 2021.
(23) The elasticity of other income-tax revenue with respect to nominal GDP declines from 1.5 in 2016 to 1 in 2021.

(25) The elasticity of customs revenue with respect to merchandise-imports value declines from 1.9 in 2016 to 1 in 2021.
(26) The elasticity of excise revenue with respect to merchandise-imports value declines from 1.9 in 2016 to 1 in 2021.
(27) The elasticity of export-duty revenue with respect to export value declines from 1.9 in 2016 to 1 in 2021.
(28) The internal value-added tax rate remains unchanged at 13 per cent.
(29) The internal value-added tax collection efficiency remains unchanged from its 2016 value.
(30) The import-based value-added tax rate remains at 13 per cent.
(31) The import-based value-added tax collection efficiency remains unchanged from its 2016 value.
(32) The elasticity of central-government non-tax revenue with respect to nominal GDP declines from 1.6 in 2016 to 1 in 2021.
(D) External grants to the government (33-34):
(33) External grants for current government expenditure remains at 0.5 per cent of GDP over the projection period.
(34) External grants for government capital expenditure (projects)remains at 1 per cent of GDP over the projection period.
(E) Government expenditure in the priority and non-priority categories (35-49):
(E.1) For non-interest recurrent expenditure:
(E.1.a) In the education sector,
(35) The staff size grows at the same rate as the number of children.
(36) Staff salaries grow at a rate equal to the growth rate of per-capita nominal GDP.
(37) Expenditure on current goods and services grows at a rate equal to the combined growth rates of the year-average CPI and the sectoral staff size.
(38) Expenditure on non-staff recurrent expenditure excluding current goods and services grows at a rate equal to the combined growth rates of the year-average CPI and the number of children.
(E.1.b) In the health sector,
(39) The staff size grows at the same rate as the population.
(40) Staff salaries grow at a rate equal to the growth rate of per-capita nominal GDP.
(41) Expenditure on current goods and services grows at a rate equal to the combined growth rates of the year-average CPI and the sectoral staff size.
(42) Expenditure on non-staff recurrent expenditure excluding current goods and services grows at a rate equal to the combined growth rates of the year-average CPI and the population growth rate.
(E.1.f) In the non-priority expenditure sectors,
(43) The staff size grows at the same rate as the population.
(44) Staff salaries grow at a rate equal to the growth rate of per-capita nominal GDP.
(45) Expenditure on current goods and services grows at a rate equal to the combined growth rates of the year-average CPI and the sectoral staff size.
(46) Expenditure on non-staff recurrent expenditure excluding current goods and services grows at a rate equal to the combined growth rates of the year-average CPI and the population growth rate.
(E.2) For non-recurrent expenditure, over the projection years,
(47) Education non-recurrent government expenditure increases gradually from a 2016 value of 0.5 per cent of GDP to a 2021 value of 2 per cent of GDP.
(48) Health non-recurrent government expenditure increases gradually from a 2016 value of 0.2 per cent of GDP to a 2021 value of 2 per cent of GDP.
(49) Non-priority non-recurrent government expenditure increases gradually from a 2016 value of 2.5 per cent of GDP to a 2021 value of 2 per cent of GDP.

(F) For external and internal debt (50-53):
(50) Average interest rates on the previous year's year-end external debt stock increase (decrease) with LIBOR.
(51) Average interest rates on the previous year's year-end internal debt stock decline gradually from 11.7 per cent in 2016 to 9.4 per cent in 2021.
(52) External-debt repayments in each projection year amount to 7 per cent of the preceding year's year-end external-debt stock; and
(53) External-debt disbursements in each projection year amount to 98.9 per cent of total non-recurrent expenditure.

4. Table 6 immediately following provides a listing of these assumptions, and Table 7 shows the base-scenario projection results.

Table 6 Republic of East Africa: Fiscal-space projection assumptions (2017-2021)

		REPUBLIC OF EAST AFRICA:				Average:	
		FISCAL PROJECTION EXERCISE: ASSUMPTIONS	Calendar Year:	2015	2016	2017-2021	2021
			Scenario: 0				
			Initial projection year: 2017				
PROGRAMMING ASSUMPTIONS:							
		(A) EXTERNAL'STATE-OF-THE-WORLD' VARIABLES:					
		Growth rates:					
(1)	*	World trade volume		2.8%	2.8%	4.7%	6.0%
(2)	**	World U.S.-dollar price level		1.8%	1.8%	1.9%	2.0%
		Interest rates:					
(3)		London Interbank Offer Rate (LIBOR)		0.5%	1.1%	1.3%	1.5%
*	*Source: IMF World Economic Report*						
**	*U.S. GDP deflator.*						
		(B) BASIC MACROECONOMIC VARIABLES:					
		Growth rates:					
		Gross domestic product (national currency - millions)		8.0%	7.5%	6.9%	6.6%
(4)		Gross domestic product at 2016 prices and exchange rate (US$ million)		5.5%	6.6%	6.6%	6.6%
(5)		GDP deflator		2.4%	0.8%	0.3%	0.0%
		Consumer prices (year-average)		0.8%	1.6%	0.3%	0.0%
(6)		Consumer prices (December)		2.3%	1.7%	1.9%	2.0%
		Exchange rate (year-average)		3.4%	2.3%	0.2%	0.0%
(7)		Exchange rate (December)		2.9%	2.4%	0.0%	0.0%
(8)		Population (millions)		1.8%	1.8%	1.7%	1.6%
(9)		Population under fifteen (millions)		2.0%	1.8%	1.7%	1.6%
		Population in poverty				-3.2%	-3.2%
(10)		Headcount poverty incidence		41.0%	41.0%	37.2%	34.9%
		Growth rates (US$ million):					
		Merchandise exports:				**6.7%**	**8.1%**
(11)		*Unit value*					
(12)		*Volume*					
		Merchandise imports:				**8.7%**	**8.8%**
(13)		*Unit value*					
(14)		*Volume*					
		Growth rates:					
(15)		Non-factor services receipts				6.7%	8.1%
(16)		Non-factor services payments, excluding merchandise-imports insurance and freight				8.7%	8.8%
		Ratios:					
(17)		Ratio, insurance and freight costs/merchandise imports value		6.8%	6.8%	7.2%	7.5%
		Incremental capital-output ratio		355.8%	336.6%	336.6%	336.6%
		Per cent of GDP:					
(18)		Consumption expenditure by governments excl. central government		5.2%	5.1%	5.1%	5.1%
(19)		Gross fixed capital formation		23.6%	22.4%	22.4%	22.4%
(20)		Net increase in inventory stocks		-0.1%	0.6%	0.3%	0.0%
		GENERAL-GOVERNMENT FINANCIAL ACCOUNTS:					
		Tax and non-tax revenue (excl. external grants) (+):					
		(C) TAX REVENUE:					
		Central government:					
		Elasticities of...					
(21)		personal income tax with respect to nominal GDP				1.2	1.0
(22)		company-tax revenue with respect to nominal GDP				1.2	1.0
(23)		other income-tax revenue with respect to nominal GDP				1.2	1.0
(24)		specific tax revenue with respect to nominal GDP				1.2	1.0
(25)		customs revenue with respect to merchandise-imports value				1.3	1.0
(26)		excise revenue with respect to merchandise-imports value				1.3	1.0
(27)		export-duty revenue with respect to export value				1.3	1.0
		internal value-added tax revenue with respect to nominal GDP				1.0	1.0
		value-added tax revenue from imports with respect to the value of merchandise imports				1.0	1.0
		Value-added tax:					
		Internal value-added tax:					
(28)		*Internal value-added tax rate*			13.0%	13.0%	13.0%
(29)		*Internal value-added tax collection efficiency*			21.2%	21.2%	21.2%
		Value-added tax revenue from imports:					
(30)		*External value-added tax rate*			13.0%	13.0%	13.0%
(31)		*External value-added tax collection efficiency*			61.7%	61.7%	61.7%
		NON-TAX REVENUE:					
		Elasticities of...					
(32)		central-government non-tax revenue with respect to nominal GDP				121.4%	100.0%

(continues)

Table 6 Republic of East Africa: Fiscal-space projection assumptions (2017-2021) (concluded)

	REPUBLIC OF EAST AFRICA:				Average:	
	FISCAL PROJECTION EXERCISE: ASSUMPTIONS	Calendar Year:	2015	2016	2017-2021	2021
		Scenario: 0				
		Initial projection year: 2017				
	PROGRAMMING ASSUMPTIONS:					
	(D) External grants (+):					
	Per cent of GDP:					
(33)	Central-government external grants for current expenditure		0.0%	0.0%	0.5%	0.5%
(34)	Central-government external grants for capital expenditure (projects)		0.0%	0.0%	1.0%	1.0%
	(E) CENTRAL-GOVERNMENT EXPENDITURE:					
	Growth rates:					
	Recurrent education expenditure:				**5.6%**	**5.4%**
(35)	Education staff				1.7%	1.6%
(36)	Education remuneration rates				5.2%	4.9%
	Non-staff recurrent education expenditure:				2.0%	1.6%
(37)	Recurrent education expenditure on goods and services				2.0%	1.6%
(38)	Other non-staff recurrent education expenditure				2.0%	1.6%
	Recurrent health expenditure:				**2.4%**	**2.1%**
(39)	Health staff				1.7%	1.6%
(40)	Health remuneration rates				5.2%	4.9%
	Non-staff recurrent health expenditure:				2.0%	1.6%
(41)	Recurrent health expenditure on goods and services				2.0%	1.6%
(42)	Other non-staff recurrent health expenditure				2.0%	1.6%
	Non-priority recurrent expenditure:				**3.6%**	**3.3%**
(43)	Non-priority staff				1.7%	1.6%
(44)	Remuneration rates in non-priority sectors				5.2%	4.9%
	Non-staff recurrent non-priority expenditure:				2.0%	1.6%
(45)	Recurrent non-priority expenditure on goods and services				2.0%	1.6%
(46)	Other non-staff recurrent non-priority expenditure				2.0%	1.6%
	Per cent of GDP:					
(47)	**Non-recurrent education expenditure:**		**0.8%**	**0.5%**	**1.4%**	**2.0%**
(48)	**Non-recurrent health expenditure:**		**0.2%**	**0.2%**	**1.3%**	**2.0%**
(49)	**Non-priority non-recurrent expenditure:**		**2.4%**	**2.5%**	**2.2%**	**2.0%**
	(F) EXTERNAL AND INTERNAL DEBT:					
	Average interest rates (applied to preceding year-end debt stock):					
(50)	Average interest rates on external debt		3.2%	3.8%	4.1%	4.3%
(51)	Average interest rates on internal debt		13.8%	11.7%	10.3%	9.4%
	Per cent of preceding year-end debt stock:					
(52)	External-debt repayments (-)				-7.0%	-7.0%
	Per cent of GDP:					
	External-debt disbursements (+):		7.2%	3.2%	2.2%	2.0%
(53)	External-debt disbursements/total non-recurrent expenditure		211.7%	98.9%	98.9%	98.9%
	External-debt repayments (-)		-7.2%	-3.1%	-1.9%	-1.7%
	Net internal-debt flow (+):		**1.6%**	**1.3%**	**-0.5%**	**-0.2%**

Source: Worksheet EAFS.xlsm/Assumptions.

Table 7 Republic of East Africa: Fiscal-space projections (per cent of GDP), 2017-2021

REPUBLIC OF EAST AFRICA:				Average:	
FISCAL PROJECTION EXERCISE: PROJECTIONS	Calendar Year:	2015	2016	2017-2021	2021
	Scenario: 0				
	Initial projection year: 2017				
GENERAL-GOVERNMENT FINANCIAL ACCOUNTS:	*National currency - millions:*				
(A) Total priority non-interest expenditure:		**553,460.8**	**591,276.8**	**948,797.3**	**1,225,125.5**
Total education expenditure		**362,954.1**	**399,595.5**	**596,430.8**	**746,136.7**
Total health expenditure		**190,506.8**	**191,681.3**	**352,366.5**	**478,988.7**
Priority recurrent expenditure:		**456,260.7**	**515,652.7**	**594,234.9**	**645,799.3**
Recurrent education expenditure:		**288,933.6**	**347,446.3**	**412,476.6**	**456,473.6**
Expenditure on education staff		201,695.0	249,033.0	307,472.8	348,067.4
Non-staff recurrent education expenditure:		87,238.6	98,413.3	105,003.8	108,406.3
Recurrent education expenditure on goods and services		21,160.0	21,971.2	23,442.5	24,202.1
Other non-staff recurrent education expenditure		66,078.6	76,442.2	81,561.3	84,204.1
Recurrent health expenditure:		**167,327.1**	**168,206.4**	**181,758.3**	**189,325.6**
Expenditure on health staff		82,429.3	13,640.8	16,841.8	19,065.4
Non-staff recurrent health expenditure:		84,897.8	154,565.6	164,916.5	170,260.3
Recurrent health expenditure on goods and services		34,088.4	21,486.2	22,925.1	23,667.9
Other non-staff recurrent health expenditure		50,809.4	133,079.4	141,991.4	146,592.4
Priority non-recurrent expenditure:		**97,200.1**	**75,624.1**	**354,562.4**	**579,326.2**
Non-recurrent education expenditure		**74,020.5**	**52,149.1**	**183,954.2**	**289,663.1**
Non-recurrent health expenditure		**23,179.6**	**23,474.9**	**170,608.2**	**289,663.1**
(B) Tax and non-tax revenue (excl. external grants) (+):	*National currency - millions:*	**1,393,745.7**	**1,536,781.8**	**1,982,986.1**	**2,272,487.1**
Tax revenue:		**1,306,984.7**	**1,430,817.8**	**1,843,743.0**	**2,113,078.9**
Income tax:		**436,252.1**	**491,397.6**	**644,152.0**	**737,308.1**
Personal income tax		122,508.2	138,744.8	181,917.4	208,234.4
Company tax		227,515.2	257,668.9	337,846.6	386,721.1
Other income tax		86,228.6	94,983.9	124,388.0	142,352.5
Value-added tax:		**448,498.1**	**483,249.4**	**611,018.4**	**702,412.9**
Value-added tax on internal transactions		265,022.6	285,557.5	352,568.4	399,116.9
Value-added tax on imports		183,475.5	197,691.8	258,449.9	303,296.0
Specific taxes					
Customs and excise duties:		**97,659.1**	**105,198.6**	**131,060.9**	**150,150.2**
Customs duties		78,118.7	84,149.7	110,012.1	129,101.3
Excises		19,540.3	21,048.9	21,048.9	21,048.9
Export duties		**44.4**	**47.8**	**68.6**	**82.3**
Other tax revenue		**6,282.2**	**6,968.0**	**8,603.2**	**9,739.1**
Non-tax revenue (excl. external grants) (+)		**86,761.0**	**105,964.0**	**139,243.1**	**159,408.3**
(C) External grants (+):	*National currency - millions:*	**5,489.4**	**3,216.0**	**191,910.1**	**217,247.3**
External grants for current expenditure		2,195.7	1,286.4	63,970.0	72,415.8
External grants for capital expenditure (projects)		3,293.6	1,929.6	127,940.1	144,831.5
(D) Total non-priority non-interest expenditure (-):	*National currency - millions:*	**-903,059.4**	**-959,790.8**	**-1,063,996.8**	**-1,126,108.2**
Non-priority recurrent expenditure:		**-670,813.2**	**-702,499.8**	**-785,001.8**	**-836,445.1**
Non-priority expenditure on staff		-196,390.7	-211,434.3	-261,050.9	-295,516.6
Non-staff recurrent non-priority expenditure:		-474,422.5	-491,065.5	-523,950.9	-540,928.5
Recurrent non-priority expenditure on goods and services		0.0	-133,535.8	-142,478.3	-147,095.0
Other non-staff recurrent non-priority expenditure		0.0	-357,529.7	-381,472.6	-393,833.5
Non-priority non-recurrent expenditure		**-232,246.2**	**-257,291.0**	**-278,995.0**	**-289,663.1**
(E) External-debt disbursements (+):	*National currency - millions:*	**697,356.5**	**329,134.1**	**275,826.4**	**286,373.3**
External-debt disbursements (+) (US$ millions):		*$1,512.3*	*$697.8*	*$578.0*	*$600.4*
(F) External debt service (-):	*National currency - millions:*	**-794,198.3**	**-450,356.7**	**-376,559.9**	**-391,065.1**
External interest expenditure (-)		-103,507.7	-129,872.0	-139,371.9	-148,560.8
External interest expenditure (-) (US$ million)		*-$224.5*	*-$275.4*	*-$292.0*	*-$311.5*
External debt repayments (-)		-690,690.6	-320,484.6	-237,188.0	-242,504.3
External debt repayments (-) (US$ millions)		*-$1,497.8*	*-$679.5*	*-$497.0*	*-$508.4*
(G) Net internal financial flows (incl. internal interest) (+):	*National currency - millions:*	**154,127.0**	**132,292.3**	**-61,368.6**	**-33,809.1**
Net internal-debt flow (+):		262,239.2	255,683.4	83,957.2	113,666.9
Internal interest expenditure (-)		-102,989.0	-118,500.4	-145,325.8	-147,476.0
Discrepancy (+)		-5,123.2	-4,890.6	#DIV/0!	0.0

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5. The projections in Table 7 show the evolution of the Republic of East Africa's fiscal accounts under the assumptions listed in Table 6. The top line of the projection (A) shows the evolution of priority expenditure, and the lines below show the evolution of the components of its fiscal space: tax and non-tax revenue (B), external grants (C), non-priority expenditure (-) (D), external-debt disbursements (E), external-debt service (-) (F), and the "fiscal gap" (G).

Table 7 Republic of East Africa: Fiscal-space projections (per cent of GDP), (concluded)

REPUBLIC OF EAST AFRICA:				Average:	
FISCAL PROJECTION EXERCISE: PROJECTIONS	Calendar Year:	2015	2016	2017-2021	2021
	Scenario: 0				
	Initial projection year: 2017				
Revenue and grants	*National currency - millions:*	**1,399,235.1**	**1,539,997.8**	**2,174,896.2**	**2,489,734.5**
Expenditure:		**-1,663,017.0**	**-1,799,440.0**	**-2,297,491.8**	**-2,647,270.5**
Recurrent expenditure:		**-1,333,570.7**	**-1,466,524.9**	**-1,663,934.4**	**-1,778,281.2**
Non-interest recurrent expenditure		-1,127,073.9	-1,218,152.5	-1,379,236.7	-1,482,244.3
Interest		-206,496.8	-248,372.5	-284,697.7	-296,036.8
Non-recurrent expenditure:		**-329,446.4**	**-332,915.0**	**-633,557.4**	**-868,989.3**
Discrepancy		**-5,123.2**	**-4,890.6**	**0.0**	**0.0**
Surplus (deficit):		**-268,905.2**	**-264,332.8**	**-122,595.6**	**-157,536.0**
Primary surplus (deficit)		-62,408.4	-15,960.4	162,102.1	138,500.8
Interest		-206,496.8	-248,372.5	-284,697.7	-296,036.8
Financing:		**268,905.2**	**264,332.8**	**122,595.6**	**157,536.0**
Net external financing		6,665.9	8,649.4	38,638.4	43,869.1
Net internal financing		262,239.2	255,683.4	83,957.2	113,666.9
	National currency - millions:				
External and internal debt:		**4,351,203.4**	**4,588,488.1**	**4,926,818.0**	**5,194,760.5**
Net debt:		**4,351,203.4**	**4,588,488.1**	**4,926,818.0**	**5,194,760.5**
External debt		**3,340,128.1**	**3,321,729.4**	**3,426,420.7**	**3,508,216.0**
External (US$ millions)		*$7,159.2*	*$6,950.5*	*$7,181.0*	*$7,355.3*
Internal:		**1,011,075.3**	**1,266,758.7**	**1,500,397.3**	**1,686,544.5**
Internal debt		1,011,075.3	1,266,758.7	1,500,397.3	1,686,544.5
Internal deposits (-)		0.0	0.0	0.0	0.0
MACROECONOMIC AGGREGATES:					
Gross domestic product (US$ million)		**$20,902.8**	**$21,970.8**	**$26,809.6**	**$30,365.3**
Gross domestic product at 2016 prices and exchange rate (US$ million)		**$20,601.7**	**$21,970.8**	**$26,758.8**	**$30,307.7**
Gross domestic product (national currency - millions)		**9,638,842.1**	**10,362,313.9**	**12,794,005.8**	**14,483,154.8**
GDP deflator		**99.2**	**100.0**	**101.4**	**101.3**
Consumer prices (year-average)		100.0	101.6	103.0	103.0
Consumer prices (December)		101.4	103.2	109.0	113.2
Exchange rate (year-average)		461.1	471.6	477.2	477.0
Exchange rate (December)		466.6	477.9	477.2	477.0
Population (millions)		21.6	22.0	23.1	23.9
Population under fifteen (millions)		10.1	10.3	10.9	11.2
Headcount poverty incidence		41.0%	41.0%	37.2%	34.9%
NET EXPORTS OF GOODS AND NON-FACTOR SERVICES (US$ MILLION):		**-$8,352.2**	**-$8,629.2**	**-$11,434.5**	**-$13,536.6**
EXPORTS OF GOODS AND NON-FACTOR SERVICES		**-$2,231.3**	**-$2,278.6**	**-$3,200.0**	**-$3,848.4**
Merchandise exports:		**$2,822.2**	**$2,947.3**	**$3,552.4**	**$4,079.7**
Non-factor services receipts		**$2,344.9**	**$2,582.3**	**$3,112.4**	**$3,574.4**
IMPORTS OF GOODS AND NON-FACTOR SERVICES		**-$6,120.9**	**-$6,350.5**	**-$8,234.5**	**-$9,688.2**
Merchandise imports:		-$5,053.5	-$5,225.9	-$6,752.3	-$7,928.1
Non-factor services payments:		**-$1,067.5**	**-$1,124.6**	**-$1,482.2**	**-$1,760.1**
Insurance and freight payments for merchandise imports		-$345.5	-$355.9	-$489.0	-$593.9
Other non-factor services payments		-$722.0	-$768.7	-$993.2	-$1,166.2
	National currency - millions:				
GROSS DOMESTIC PRODUCT (NATIONAL CURRENCY):		**9,638,842.1**	**10,362,313.9**	**12,794,005.8**	**14,483,154.8**
Total consumption:		**7,814,158.2**	**8,364,907.1**	**10,650,230.1**	**12,213,319.6**
Non-government consumption		6,765,021.0	7,222,529.2	9,265,852.3	10,662,696.8
Government consumption:		1,049,137.3	1,142,377.9	1,384,377.8	1,550,622.8
Central-government consumption		543,382.2	615,974.2	734,444.5	814,881.1
Consumption of other governments		505,755.1	526,403.7	649,933.2	735,741.7
Total investment:		**2,264,518.9**	**2,384,585.8**	**2,892,811.6**	**3,240,010.1**
Gross fixed capital formation		2,278,921.3	2,318,141.5	2,862,132.5	3,240,010.1
Net increase in inventory stocks		-14,402.4	66,444.3	30,679.1	0.0
Net exports of goods and non-factor services:		**-439,835.1**	**-387,179.0**	**-749,035.9**	**-970,175.0**
Exports of goods and non-factor services		2,382,688.9	2,607,997.3	3,180,554.3	3,650,735.2
Imports of goods and non-factor services (-)		-2,822,523.9	-2,995,176.3	-3,929,590.2	-4,620,910.2

Source: Worksheet EAFS.xlsm/Projections.

6. The net internal-debt flow as a percentage of GDP may be regarded as the "bottom-line" result. The average flow over the five years 2017-2021 would average 0.7 per cent of GDP, which policy-makers would probably regard as reasonable enough. It is interesting to note that the net flow excluding internal interest would be in surplus, at -0.5 per cent. (The large difference arises from the relatively high interest-rate assumption.) The government's debt stock would be diminishing as a percentage of GDP over the projection years, but relatively slowly: many observers would regard the projected 2021 debt-GDP ratio of 35.9 per cent as relatively high.

7. In any case, it is important to note that under the base-scenario assumptions given priority expenditure would grow rapidly. Table 8 shows its evolution in U.S. dollars per child at 2016 prices and exchange rate:

Table 8 Republic of East Africa: Fiscal-space projections (U.S. dollars per child at 2016 prices and exchange rate) (2017-2021)

REPUBLIC OF EAST AFRICA:				Average	
FISCAL PROJECTION EXERCISE RESULTS	Calendar Year:	2015	2016	2017-2021	2021
	Scenario 0				
	Initial projection year: 2017				
GENERAL-GOVERNMENT FINANCIAL ACCOUNTS:	US$ per child at prices and exchange rate of 2016				
(A) Total priority non-interest expenditure		118.3	123.2	184.5	231.7
Total education expenditure		77.6	83.2	116.1	141.1
Total health expenditure		40.7	39.9	68.5	90.6
Priority recurrent expenditure:		97.5	107.4	115.9	122.1
Recurrent education expenditure:		61.8	72.4	80.4	86.3
Expenditure on education staff		43.1	51.9	59.9	65.8
Non-staff recurrent education expenditure:		18.6	20.5	20.5	20.5
Recurrent education expenditure on goods and services		4.5	4.6	4.6	4.6
Other non-staff recurrent education expenditure		14.1	15.9	15.9	15.9
Recurrent health expenditure:		35.8	35.0	35.5	35.8
Expenditure on health staff		17.6	2.8	3.3	3.6
Non-staff recurrent health expenditure:		18.1	32.2	32.2	32.2
Recurrent health expenditure on goods and services		7.3	4.5	4.5	4.5
Other non-staff recurrent health expenditure		10.9	27.7	27.7	27.7
Priority non-recurrent expenditure:		20.8	15.8	68.6	109.6
Non-recurrent education expenditure:		15.8	10.9	35.6	54.8
Non-recurrent health expenditure:		5.0	4.9	33.0	54.8
(B) Tax and non-tax revenue (excl. external grants) (+):	US$ per child at prices and exchange rate of 2016	297.9	320.2	386.5	429.8
Tax revenue:		279.4	298.1	359.3	399.6
Income tax:		93.3	102.4	125.5	139.4
Personal income tax		26.2	28.9	35.5	39.4
Company tax		48.6	53.7	65.8	73.1
Other income tax		18.4	19.8	24.2	26.9
Value-added tax:		95.9	100.7	119.1	132.8
Value-added tax on internal transactions		56.7	59.5	68.7	75.5
Value-added tax on imports		39.2	41.2	50.4	57.4
Specific taxes					
Customs and excise duties:		20.9	21.9	25.5	28.4
Customs duties		16.7	17.5	21.4	24.4
Excises		4.2	4.4	4.1	4.0
Export duties		0.0	0.0	0.0	0.0
Other tax revenue		1.3	1.5	1.7	1.8
Non-tax revenue (excl. external grants) (+)		18.5	22.1	27.1	30.1
(C) External grants (+):	US$ per child at prices and exchange rate of 2016	1.2	0.7	37.4	41.1
External grants for current expenditure:		0.5	0.3	12.5	13.7
External grants for capital expenditure (projects):		0.7	0.4	24.9	27.4
(D) Total non-priority non-interest expenditure (-):	US$ per child at prices and exchange rate of 2016	-193.1	-200.0	-207.7	-213.0
Non-priority recurrent expenditure:		-143.4	-146.4	-153.2	-158.2
Non-priority expenditure on staff		-42.0	-44.0	-50.9	-55.9
Non-staff recurrent non-priority expenditure:		-101.4	-102.3	-102.3	-102.3
Recurrent non-priority expenditure on goods and services		0.0	-27.8	-27.8	-27.8
Other non-staff recurrent non-priority expenditure		0.0	-74.5	-74.5	-74.5
Non-priority non-recurrent expenditure		-49.6	-53.6	-54.5	-54.8
(E) External-debt disbursements (+):	US$ per child at prices and exchange rate of 2016	149.1	68.6	53.8	54.2
External-debt disbursements (+) (US$ millions):		*$1,512.3*	*$697.8*	*$578.0*	*$600.4*
(F) External debt service (-):	US$ per child at prices and exchange rate of 2016	-169.8	-93.8	-73.5	-74.0
External interest expenditure (-)		-22.1	-27.1	-27.2	-28.1
External interest expenditure (-) (US$ million)		*-$224.5*	*-$275.4*	*-$292.0*	*-$311.5*
External debt repayments (-)		-147.7	-66.8	-46.3	-45.9
External debt repayments (-) (US$ million)		*-$1,497.8*	*-$679.5*	*-$497.0*	*-$508.4*
(G) Net internal financial flows (incl. internal interest) (+):	US$ per child at prices and exchange rate of 2016	32.9	27.6	-12.0	-6.4
Net internal-debt flow (+):		56.1	53.3	16.3	21.5
Internal interest expenditure (-)		-22.0	-24.7	-28.4	-27.9
Discrepancy (+)		-1.1	-1.0	0.0	0.0

(continues)

Table 8 Republic of East Africa: Fiscal-space projections (U.S. dollars per child at 2016 prices and exchange rate) (2017-2021) (concluded)

REPUBLIC OF EAST AFRICA:				Average	
FISCAL PROJECTION EXERCISE RESULTS	*Calendar Year:*	2015	2016	2017-2021	2021
	Scenario	*0*			
	Initial projection year:	*2017*			
Revenue and grants	***US$ per child at prices and exchange rate of 2016***	**299.1**	**320.8**	**423.9**	**470.9**
Expenditure:		**-355.5**	**-374.9**	**-447.8**	**-500.7**
Recurrent expenditure:		**-285.1**	**-305.5**	**-324.7**	**-336.3**
Non-interest recurrent expenditure		-240.9	-253.8	-269.1	-280.3
Interest		-44.1	-51.7	-55.6	-56.0
Non-recurrent expenditure:		**-70.4**	**-69.4**	**-123.1**	**-164.3**
Discrepancy		**-1.1**	**-1.0**	**0.0**	**0.0**
Surplus (deficit):		**-57.5**	**-55.1**	**-23.9**	**-29.8**
Primary surplus (deficit)		-13.3	-3.3	31.7	26.2
Interest		-44.1	-51.7	-55.6	-56.0
Financing:		**57.5**	**55.1**	**23.9**	**29.8**
Net external financing		1.4	1.8	7.5	8.3
Net internal financing		56.1	53.3	16.3	21.5
External and internal debt	***US$ per child at prices and exchange rate of 2016***	**930.2**	**979.2**	**1,012.5**	**1,033.1**
Net debt:		**930.2**	**979.2**	**1,012.5**	**1,033.1**
External debt		**714.0**	**708.9**	**704.5**	**697.7**
External (US$ millions)		*$7,159.2*	*$6,950.5*	*$7,181.0*	*$7,355.3*
Internal:		**216.1**	**270.3**	**308.0**	**335.4**
Internal debt		216.1	270.3	308.0	335.4
Internal deposits (-)		0.0	0.0	0.0	0.0
MACROECONOMIC AGGREGATES:					
Gross domestic product (US$ million)		**$20,902.8**	**$21,970.8**	**$26,809.6**	**$30,365.3**
Gross domestic product at 2016 prices and exchange rate (US$ million)		**$20,601.7**	**$21,970.8**	**$26,758.8**	**$30,307.7**
Gross domestic product (national currency - millions)		**9,638,842.1**	**10,362,313.9**	**12,794,005.8**	**14,483,154.8**
GDP deflator		**99.2**	**100.0**	**101.4**	**101.3**
Consumer prices (year-average)		100.0	101.6	103.0	103.0
Consumer prices (December)		101.4	103.2	109.0	113.2
Exchange rate (year-average)		461.1	471.6	477.2	477.0
Exchange rate (December)		466.6	477.9	477.2	477.0
Population (millions)		21.6	22.0	23.1	23.9
Population under fifteen (millions)		10.1	10.3	10.9	11.2
Headcount poverty incidence		41.0%	41.0%	37.2%	34.9%
NET EXPORTS OF GOODS AND NON-FACTOR SERVICES (US$ MILLION):		**-$8,352.2**	**-$8,629.2**	**-$11,434.5**	**-$13,536.6**
EXPORTS OF GOODS AND NON-FACTOR SERVICES		**-$2,231.3**	**-$2,278.6**	**-$3,200.0**	**-$3,848.4**
Merchandise exports:		**$2,822.2**	**$2,947.3**	**$3,552.4**	**$4,079.7**
Non-factor services receipts		**$2,344.9**	**$2,582.3**	**$3,112.4**	**$3,574.4**
IMPORTS OF GOODS AND NON-FACTOR SERVICES		**-$6,120.9**	**-$6,350.5**	**-$8,234.5**	**-$9,688.2**
Merchandise imports:		-$5,053.5	-$5,225.9	-$6,752.3	-$7,928.1
Non-factor services payments:		**-$1,067.5**	**-$1,124.6**	**-$1,482.2**	**-$1,760.1**
Insurance and freight payments for merchandise imports		-$345.5	-$355.9	-$489.0	-$593.9
Other non-factor services payments		-$722.0	-$768.7	-$993.2	-$1,166.2
	US$ per child at prices and exchange rate of 2016:				
GROSS DOMESTIC PRODUCT (NATIONAL CURRENCY):		**2,060,545.9**	**2,158,758.0**	**2,494,210.7**	**2,739,113.0**
Total consumption:		**1,670,473.6**	**1,742,642.7**	**2,075,758.8**	**2,309,832.5**
Non-government consumption		1,446,194.0	1,504,653.6	1,805,822.4	2,016,572.4
Government consumption:		224,279.6	237,989.1	269,936.4	293,260.1
Central-government consumption		116,161.7	128,324.5	143,231.0	154,113.6
Consumption of other governments		108,117.9	109,664.5	126,705.5	139,146.5
Total investment:		**484,098.1**	**496,775.5**	**564,060.8**	**612,763.9**
Gross fixed capital formation		487,177.0	482,933.3	557,977.0	612,763.9
Net increase in inventory stocks		-3,078.9	13,842.2	6,083.7	0.0
Net exports of goods and non-factor services:		**-94,025.8**	**-80,660.2**	**-145,608.9**	**-183,483.4**
Exports of goods and non-factor services		509,359.9	543,318.3	619,970.1	690,441.8
Imports of goods and non-factor services (-)		-603,385.8	-623,978.5	-765,579.0	-873,925.3
Per-capita non-government consumption at 2016 prices and exchange rate		**$669.9**	**$697.0**	**$836.5**	**$934.1**
Growth rate		***2.2%***	***4.0%***	***6.0%***	***5.7%***

Source: Worksheet EAFS.xlsm/Results.

In terms of this "unit of account," priority expenditure would grow rapidly over the projection period.

8. The projection exercise can be straightforwardly used to try out alternative scenarios, to compare with the base scenario and with one another. For example, a simple alternative scenario could program an increase in the collection efficiency of the value-added-tax. This would be accomplished through improved tax administration and adjustment of exemptions. (It is important to remember that improved tax administration may require some additional personnel in the relevant revenue authorities.).

9. In the base scenario, the collection efficiency of the value-added tax would remain unchanged. In the alternative Scenario 1, the sole change from the base scenario is that the collection efficiency of the domestic and import value-added tax would be assumed to rise gradually, so it reaches a value 20 per cent higher in 2021 than it was in 2016 (assumptions lines 29 and 31). As a consequence, the average 2017-2021 *overall* tax-revenue flow would be 15.1 per cent of GDP, compared with 14.4 per cent of GDP in the base scenario. The average 2017-2021 net internal debt flow would be -0.1 per cent of GDP, compared with 0.7 per cent of GDP in the base scenario, and the total (external and internal) government debt stock would conclude 2020 at 32.3 per cent of GDP, compared with 35.9 per cent in the base scenario. That is, the assumed improvement in the value-added tax collection efficiency would reduce the fiscal-space gap to this extent.

10. The alternative Scenario 2 reverts to the Scenario 0 assumption that the value-added-tax collection efficiency remains unchanging. It assumes, however, that the education and health staff sizes grow each year at growth rates equal to 3 times their base-scenario growth rates. With no other changes in the assumptions, this increases the fiscal-space gap. In Scenario 2, the average 2017-2021 net internal debt flow would be 1.0 per cent of GDP (compared with 0.7 per cent of GDP in the base scenario), and the total (external and internal) government debt stock would conclude 2021 at 37.5 per cent of GDP (compared with 35.9 per cent in the base scenario). In Scenario 2 per-child real priority expenditure at the 2015 prices and exchange rate would be US$190.10, 4.3 per cent higher than the US$182.30 in the base scenario.

11. The alternative Scenario 3 combines the changes of Scenarios 1 and 2, so that the enhanced revenue flow of Scenario 1 pays for the increase in the priority expenditure flow of Scenario 2. With the specific figures of the programming assumptions, the average 2017-2021 net internal debt flow would be 0.2 per cent of GDP (compared with 0.7 per cent of GDP in the base scenario), and the total (external and internal) government debt stock would conclude 2021 at 33.9 per cent of GDP (compared with 35.9 per cent in the base scenario). This would be an instance in which the fiscal space would be enhanced, and leave enough to reduce the government deficit.

Finally, the alternative Scenario 4 reverts to the Scenario 0 assumptions, but then makes a single change: the real-GDP growth rate rises from 6.6 per cent in 2016 to 7 per cent in 2021, rather than remaining unchanged at 6.6 per cent in the base scenario. With this assumption, the average 2017-2021 net internal debt flow would be 0.6 per cent of GDP (compared with 0.7 per cent of GDP *of a smaller GDP* in the base scenario), and the total (external and internal) government debt stock would conclude 2021 at 35,3 per cent of GDP (compared with 35.9 per cent *of a smaller GDP* in the base scenario). Per-child real priority expenditure at 2016 prices and exchange rate would be US$183.10, 4.2 per cent higher than the US$182.30 in the base scenario. (The reason the Scenario 4 priority-expenditure figure is higher in Scenario 4 than in the base scenario is that non-recurrent priority expenditure is assumed to depend on real GDP, which is higher in Scenario 4 than in the base scenario.).

Table 9 summarizes the sensitivity-analysis assumptions and results.

Table 9 Republic of East Africa: Sensitivity analysis for the fiscal-space projection exercise

Scenario:	0	1	2	3	4
Programming assumptions:					
Real GDP growth, 2017-2021	Remains unchanged at 6.6 per cent.	Remains unchanged at 6.6 per cent.	Remains unchanged at 6.6 per cent.	Remains unchanged at 6.6 per cent.	Rises gradually from 6.6 per cent in 2016 to 7 per cent in 2021.
Domestic VAT collection efficiency, 2017-2021	Remains unchanged at 21.2 per cent.	Rises gradually from 21.2 per cent in 2016 to 25.4 per cent in 2021.	Remains unchanged at 21.2 per cent.	Rises gradually from 21.2 per cent in 2016 to 25.4 per cent in 2021.	Remains unchanged at 21.2 per cent.
Import VAT collection efficiency, 2017-2021	Remains unchanged at 61.7 per cent.	Rises gradually from 61.7 per cent in 2016 to 74 per cent in 2021.	Remains unchanged at 61.7 per cent.	Rises gradually from 61.7 per cent in 2016 to 74 per cent in 2021.	Remains unchanged at 61.7 per cent.
Growth rate of education expenditure/growth rate of child population, 2017-2021	Remains unchanged at 1 over the projection period.	Remains unchanged at 1 over the projection period.	Remains unchanged at 3 over the projection period.	Remains unchanged at 3 over the projection period.	Remains unchanged at 1 over the projection period.
Growth rate of health expenditure/growth rate of overall population, 2017-2021	Remains unchanged at 1 over the projection period.	Remains unchanged at 1 over the projection period.	Remains unchanged at 3 over the projection period.	Remains unchanged at 3 over the projection period.	Remains unchanged at 1 over the projection period.
Results:					
Average tax revenue/GDP, 2017-2021	14.4%	15.1%	14.4%	15.1%	14.4%

Scenario:	0	1	2	3	4
Programming assumptions:					
Average priority expenditure/GDP, 2017-2021	7.3%	7.3%	7.7%	7.7%	7.3%
Average priority expenditure per child (U.S. dollars at 2016 prices and exchange rate), 2017-2021	$182.3	$182.3	$190.1	$190.1	$183.1
Net internal debt flow/GDP, 2017-2021	0.7%	-0.1%	1.0%	0.2%	0.6%
Total government debt/GDP, 2021	35.9%	32.3%	37.5%	33.9%	35.3%

Appendix II: Some Excel techniques used in the Workbook

12. **"Logical" functions:** The EAFS.xlsm workbook makes use of Excel's "logical," or "Boolean," functions. In Excel, these include the "IF," "OR," "AND," and "NOT" functions. (Spreadsheet programs other than Excel have the same or similar functions.).

13. The function **IF(*relational*, *a*, *b*)** returns the value "a" if the "relational" expression is true and "b" if false. (Examples of "relational" expressions are "1=2" or "5<B6.").

14. The function **AND(*relational1*, *relational2*, *relational3*…)** returns the value "one" if *all* the relational arguments are true and "zero" if *any* are untrue, while the function **OR(*relational1*, *relational2*, *relational3*…)** returns the value "one" if *any* of the relational arguments are true and "zero" if *all* are untrue.

15. The **NOT(*relational*)** function returns the value "one" if the relational is not true and "zero" if it is true. (Refer to an Excel User Guide or the help menu tab on a worksheet screen.).

16. A simple example of the use of the "IF" function would be the following. Suppose that the economy is projected to consume "c" barrels of oil and produce "p" barrels during a given year. Suppose that if "p" exceeds "c" the economy would export the difference, while if "c" exceeds "p" the economy would import the difference. The volume exported could be set using the function:

+IF (p>c, p-c, 0)

and the volume imported could be set using the function

+IF (p<c, c-p, 0).

17. The ***CHOOSE(a, b_1, b_2, b_3…)*** function is also especially useful in the EAFS.xlsm workbook. It returns the value b_i if "a" is equal to "i". For example, suppose the cells J3:M3 contain the years 1995, 1996, 1997 and 1998. Suppose the function +CHOOSE(J3-(J3-1), 45,50,55,60) is placed in all of the cells J4:M4 directly below J3:M3. This function would return 45 in J4 under 1995, 50 in K4 for1996, 55 in L4 for 1997, and 60 in M4 for 1998.

18. One obvious application of this function is to set "scenarios" for sensitivity analysis. Suppose an analyst wishes to determine the consequences of a 10-per-cent exchange-rate depreciation in a future year. Suppose that the cell A1 is set as the "scenario" cell. Suppose that the exchange rate would be 10 per dollar if there were no depreciation and 11 per dollar if there were. The cell for the exchange rate setting in the future year could then contain the function:

+CHOOSE (A1, 10, 11).

19. By setting A1 alternatively equal to 1 and 2 and comparing the projection results, the analyst could determine the implications of the more depreciated exchange rate.

20. Another use of the CHOOSE function is to have titles change with changing scenarios, choices of units, or even language. Thus, for example,

+CHOOSE (a, “Base scenario”, “High scenario”, “Low scenario”)

sets the scenario title according to whether the scenario setting “a” (which may be the content of a cell) equals 1, 2, or 3.

+CHOOSE (a, “English”,”castellano”,“français”)

sets the language according to whether “a” equals 1, 2, or 3.

21. **The “goal-seek” feature:** “Goal seek” is an Excel feature that is often useful for work involving exercises like EAFS.xlsm. In a simple example, suppose cell A1 is set through a formula involving a growth rate “g” in cell A2, but independent information shows that cell A1 should take on the specified numerical value “v”. By placing the cursor on cell A1, selecting the “goal-seek” feature from the Excel “Tools” menu, and following the prompts, the user activates an iterative procedure that determines the value of “g” that sets A1 to “v.”.

22. This is a simple example, of course, which would not really require the technique, since “g” could simply set as $(v/v_{-1})-1$. The technique is appropriate for what would otherwise be excessively complicated calculations, or indeed for estimations that would otherwise be possible only through trial and error. The technique could be used, for example, to determine the exchange rate that would set a given projection year’s current-account deficit to some specified value.

23. **“Formula auditing:** The auditing feature (under “tools”) can be helpful for navigating through a workbook as well as for debugging. By placing the cursor on any cell, the auditor can be used to show the cells that include the cell in question as part of a formula.

24. **Hiding cells from view:** It is often useful to hide cells from view for printing and to make it easier to navigate around a worksheet. There are two basic ways to do this. The first is to use the “hide” procedure under “Format,” which can be used to remove cells, rows, and columns from view. It is also possible to keep a row or column visible but have its contents invisible, by choosing the choosing the white font colour for the cell.

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