TECHNICAL ASSISTANCE REPORT

COLOMBIA

Scoping Mission to Develop Macroeconomic Forecasting Capacity at the Autonomous Committee for the Fiscal Rule (CARF)

APRIL 2024

Prepared By

José Federico Geli Manzano
Juan Sebastián Corrales

Authoring Department:

Institute for Capacity Development

DISCLAIMER

The contents of this document constitute technical advice provided by the staff of the International Monetary Fund to the authorities of Colombia (the "CD recipient") in response to their request for technical assistance. Unless the CD recipient specifically objects to such disclosure, this document (in whole or in part) or summaries thereof may be disclosed by the IMF to the IMF Executive Director for Colombia, to other IMF Executive Directors and members of their staff, as well as to other agencies or instrumentalities of the CD recipient, and upon their request, to World Bank staff, and other technical assistance providers and donors with legitimate interest (see Staff Operational Guidance on the Dissemination of Capacity Development Information). Publication or Disclosure of this report (in whole or in part) to parties outside the IMF other than agencies or instrumentalities of the CD recipient, World Bank staff, other technical assistance providers and donors with legitimate interest shall require the explicit consent of the CD recipient and the IMF's ICD.

The analysis and policy considerations expressed in this publication are those of the IMF staff and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

International Monetary Fund, IMF Publications
P.O. Box 92780, Washington, DC 20090, U.S.A.
T. +(1) 202.623.7430 • F. +(1) 202.623.7201
publications@IMF.org
IMF.org/pubs

Table of Contents

Acronyms and Abbreviations

CARF..... Autonomous Committee for the Fiscal Rule

CB ..... Central Bank

CAEM.. ... Comprehensive Adaptive Expectations Model

DGMP..... Directorate General for Macroeconomic Policy

DGPDT... Directorate General for Public Debt and Treasury Operations

DIAN..... National Department of Taxes and Customs

FAD……..Fiscal Affairs Department

FP..... Financial Plan

ICD…… .. Institute for Capacity Development

ICDMF .... ICD's General Macro and Fiscal Division

ICDMM ... ICD's Macro-Modelling and Monetary Division

MoF ..... Ministry of Finance

MFPT..... Macro-Fiscal Projections Tool

MPT..... Macroeconomic Projections Tool

MTFF..... Medium-Term Fiscal Framework

MTEF..... Medium-Term Expenditure Framework

NPB..... National Public Budget

NPD..... National Planning Department

NSD..... National Statistics Department

Preface

During June 27-30, a technical assistance (TA) mission from the Institute for Capacity Development (ICD) finalized a diagnosis of the macroeconomic forecasting and policy analysis functions of the Autonomous Committee for the Fiscal Rule (CARF). The ICD team, composed by José Federico Geli Manzano (head of mission) and Juan Sebastián Corrales, visited Bogotá, Colombia, during June 27-28, 2023, and held virtual engagements during June 29-30. This assessment marked the culmination of extensive scoping efforts initiated in April 2023, starting with a meeting between Juan Pablo Córdoba, CARF's president, and the staff from ICD and FAD. During the pre-scoping phase, the ICD team conducted multiple virtual meetings with CARF staff and gained access to the documentation and files associated with CARF's analytical tools. Additionally, the ICD team had the opportunity to review CARF's institutional framework and mandate, as well as study the responses to a written questionnaire.

The mission met CARF´s president, and held in-person engagements with Andres Velasco, technical director of CARF, and his team. The mission also held meetings with the Directorate General for Macroeconomic Policy (DGMP) from the Ministry of Finance (MoF). The DGMP is the main counterpart of CARF's technical staff and is responsible for the production of the Medium-Term Fiscal and Budgetary Frameworks (MTFF and MTBF), draft Budget Law and Financial Plan. During the meetings with the Deputy Director for Fiscal Policy, Sammy Libos, the mission discussed current practices in terms of interchange of information and work collaboration between CARF technical staff and the DGMP. The meeting also clarified certain details about DGMP's tools for macroeconomic forecasting and policy analysis.

Likewise, the mission had the opportunity to meet with Chief Officer for Monetary Policy and Economic Information from the Colombian Central Bank (CB), Juan Jose Ospina, and the technical staff in charge of fiscal policy analysis led by Jesus Bejarano (former Deputy Minister of Finance). CARF's analysis for fiscal policy sustainability is increasingly becoming an important and complementary input for the CB. Finally, the mission held a short conversation with the Congresswoman Katherine Miranda, president of the House of Representatives' Economic Commission. The discussion helped to understand the nature of the increasing analytical demands CARF is facing from congresspeople, who are relying increasingly on CARF's analysis.

Overall, the information gathered during the scoping process helped to understand in depth (i) CARF's functions and processes regarding the assessment of MoF's macroeconomic and fiscal forecasts, (ii) the tools, data, and staff resources involved in these activities, and (iii) the interactions with other institutions and agencies participating in the design of macroeconomic policies in Colombia. The information gathered served to identify areas of potential strengthening and agree with the authorities an Action Plan (AP), including a tentative delivery schedule, to support CARF in the development of a macroeconomic framework to independently assess MoF's macro-fiscal forecast and enhance its forecast and policy analysis systems.

The mission would like to thank Andrés Velasco, our main counterpart in the CARF, for the excellent help provided during the preparation of the mission and his magnificent welcome and availability. Likewise, our appreciation to Ceyda Oner, IMF Mission Chief for Colombia, and colleagues from FAD and ICDMM, for their support and valuable suggestions during the preparation of the mission and the preliminary design of the project. Our final gratitude to Ms. Silvana Pighi (ICDMF), who provided excellent administrative support before, during and after the mission.

Executive Summary

The technical assistance project seeks to improve the macroeconomic and fiscal projections and policy analysis tools and processes at the Autonomous Committee for the Fiscal Rule (CARF). The objective is to support CARF to develop a macroeconomic projections tool (MFPT), integrate its current satellite fiscal forecast tools, institutionalize the use of the MFPT in a sustainable fashion and develop a methodology to independently assess macro-fiscal forecast prepared by the Ministry of Finance (MoF).

A diagnostic mission to Bogota between June 27 and June 28, 2023, and virtually during June 29 and June 30, 2023, consulted the authorities and assessed CARF's technical capacities, human resources, and analytical instruments. This assessment marked the culmination of a series of scoping efforts that began in April 2023, initiated with a meeting between CARF's president and the staff from ICD and FAD. The mission found that (i) although CARF's technical staff have strong, though heterogenous, analytical skills, they will benefit from reinforcement in financial programming and semi-structural models, (ii) with limited resources, CARF's technical staff have focused its efforts in developing tools to produce estimates of potential output, revenue elasticities, and fiscal projections, (iii) while statistical information is available, there are limitations in terms of software to process it and produce analysis and (iv) CARF lacks a macro-fiscal framework ensuring accounting and economic consistency and integrating satellite fiscal tools.

Therefore, the mission recommends the development of a new semi-structural macroeconomic model, integrated into a sectoral consistency framework, aimed at producing a complete set of macroeconomic projections with a 10-year horizon. The project will focus on technical assistance activities supporting the development and calibration of a sector-based macroeconomic consistency framework in Excel with the semi-structural model as its primary engine. Other CARF's satellite models, such as potential output estimation models, will be integrated to this projections tool. Forecasts will be generated for different scenarios, the model's dynamic properties studied, and economic policy simulations will be done. Additional tasks would imply (i) structuring projection processes according to best practice (including the definition of a forecast production calendar (FPC) and distribution of responsibilities), (ii) building an easily updatable macro-fiscal database, (iii) documenting institutional processes and tools and (iv) defining and implementing a methodology to assess the realism of MoF macroeconomic scenario and fiscal projections, including the draft of a report and graphical outputs.

The Action Plan, included in this report with the details for the project, is indicatively structured around a calendar of weekly activities for the remaining of 2023 and up to 2025 and four planned in-person weekly missions. During the first year of activities, the CARF team will aim to develop the basic semi-structural model under the guidance of ICD-MF, using as a starting point the Comprehensive Adaptive Expectations Model (CAEM) template. The team should be able to produce a baseline forecast and conduct risk scenario analysis. During the second year the CARF team will pursue a further customization of the MFPT (especially the fiscal sector), integrate the framework with CARF existing suite of models and develop a methodology to assess the realism of MoF macro-fiscal projections.

Finally, the diagnosis identified four major risks to the project: i) the reliance on continuous weekly virtual sessions of 1.5 hs each, high staff turnover, a large gap between CARF and the MoF analytical capacity and restrictions to CARF's analytical independence. Nevertheless, a series of mitigation actions and factors are also included to limit or mitigate these risks should they materialize.

I. Introduction

1. After the 2020 pandemic shock, the Colombian economy rapidly recovered. GDP grew by 11 percent in 2021 and 7.5 percent in 2022 supported by favorable terms of trade and remaining effects of policy measures implemented to mitigate the negative impact derived from Covid-19. According to the April 2023 WEO, economic growth for 2023 is forecasted to be around 1 percent, a deceleration mainly explained by a moderation in domestic demand growth in line with monetary and fiscal policy tightening. The Monetary Policy Rate reached 13.25 percent last April, an increase of 1,150 basis points since September 2021 when the tightening cycle began. While inflation has eased in the initial months of 2023, declining from its peak of 13.34 percent in March to 12.36 percent in May, it remains significantly above the 3 percent target. On the other hand, the Central Government (CG) deficit as percent of GDP is expected to decline this year by 1 percentage point with respect to 2022, according to the 2023 Medium-Term Fiscal Framework (MTFF), which will contribute reduce public debt to GDP ratio by about 1.6 percentage points and reach 59,5 percent.

2. TA provided by the IMF has contributed to build strong policy frameworks to design, implement, and monitor macroeconomic policies in Colombia. For example, ICD has provided TA to the Central Bank (CB) to develop a DSGE model for fiscal policy analysis purposes. Likewise, the Ministry of Finance (MoF) is consolidating a forecasting system with ICD support. Moreover, the support from the Fiscal Affairs Department (FAD) has been fundamental to the successful implementation of the reform to the fiscal rule and the evolution of the fiscal council into what is now the CARF. Moving forward, consolidating a robust macroeconomic forecasting framework at CARF will help strengthen the dialogue between macroeconomic policy agencies. This would contribute to a better analysis of macroeconomic risks and to improving policy design and implementation.

3. The MoF and the CB requested technical assistance to improve the macroeconomic forecasting instruments at CARF. In response to this TA request, ICD staff held two virtual pre-scoping meetings with CARF authorities, Mr. Juan Pablo Córdoba (president) and Mr. Andrés Mauricio Velasco Martinez (technical director), on April 17, 2023. Three additional meetings with CARF´s technical director and a set of detailed responses to a questionnaire sent by ICD, provided valuable information to understand CARF's legal remit, current capacity, needs and resources. It was agreed that the purpose of the scoping mission in June 2023 was to assess the current macroeconomic forecasting process and tools used by CARF, as well as data management, human resources, skills, capacity, organization, and policy analysis systems, and their contribution to policy decisions. Based on the findings ICD will propose an Action Plan to develop a TA project on macroeconomic forecasting tools.

II. Responsibilities, Instruments and Forecasting Capacities of CARF

A. Responsibilities, Outputs and Resources

4. The Ministry of Finance and the Central Bank of Colombia requested technical assistance to improve the macroeconomic forecasting instruments at CARF. In response to this TA request, ICD staff held two virtual pre-scoping meetings with CARF authorities, Mr. Juan Pablo Córdoba (president) and Mr. Andrés Mauricio Velasco Martinez (technical director), on April 17, 2023. Three additional meetings with CARF´s technical director and a set of detailed responses to a questionnaire sent by ICD, provided valuable information to understand CARF's legal remit, current capacity, needs and resources. It was agreed that the purpose of the scoping mission in June 2023 was to assess the current macroeconomic forecasting process and tools used by CARF, as well as data management, human resources, skills, capacity, organization, and policy analysis systems, and their contribution to policy decisions. Based on the findings ICD will propose an Action Plan to develop a TA project on macroeconomic forecasting tools.

5. The Autonomous Committee for the Fiscal Rule (CARF) was established in 2021.[1] The CARF serves as a permanent, independent technical body, affiliated with the MoF. Its main objective is to oversee the implementation of the fiscal rule and promote the long-term sustainability of public finances through non-binding recommendations. The board is composed by five experts in the field of public finance, who are not public servants, and by two of the presidents of the economic affairs commissions of the National Congress. The five expert members are appointed by the Minister of Finance and Public Credit to serve for a period of four years.[2] Board members work on a part-time basis, and they appoint a technical director and a group of analysts who work full-time. CARF technical staff provide all the analytical inputs and draft the reports which inform the meetings and final reports of CARF board member meetings.

6. Part of CARF's legal mandate is to provide an independent assessment of the MoF compliance with the Fiscal Rule and macro-fiscal projections. As established by law, and directly related to the purpose of this TA project, CARF analyzes the MoF short-and medium-term macroeconomic projections, particularly GDP growth, inflation, and external balance, and discusses their implications for fiscal perspectives (tax revenue, expenditure, public debt). This analysis occurs at least three times during the year, when the MoF presents the Medium-Term Fiscal Framework (mid-June) and the two updates of the financial plan (usually February and December).

[1] Through the enactment of Article 61 of Law 2155 of 2021 (Social Investment Law) which amended Article 14 of Law 1473 of 2011.

[2] Two CARF members were initially appointed only for two years, to rule out the possibility that one government could select a majority of members.

7. However, CARF remit is much wider, and its role is key in the design, implementation, and assessment of fiscal policy in Colombia. Before the end of April, CARF must provide potential output estimates to the MoF, which must be factored in the calculation of the fiscal rule targets. For this purpose, CARF's staff uses a production function approach and forecasts labor market variables, investment, inflation, and capacity utilization. In addition, they also provide estimates of non-oil tax revenue elasticities to economic growth. The results are presented in publicly available documents on their webpage. CARF also produces a specific report with independent analysis for each of the most important reports published by the MoF (i.e., the Medium-Term Expenditure Framework, the Annual Budget, the Policy Proposal, etc.). Although there is currently no pre-defined methodology on how to assess the macro-fiscal projections embedded on each of these reports, CARF so far has been providing analysis on the macroeconomic assumptions and the evolution of fiscal variables, both on the revenue and expenditure side. Although most reports prepared by CARF are published on their webpage, questions made by Congress are usually channeled via written communications or presentations to congresspeople from the Economic Committee.

8. Moreover, CARF analytical demands from Congress will continue to grow. At least twice a year, CARF reports to Congress on their operations and analysis. Since the presidents of the two congressional economic commission are part of the CARF, its technical staff is regularly consulted by Congress and invited to discuss on the possible fiscal implications of different reforms being discussed. The recent increase in CARFs analytical contributions to congressional discussions is expected to continue in the future.

9. A group of five economists is tasked to produce all the analytical output needed to fulfil CARF´s legal mandate. CARF's technical director heads a group of five economists with strong, though heterogenous, analytical skills. While all are strong in macro-fiscal analysis and exhibit medium to strong skills in macroeconometrics, only two are strong operating software such as STATA or MATLAB. In addition, some have already been exposed to Financial Programming material. CARF's technical team is complemented by a communications specialist and an administrative secretary. Most staff have 9-month contracts with the MoF which, as it is a frequent practice in the Colombian public sector, are rolled over on a continuous basis. The technical staff has benefitted from the continuous work of the initial hires, and under the current institutional arrangement the probability of a staff increase is low.

B. Analytical Instruments

10. With limited resources, CARF's technical staff have developed tools to produce estimates of potential output, revenue elasticities, and fiscal projections and analysis. The staff has developed a potential output model following a production function approach estimated on an annual basis and updated quarterly. The staff also produces estimates of the NAIRU and the NAICU used as inputs in the estimation of the production function. For tax revenue elasticities, the staff uses econometric models, estimated on an annual basis, and updated once a year. The outputs of these two models, together with the results from the model to forecast international oil prices and the deficit of the Oil Price Stabilization Fund (FEPC), are key to complement the analysis in the fiscal balance accounting model, where revenue and expenditure are disaggregated in detail and projected ten years ahead. This information is complemented with estimates of interest rates and feed into the public debt model to forecast public debt dynamics also ten years ahead.

Table 1. Brief Description of CARF's Current Models

	Potential Output	Elasticity Model
Description	Potential output annual estimation and forecast using a Cobb-Douglas production function approach	Econometric models to estimate non-oil tax revenue
Frequency	Annual	Annual
Updates	Quarterly	Annually
Inputs	National accounts, labor market statistics, inflation (all from NSD), capacity utilization (Fedesarrollo), inflation forecasts (CB), GDP growth forecasts (MoF)	Non-oil tax revenue (MoF, DIAN), nominal GDP (NSD)
Outputs	Potential Output, NAIRU, NAICU	Elasticities for non-oil tax revenue
Outputs used for	To provide inputs to the MoF and produce public technical document in accordance with the law	To provide inputs to the MoF and produce public technical document in accordance with the law
Software	MATLAB and Excel	MATLAB and R
Human Resources	One full time analyst	One full time analyst
Documentation	Limited user manual. Not published	No

Source: CARF and own elaboration.

Table 2. Brief Description of CARF's Current Models (continued)

	PPE Model	Interest Rates Model
Description	Econometric tool to forecast gasoline international price	A Nelson & Siegel like model for public bonds (COP and USD) interest rates term structure
Frequency	Daily	Daily
Updates	Every two months	Every two months
Inputs	International prices for different gasoline references (Ecopetrol), exchange rate (Bloomberg), oil international price (Bloomberg)	Sovereign bonds (COP and USD) yields (Bloomberg)
Outputs	Forecasts for gasoline prices four years ahead	Yield curves (COP, USD and UVR)
Use of outputs	Estimation of Gasoline Price Stabilization Fund (FEPC)	Public debt model
Software	MATLAB	MATLAB
Human Resources	One full time analyst	One full time analyst
Documentation	No	No

Source: CARF and own elaboration.

Table 3. Brief Description of CARF's Current Models (continued)

	Tax Revenue Model	Fiscal Balance and Debt Models
Description	Disaggregated tax revenue forecast for a 10-year period incorporating macroeconomic forecasts	Forecasts for Central Government's fiscal balance and debt in a 10-year horizon
Frequency	Annual	Annual
Updates	Usually, three times a year	Usually, three times a year
Inputs	Tax Revenue (DIAN), non-oil tax revenue elasticities (CARF), policy changes, oil tax revenue (Ecopetrol), macroeconomic scenario (CARF)	Tax revenue forecasts (CARF), expected expenditure (MoF), macroeconomic scenario (CARF), estimated economic and oil cycles

		(CARF), public debt interest rates (CARF), outstanding debt profile (MoF)
Outputs	Nominal tax revenue by type of tax	Central government fiscal balance and debt scenarios
Use of outputs	Analysis of the MTFF, MTEF, NPB, other	Analysis of the MTFF, MTEF, NPB, other
Software	Excel	Excel
Human Resources	One full time analyst	One full time analyst
Documentation	User manual is being produced	Not for the balance model. A first version for the debt model is being produced

11. While statistical information is available, there are limitations in terms of software to process it and produce analysis. A comprehensive set of information is published by the National Statistics Department, the Central Bank, the National Tax Administration, and the Ministry of Finance following IMF Special Data Dissemination Standards (SDDS) (Table 2). These datasets allow CARF's technical staff to obtain most statistics related with national accounts, labor market, inflation, capacity utilization, tax revenue, fiscal balance, and public debt. However, key economic information, such as the estimated impact of policy measures, is provided to CARF by the MoF through an informal process via email on a discretionary basis. A similar informal information exchange (e.g., alternative forecast scenarios, etc.) occurs between CARF and the CB technical staff due to the lack of an institutionalized process. Moreover, limitations in terms of software include access to one-single user license of Stata, the absence of a MATLAB license, and the use of MoF's Bloomberg terminal.

12. However, CARF lacks a macro-fiscal framework ensuring accounting and economic consistency and integrating satellite tools. While the outputs from the different models serve to inform monthly discussions with the MoF and the monthly presentations to CARF's senior management of macro-fiscal prospects and risks, the technical staff lacks a macro-fiscal consistency framework facilitating data management and updates, integration of satellite models, production of consistent alternative scenarios, and discussion of transmission mechanisms using disaggregated information. Likewise, there is currently no forecast production calendar (FPC) associated with macro-fiscal projections.

Table 4. Colombia: Macroeconomic Data Periodicity and Release Lag

	Periodicity	Release Lag
Real Sector		
National accounts	Q	45D *
Production index	M	6W
Labor market: Employment	M *	1M *
Labor market: Unemployment	M *	1M *
Labor market: Wages/Earnings	M *	1M *
Price index: Consumer prices	M	NLT 5D *
Price index: Producer prices	M	NLT 5D *
Fiscal Sector		
General Government Operations	Q *	2Q
Central Government Operations	M	1M
Central Government Debt	Q	1Q
Financial Sector		
Depository Corporations Survey	M	6W
Central Bank Survey	M	2W
Interest Rates	D	1D
Stock Market: Share Price Index	D	NLT 1W
External Sector		
Balance of payments	Q	3M
Official reserve assets	M	NLT 1W
Reserves template†	M	7D *
Merchandise trade	M	8W
International investment position	Q	3M
External debt	Q	3M
Exchange rates	D	D
Socio-demographic Data		
Population	A	5D

Source: IMF - Colombia: Annual Observance Report of the Special Data Dissemination Standard 2022

* Exceeds Special Data Dissemination Standard (SDDS), NLT: No Later Than

C. Institutional Discussions of Macroeconomic Forecasts

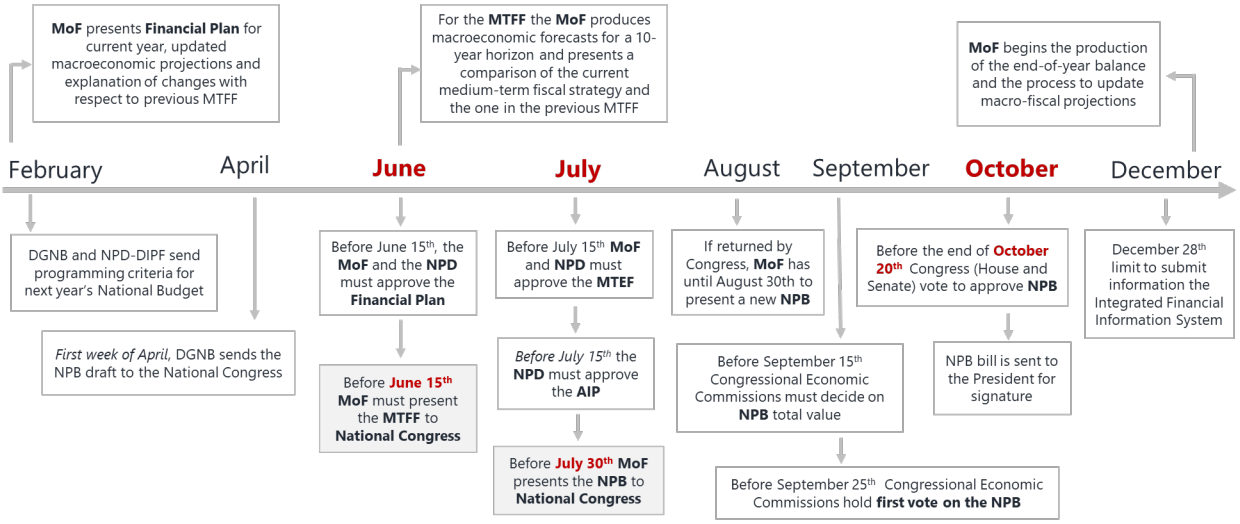
13. CARF's main counterpart is the MoF's Directorate General for Macroeconomic Policy (DGMP). DGPM is responsible for the production of the macroeconomic projections supporting the fiscal policy plans embodied in the National Public Budget, the Medium-Term Fiscal Framework (MTFF), and

the Medium-Term Expenditure Framework, which are presented once every year (Figure 1). The design of these fiscal plans encompasses technical discussions within the MoF involving mainly DGMP, the Directorate General for Public Budget (DGPB), the Directorate General for Public Debt and Treasury Operations (DGPDT), and engagements with other government agencies such as the National Tax and Customs Directorate (NTCD) and the National Planning Department (NPD).

14. CARF also interacts and shares information with the CB through informal, yet effective, channels. As the Minister of Finance is a member of the CB's Monetary Policy Board, there is also a regular interaction between the MoF and CB´s technical staff. The CB implements an inflation targeting regime with monetary policy action taken eight times a year by considering the evolution of the economy, macroeconomic perspectives, and inflation's deviation from the target of 3 percent. The CB technical staff follows a well-established macroeconomic forecasting system to produce monetary policy recommendations to the Board. The system involves a set of meetings to evaluate recent information, present short-term forecasts (derived mainly from econometric models), decide on assumptions for exogenous variables entering the medium-term forecasting models (a DSGE and a semi-structural gap model), and discuss the baseline and alternative scenarios. The MoF technical staff is invited to the meetings where the CB technical staff presents to the Board the results of the forecasting cycles. In these meetings, CB's Board members may also consult MoF technical staff on possible changes to fiscal plans or other relevant matters. CARF's analysis for fiscal policy sustainability is increasingly becoming an important and complementary input for the CB. At the same time, CARF receives from the CB additional information (e.g., public debt maturity profile, etc.). Although current cooperation at a technical level and interchange of information are satisfactory (including regular contacts and meetings), they mainly rely on informal channels and personal working relationships.

15. The MoF's DGMP has two main macroeconomic projections cycles to which CARF provides inputs or assessment. The main cycle is associated with the production of the MTFF, MTBF and the presentation of draft Budget Law which must be presented to Congress once a year, respectively, before June 15th, July 15^{th,} and August 30th (Figure 1). DGPM's staff initiate this cycle by incorporating the most recent macroeconomic data and build an initial baseline scenario. For this purpose, the DGMP has a team of about 14 professionals in charge of the macroeconomic analysis and forecasting tools, such as the semi-structural model that is being developed with the help of ICD-MM. The macroeconomic projections feed into the design of the medium-term fiscal plans, for which DGMP has a group of about 21 professionals and receives two key inputs from CARF: (i) tax revenue elasticity to economic growth, and (ii) potential output estimates, and the two group iterate until they converge to the baseline scenario for the MTFF. The other cycle is associated to the production of the Financial Plan, which is presented in February after the release of the previous year's GDP data to update the end-of-year balance figures and discuss the compliance with the fiscal rule. There are many other moments through the year, though, in which CARF requires to have an up-to-date prospection of the economic. Although there are only two major production cycles of budgetary plans, CARF needs to update its macroeconomic and fiscal projections at a higher frequency. For example, they need to monitor the execution of budgetary targets (monthly statistics) or changes introduced in the draft budget law (October each year) and also assess the close of the fiscal year (January each year).

Figure 1. Colombia: Fiscal Policy Processes



*The **Financial Plan** is part of the **MTFF**, the first year of the **MTEF** coincides with the **NPB** and the **AIP** must be in line with the **MTFF** and the **MTEF***

DGNB: Directorate General for National Budget/ NPD-DIPF: National Planning Department – Direction of Investment and Public Finances / DGPDTO: Directorate General for Public Debt and Treasury Operations / MoF: Ministry of Finance / NPB: National Public Budget / MTFF: Medium-Term Fiscal Framework / MTEF: Medium-Term Expenditure Framework / AIP: Annual Investment Plan

16. The fiscal policy rule is at the heart of the macro-fiscal projections in Colombia. The country initially implemented a fiscal policy rule for the Central Government in 2011 (Law 1473 of 2011) targeting the structural fiscal balance. In 2021 the government reformed the fiscal policy rule (Law 2155 of 2021) to incorporate a debt anchor (55 percent of GDP), a debt limit (71 percent of GDP) and an automatic and transparent definition of the structural primary balance (net of one-off operations) as percent of GDP based on the result of the public debt in the previous year. To achieve the target, the MoF must align expenditure plans with the estimated structural revenue (Figure 2). DGMP monitors closely the evolution of the fiscal accounts to guarantee that the government meets the fiscal rule target and updates regularly its macroeconomic projections to incorporate developments that may alter the initial fiscal plan. CARF technical staff meets regularly with DGMP to discuss updates to macroeconomic forecast and implications for the fiscal scenario. Both present baseline scenarios and discuss possible risks, and CARF technical staff would greatly benefit from developing a macroeconomic forecasting tool (such as the tool proposed for this TA project) to start closing the gap with DGMP in terms of models for this purpose.

Figure 2. Colombia: Fiscal Policy Rule

$$\underset{SNPB:\ Structural\ Net\ Primary\ Balance\ (net\ of\ one-off\ operations)}{\boldsymbol{SNPB\ Target}\ (Percent\ of\ GDP)} = \begin{cases} 0.2 + 0.1 * (Net\_Debt_{t-1} - 55)\ if\ Net\_Debt_{t-1} < 70 \\ 1.8 \qquad\qquad\qquad\qquad\qquad if\ Net\_Debt_{t-1} \geq 70 \end{cases}$$

$$SNPB = [Total\ revenue - interest\ earnings - one\_time\_revenue]$$

$$- [Total\ expenditure - interests\ - one\_time\_expenditure]$$

$$- Oil\ Revenue\ Cycle \longrightarrow Oil\ revenue\ (t)\ less\ the\ average\ of\ oil\ revenues\ in\ the\ previous\ 7\ years\ excluding\ min\ \&\ max$$

$$- Economic\ Cycle \longrightarrow Non\ Oil\ Tax\ Revenue\ *\ Output\ Gap$$

Source: Based on Information from the Colombian Ministry of Finance

17. CARF is directly involved in the design of fiscal policy plans and plays a key role in strengthening the public discussion. CARF produces public technical documents presenting the estimation of potential output and non-oil tax revenue elasticity to economic growth, the analysis of the government's MTFF, MTEF, Financial Plan and Annual Budget. In these documents, among others, the CARF describes the methodologies, data and assumptions used to produce the estimations of potential output and non-oil tax revenue elasticity, presents comparisons of governments macroeconomic forecasts at different points in time, and comments on the consistency of the fiscal plans and possible risks that could imply further policy actions by the government. The analysis concentrates on the central government fiscal plans and efforts to expand it to the general government are limited by the availability detailed information. However, CARF recognizes the need of moving in this direction to, among other things, improve the consistency of the analysis between government statistics and national accounts.

III. Action Plan

A. Objectives

18. The main TA objective is to support CARF to independently assess MoF's macro-fiscal forecast using their own macro-fiscal projections tool (MFPT). The ICD team will assist CARF staff to strengthen its institutional capacity to develop a macro-fiscal framework which ensures accounting and economic consistency.[3] By the end of the TA project, the CARF team of economic analysts should be able to:

a) Structure projection processes according to best practice (including the definition of a forecast production calendar (FPC), distribution of responsibilities, etc.).

b) Build an easily updatable macro-fiscal database.

c) Produce baseline and alternative macro-fiscal scenarios with a 10-year horizon at an annual frequency.

d) Identify and quantify risks to the baseline.

e) Integrate CARF's satellite tools (i.e., debt sustainability, potential output, and fiscal revenue tools) to the macroeconomic framework.

f) Document institutional processes and tools.

g) Define and implement a methodology to assess the realism of MoF macroeconomic scenario and fiscal projections, including a report and graphical outputs.

h) Efficiently communicate the MTP outputs to key stakeholders.

B. Proposal

19. The Comprehensive Adaptive Expectations Model (CAEM) will be used as the starting point to develop an MFPT for the CARF. Besides meeting CARF analytical needs, the MFPT chosen to produce macro-fiscal forecasts must be commensurate to current TA absorption constraints and initial institutional capacity. During the scoping mission, ICD staff explained the main characteristics and requirements of two different modelling alternatives: a backward-looking model featuring error-correction calibrated equations (CAEM) and a semi-structural, forward-looking model, like the one currently being

[3] Besides producing a macroeconomic scenario, the fiscal sector in the MFPT needs to have the same level of disaggregation used in the presentation of the MoF official reports, integrate the operation of the fiscal rule and incorporate CARF fiscal satellite models for revenue and expenditure projection. In the case of the database, it also implies the capacity to store estimates of fiscal measures.

developed at the MoF with the support of ICD.[4] ICD pre-selection of tools was justified for several reasons:

a) CARF staff has experience in economic modelling and forecasting and time-series econometrics.

b) CARF must assess both the realism of MoF macroeconomic projections and the economic impact of proposed policy measures.

c) The CAEM can be easily modified to project point and range estimates, and the initial template allows for a relatively easy customization to incorporate more disaggregated data for the different sectors (e.g., fiscal accounts or balance of payments).

d) A forward-looking model like the one currently being designed at the MoF could also serve for policy analysis but would require substantially more time commitment from CARF.[5]

e) Although statistical limitations or IT-related issues would not be a major factor in the case of CAEM, a more sophisticated alternative would probably require acquiring (e.g., MATLAB) licenses and/or investing more time learning a new programing language (e.g., Python).

Based on their analytical needs and given current capacity constraints, CARF authorities opted to develop an MFPT using the CAEM template as a foundation. The ICD team will support CARF staff in customizing the initial specifications and calibrating the model parameters to suit the nuances of the Colombian economy. CARF's ultimate objective, potentially in a subsequent TA project, is to develop a tool like the one currently being implemented at the MoF with the assistance of ICD.

20. To boost long-term capacity building and sustainability of the TA, all economists working for CARF will be part of the core forecast group and are expected to become proficient in using the MFPT. To reduce staff turnover risks and individual workload derived from TA and to increase the benefits of the project, the five economic analysts from CARF will be part of the core group receiving TA on macroeconomic frameworks. The initial workplan foresees a clear distribution of responsibilities, including the appointment of a forecast coordinator, Mrs. López Velandia, who will oversee the whole forecast procedure, and sectoral responsibility across team members, including data updates, production of economic analysis and drafting sectoral write-ups and manuals. Although the forecast and deputy-forecast coordinators will work as the main model users, CD activities will ensure that all team members can independently use the model. Moreover, a system of backups will be put in place to cover for potential absences (Table 5).

[4] A list of the main behavioral equations included in the CAEM template can be found in Annex C.

[5] Nevertheless, the development of CAEM would ease the transitions costs towards a more sophisticated model such as the one mentioned above, as the procedures, diagnostics, and rules applicable for the operation of CAEM would also apply.

Table 5. Initial distribution of responsibilities in the core team

	Name	Primary role	Back-up role
1	Johanna Maricela López Velandia	Forecast coordinator - Fiscal sector	External sector
2	Jorge Andrés Zambrano Riveros	Deputy Forecast coordinator	
3	David Augusto Montoya Ruiz	Monetary sector	Real sector
4	Camilo José Rios Ibarra	Real sector	Fiscal sector
5	Manuela Restrepo Bernal	External sector	Monetary sector

Source: CARF.

21. As a TA project based solely on traditional CD delivery is unfeasible, the AP envisages a two-year delivery schedule that mixes weekly virtual engagements with four weeks in-person missions. The mismatch between current workload and number of staff limits the time in which CARF economic analysts can receive traditional TA (i.e., engagements of several hours per day during a one- or two-week period), as they would have to stop their other activities at CARF. To minimize CARF's daily work disruption, TA will be partially delivered through a series of virtual engagements with the core team during a two-year horizon. In particular, the AP envisages to hold sessions of 1.5hs with the ICD team every Wednesday and Thursday on a weekly basis. Unlike the whole-week mission approach to TA, which takes the staff out of their regular work routines, using the virtual approach has the potential to align more closely with the core team's work dynamics, easing the process of its institutionalization. On top of that, CARF management commits to make the necessary arrangements for each core group member to be able to spend asynchronously a similar amount of time per week in the TA project. Finally, CARF senior management committed to allocate four additional weeks (two in 2024 and two in 2025) for one-week in-person TA missions. Overall, approximately 50% of direct TA delivery is planned to be in-person and 50% virtual.

22. Despite its constraints, time commitment by CARF is in line with other TA projects which mostly rely on in-person delivery. During in-person missions, staff are required to participate in the TA during most of their workday. However, the larger the share of the workday that the TA activity occupies, the higher the risk that work-related urgent activities would crowd out TA. Although at a different degree, this can happen both during in-person or virtual deliveries, despite the senior officers' previous commitment to block their staff time for the TA. Consistent engagement every week by the authorities could also be a signal of a higher, long-term commitment to the TA. The net amount of direct delivery hours (per individual receiving TA) included in the AP is comparable to (and even higher than) TA projects in the region. Moreover, most of the TA projects for which the figures were obtained include the development of a macroframework and its integration with the DDT[6]. However, the latter is not included in the current TA project. In addition, as opposed to other TA (such as the in Ecuador with MoF and CB), in this case there is no substantial training component in the direct TA delivery time.

[6] In the case of CARF this is not required, as they already have their own Debt Sustainability Assement tool.

Table 6. Time commitment during the first year across selected TA projects.

Country	Tool	IMFx pre-requisite	TA Commitment [1] Hs per year
ECU [2]	CAEM + DDT	No	220
PHL [2]	CAEM + DDT	Yes	220
HND [3][8]	CAEM-like + DDT	No	200
CARF COL [4]	To be defined	Yes	150
DOM [5][8]	CAEM + DDT	No	123
CRI [6]	CAEM-like + DDT	No	113
SLV [7]	MFT	No	54

Source: ICDMF
Notes:
1) In-person or virtual delivery mission time (i.e. excluding scoping missions)
2) Based on agenda of first delivery mission. Four two-week delivery missions within one year cycle.
3) Four delivery missions completed. Six one-week delivery missions within a one-year cycle.
4) 30 weeks of virtual delivery (two sessions of 1.5hs per week) + two in-person missions during the
5) Based on the agenda of the first delivery mission. Total corresponding to five one-week delivery missions within a one-year cycle.
6) Tool already used to produce MTFF developed without a model template. One two-week mission and two one-week missions completed.
7) Two delivery missions executed, one left to complete project.
8) Upper-bound estimate, assuming that all missions are in-person.

Source: ICD

23. The delivery engagements of the first year are grouped into four thematic blocks around the development and solution of a baseline macroeconomic model. The first one (42hs) will be devoted to understanding Colombian macroeconomic statistics, its economic relationships (the four classic sectors) and data population of the CAEM template. Database management principles and good practice (i.e., integrity and consistency checks, documentation, etc.) are also going to be discussed. This block will be an opportunity to introduce participants to key techniques used in macroeconomic forecasts (i.e., consolidation, aggregation, growth contributions and interpolation). The second block (47hs) will present the basic steps which need to be achieved to build a simple macroeconomic framework. Most of the time will be used to make a first calibration of the behavioral equations.[7] Once the first projections are produced, the ICD team will use the third block (36hs) of sessions to guide the CARF team through the process of model diagnosis, including the analysis of transmission channels and the calculation of implied fiscal multipliers. Finally, in the fourth block (44hs) CARF staff will gain the skills to properly produce a baseline forecast and conduct scenario analysis. In addition, a first presentation of outputs to the CARF board is expected to take place during the fourth block. The delivery modality for the first-year totals 70hs hours (44%) in person and 90 hours virtual (56%).

24. The remaining four thematic blocks, which include extensions to the baseline framework, will be covered during the second year. After the baseline model is developed, CARF staff is expected to extend the framework in several ways. A fifth block (45hs) will be used to produce prediction intervals[8]

[7] It is possible that more than one forecast methodology will be combined to produce a ten-year projection.

[8] As opposed to many MoFs, which typically produce point estimates or forecasts, the usual practice in fiscal councils is to publish endorsement or validation intervals. Among other things, this practice avoids a "model horse race" between the fiscal council and the MoF and allows to focus on risk signaling. So far, CARF has not explicitly defined the methodology for such assessment.

and a sixth block (35hs) to extend the fiscal sector, in line with CARF's needs. [9] A similar approach will be taken in the seventh block (33hs), as concrete CARF needs identified during the diagnosis will try to be addressed (i.e., inclusion of financial constraints, exploitation of higher frequency supply side statistics, etc.). The final block (47hs) will be used to integrate CARF's satellite tools into the framework (DSA tool and production output estimates) and produce a final macro-fiscal report. As a conclusion of the fourth in person mission, CARF staff will prepare a final presentation for CARF members using the MFPT. During the second year, virtual delivery would total 45hs (39%) and in-person delivery 70hs (61%).

25. The integration of the MFPT into CARF analysis and reports will be made with a continuous, gradual approach. The initial distribution of responsibilities planned for the first block will have, as a result, a first version of their Forecast Production Calendar (FPC). For each forecast round, the FPC will define who does what and when, starting from the update of the data until the last version of the report is published. The FPC consolidates, in one single and coherent piece, the restrictions given by the official statistics publication calendar, the legal dates in which the MoF (and hence CARF) must publish its own reports and the necessary time required to process the information, produce a forecast along with a consistent narrative and draft a report and present its main messages. In this regard, the delivery schedule includes specific sessions to gain skills oral and written communication skills, including the preparation of two presentations on macroeconomic projections for CARF board members. As the MFPT is developed and the forecast team builds capacity, the FPC will play a major role.

26. The AP envisages the achievement of several milestones related with the development of the MFPT and enhanced policy analysis processes and skills. The degree of success in terms of objectives accomplishment is going to be measured against the achievement of concrete milestones along the life of the TA. The tasks included in the tentative delivery schedule included at the end of this section (from August 2023 until August 2025), are designed to support its completion.

27. CARF authorities are committed to further extend the initial MFPT after achieving the milestones foreseen in the delivery schedule. Although the activities included in the initial workplan go until April 2025, an additional phase of the TA project could include the development of a rational expectations framework (like the one currently being developed by the MoF with the support of ICDMM).[10] Such second phase would highly benefit (in terms of transition costs) from a first phase which is built around the CAEM. Depending on several factors (e.g.: first phase finishing time, skills gained by CARF staff members, identified risk not materializing, etc.) a second phase could last until August 2026.

[9] The extension of the fiscal sector would incorporate a review in the changes of the model properties (IRFs and fiscal multipliers). The operation of the fiscal rule might be integrated depending on CARF needs.

[10] ICDMM is currently supporting the MoF to build a foward-looking semi-structural gap model at an anual frequency which is solved using the Iris/Matlab software.

Table 7. Key project outcomes

Outcome indicator	
Authorities have a baseline understanding of their existing forecasting and analytical capabilities and opportunities for improvement	
Analytical models and forecasting tools are developed and operational	
Improved analytical skills, and better macroeconomic forecasting and policy analysis capacity	
Milestone name	**Target date**
Authorities discuss and agree with scoping mission team the diagnostic on existing capacities and the Action Plan to further improve them and develop a macroeconomic projection tool.	*Jun-23*
A team coordinator is appointed. Sectoral responsibilities and a system of backup staff is put in place.	*Jul-23*
An easy-to-update macro-fiscal database to feed the MPT is built.	*Dec-23*
The core team can produce baseline medium-term macroeconomic projections and conduct scenario analysis using the MPT.	*Aug-24*
The core team can calibrate the MPT and assess model properties.	*Aug-24*
The first version of the MPT manual is produced and a calendar of projections is already in place.	*Oct-24*
The core team can introduce uncertainty in their baseline projections.	*Mar-25*
The core team can integrate their satellite tools into the MPT.	*Aug-25*
The MPT user manual is finalized and available to all staff.	*Aug-25*
The forecast process is institutionalized, including the use of a projection calendar.	*Aug-25*
The core team can effectively communicate macro-fiscal projections to senior management and independently assess MoF macro-fiscal projections.	*Aug-25*

Source: ICD

28. The delivery schedule has been designed in close coordination with ICDMM, WHD and FAD. Prior to the scoping mission, ICDMF staff met with the ICDMM team providing TA to the MoF to explore possible delivery synergies. However, after carefully analyzing CARF's technical and time constraints, the ICDMM team shared the view of the ICDMF mission team about appropriateness of the development of the proposed tool. In the same fashion, the WHD team was supportive of a piecewise, gradual approach to TA. The timing and possible complementarities of the ICD project with a possibly concurrent one by FAD were also discussed with staff from the latter department, who also participated in the pre-scoping meeting. Further TA needs related with CARF's institutional setup identified during the TA project should be channeled via a new request to FAD.

C. Risks and Mitigation Strategies

29. The delivery modality mix is an important risk to the project. However, the door is open for changes in case of large deviation to the delivery schedule. In addition to the usual issues of virtual delivery (i.e., possibility of poorer engagement by TA recipients, connectivity problems, etc.), having weekly sessions for long periods of time can potentially generate TA fatigue. To limit this risk, but also as a sign of their commitment to the project, several measures are going to be implemented. First, authorities agreed to have periodic performance assessments (usually after the completion of each thematic block solely based on virtual delivery). The results of performance assessments will be monitored by CARF board members. If the TA project does not progress according to the schedule in the AP, CARF senior management agreed to evaluate changes in the delivery modality, including the possibility of longer (traditional or reverse) mission work, in addition to the four in-person weeks already included in the delivery schedule committed for the years 2024 and 2025. Second, approximately 10% of the time allocated to virtual engagements (15hs) is reserved for additional delays that may occur due to the delivery modality chosen. Third, the AP incorporates the possibility of having a 1.5hr session on Thursdays´ afternoons as a contingency in those case on which CARF staff cannot participate. Besides all these measures, CARF senior management will continue exploring avenues to increase the in-person share of direct delivery time.

30. Although not a problem so far, staff turnover might also be a concern in the medium term, whereby measures to preserve institutional memory are key. Since its inception last year, no economist has left CARF. However, the relatively short renewal period embedded in CARF's employment contracts can also be a risk to the TA project (as the likelihood of staff seeking more stable employment alternatives or having their contracts not renewed increases). Now, all staff contracts, including the technical director, will expire on December 31st, 2023. As CARF authorities signaled they are not able to change this situation, at least until the current employment contracts expire, the AP incorporates three mitigation measures. First, all core team members are expected to become proficient in the use of the MFPT and TA delivery will be implemented to achieve this goal (including data update and forecast production and communication). Second, the approach to documentation will be gradual and continuous, starting from day one. Part of the work planned for each thematic block includes the documentation of processes, methodologies, and tools. Third, key virtual sessions are going to be recorded (as it is current practice already in many TA projects). These elements should help preserve institutional memory and ease knowledge transfer for future employees. In addition to all these concrete measures, CARF senior management would continue seeking alternatives to extend the length of the contracts ending this year.

31. A large gap between CARF and the MoF tools can limit the ability of CARF's to evaluate MoF forecasts. Differences in terms of analytical skills, tools and methodologies can limit comparability between outcomes produced and decrease CARF's ability to effectively assess the MoF macro-fiscal projections. To decrease the materialization of such risk, the MFPT must be designed in such a way that, at the minimum, can provide a forecast for all the macroeconomic and fiscal variables published by the MoF in fiscal documentation.

32. All macroeconomic forecasts integrate analytical tools with expert judgment. This synthesis is essential, as the calibration process and macroeconomic projections must invariably include an element of economic judgment. Several factors underscore this necessity: data quality and availability, the integration of information not explicitly captured by models, among others. Reliance solely on model-

based projections would result in a mechanical approach, overlooking critical information. Consequently, different institutions, such as the CARF, might derive varied outcomes using identical analytical tools, influenced by the specific information set at their disposal and their expectations concerning key economic indicators.

33. To enhance transparency and uphold CARF's reputation for unbiased analysis, the ICD commits to assisting the CARF in establishing a tripartite methodology for evaluating the MoF's macro-fiscal projections. These projections constitute one component of the broader assessment framework. The methodology comprises: a) the inclusion of retrospective analysis not generated by the MFPT, through regular reviews of MoF forecasting accuracy; b) the amalgamation of macro-fiscal forecasts for pivotal variables from various external forecasters; and c) prioritizing the identification of projection risks over mere comparisons of point forecasts, namely through the employment of prediction intervals. In parallel, ICD will support the CARF staff to strengthen its communication and forecast narrative skills, key to a successful implementation of the new assessment methodology.

34. CARF's ability to conduct independent analysis is unlikely to be greatly limited by its operative links with the MoF or the government's appointment of a majority of CARF's members. Although the MoF provides CARF with the means to work (e.g., office space, IT, etc.) and pays the salary of its staff, several legal measures have been set in place to safeguard CARFs technical and operative independence:

a) The technical director and its staff are appointed by CARF members. The MoF has no legal authority to cease the contracts of CARF members nor its staff. In addition to that, the usual legal constraints to the roll-over of employment contracts (e.g., existence of cool-off periods in between contracts) do not apply to CARF staff.

b) Second, CARF's law mandates the MoF to provide CARF with the necessary funds to pay the salary of the technical director, two senior analysts and three junior analysts (i.e., the current setup) and to provide CARF with the minimum infrastructure to operate.

c) Although the interchange of non-public information currently operates on an informal basis, access to classified data necessary for CARF's analysis is guaranteed, though not regulated yet, by law.

As regards its governance, the under the current institutional framework the same government could potentially nominate the majority of CARF members (a situation that the law creating CARF tried to avoid). Although this constitutes a political risk, it is limited by the associated reputational costs that any perceived interference with CARF's work would imply for the MoF. These costs are positively related with CARF's staff increasing presence in the public debate as a highly technical and independent actor.[11]

[11] CARF analysis is increasingly being used in Congress. This includes not only the production of reports and presentations, but also participating in Congressional hearings and meeting congressmen. CARF presence in specialized newspapers and social media is also becoming more present.

Table 8. Identified risks and mitigation factors

Risk	Impact	Probability	Mitigation actions or factors
Lack of engagement or decreased TA absorption capacity during virtual, weekly sessions.	**Medium**	**Low**	1) Periodic performance evaluation during virtual thematic blocks. Commitment to increase in-person TA if large deviations to the delivery schedule are identified. 2) Five additional buffer weeks (10% of virtual delivery time) to accommodate for additional needs. 3) Thursday afternoons as a contingent sessions for days in which a morning session is lost (due to CARF staff not being able to participate).
High staff turnover	**Medium**	**Low**	1) Support all economic analysts to become proficient in the use of the MPT and communication of results. 2) Gradual and continuous documentation of processes and methodologies since the start of the TA. 3) Record key virtual/in-person sessions. 4) CARF senior management would explore the possibility of extending until 2026 (up to three years) new contracts which would start in early 2024.
Limited ability to effectively asssess MoF macroeconomic forecasts	**Medium**	**Low**	1) Define a methodology to assess MoF projections which: a) incorporates retrospective information not produced with the MPT (i.e., periodic rview of MoF forecast performance). b) integrates information from other private and public forecasters. c) focuses on the identification of risks to the projection rather than in the comparison of point forecasts (i.e., use of confidence intervals). 2) Design an MPT capable of producing forecasts for the macroeconomic and fiscal tables included in official documentation (i.e., MTFF, Draft Budget law, etc).
Restrictions to CARF's analytical indepedence	**High**	**Low**	1) The technical director and its staff are appointed by CARF members. The MoF has no legal authority to cease its contracts. 2) Usual legal constraints to the roll-over of employment contracts do not apply to CARF staff. 3) CARF's law mandates the MoF to provide CARF with the funding to pay the salary of the technical director, 2 senior analysts and 3 junior analysts (i.e., the current setup). The MoF is also compelled to provide with the minimum infrastructure (e.g. officies, IT, web domain, etc.) to operate. 4) Access to classified information necessary for CARF's analysis is guaranted by law. 5) Reputational costs of interfiering with CARF's perceived independence are high.

Source: ICD

IV. Appendices

A. Initial project calendar

Date	Week #	Block	Year 1: Baseline framework
09/06/23	1		Overall process of macroeconomic forecast (elements of, responsibilities, calendars, etc.)
			The data
09/13/23	2		Data management (db types, db integrity, updates, comparisons, consistency, indicators, good practice, etc.)
09/20/23	3		Fiscal sector
09/27/23	4		Fiscal sector (and applications of consolidation)
Break			
10/11/23	5		Real sector
10/18/23	6		Real sector (and applications of aggregation)
10/25/23	7	**1**	Monetary sector
11/01/23	8		Monetary sector (and applications of growth contributions)
Break			
11/08/23	9		External sector
11/15/23	10		External sector (and applications of interpolation)
11/22/23	11		Wrap-up/buffer time
11/29/23	12		Presentation of CARF's potential output projection methodology
12/06/23	13		Presentation of CARF's revenue elasticities methodology
12/13/23	14		*Buffer week. TA delivery performance assessment*
Christmas break			**The model**
			Intro
01/10/24	15		Elements in a model (end vs exo, beh vs ide, linearity, constraints, etc). Types of models (capacity, purpose, resources, periodicity, etc)
01/17/24	16		Building process (stages, estimation, in vs out of sample solution, forecast vs policy analyses, etc). Diagnoses (scenarios vs shocks)
			Setup
02/07/24	17		Framework (inputs, definition, processing, outputs, etc). Documenation (conventions, manual structure, best practice, etc.)
02/14/24	18		Input (naming conventions, pre-processing routines, etc)
Break		**2**	**Behavioral equations (estimation/calibration)**
In-person Mission 1 March 4-8			Econometrics (methods, diagnosis, residual checks/decomposition, etc.)
			Private consumption / invest
			Private employment, private wages
			Exports (possible breakdown), Imports (possible breakdown)
			Others (Okun's law, Philips curve, Taylor Rule, deflators, etc)
			Price and nominal identities/restrictions
			Documenation status.

Date	Week #	Block	Year 1: Baseline framework
			Solution
04/03/24	19		Types (of backward looking approaches), stability, convergence, etc.
04/10/24	20		Forecast. Simulation/Scenarios.
			Diagnosis
04/17/24	21		IRFs/Shocks. Transmission channels.
04/24/24	22		IRFs/Shocks. Transmission channels (cont)
Break			
05/08/24	23	**3**	Fiscal multipliers implied theory
05/15/24	24		Fiscal multipliers implied by the model (cont)
05/22/24	25		Long-rung solution (existence, speed of convergence, etc)
05/29/24	26		Short and medium-run convergence
Break			
06/12/24	27		Error/residual decomposition
06/19/24	28		Residual management. Targeting simulations/add factors
06/26/24	29		Charts/tables. Documentation of results. Wrap-up/buffer meeting
07/03/24	30		*Buffer week. TA delivery performance assessment*
Summer Break			
In-person Mission 2 August 28-September 1		**4**	**Output**
			Baseline scenario (current vs unchanged policies)
			Risk scenario
			Risk scenario
			Forecast decomposition/comparison
			Charts/tables and Write-up structure design
			Documentation status, including codes, if any.
			Communication of projections
09/25/24	31		Charts/tables and Write-up/presentation
10/02/24	32		First presentation to CARF members. Seek feedback.
10/09/24	33		*Buffer week. TA delivery performance assessment*
Break			
Date	**Week #**	**Block**	**Year 2: Extensions to the framework**
			Extension 1: Model uncertainty
10/30/24	34		Fiscal councils specifities (intervals, endorsement process, etc.)
11/06/24	35		Endorsement procedure in other fiscal councils (best practice)
11/13/24	36		Definition of CARFs endorsement/assessment methodology
Break			
01/08/25	37	**5**	Sources of uncertainty
01/15/25	38		Uncertainty from estimated coefficients
01/22/25	39		Uncertainty from forecast errors
01/29/25	40		Stochatic simulations
02/05/25	41		Combining uncertainty from different models/methodologies
02/12/25	42		*Buffer week. TA delivery performance assessment*

Date	Week #	Block	Year 1: Baseline framework
Break			**Extension 2: Fiscal Sector (including interface with CARF's model revenue projection)**
In-person Mission 3 March 3-7		**6**	Revenue (Income tax and VAT) Revenue (Other non-oil tax) Oil-related revenue Expenditure (breakdown of government consumption) Expenditure (rest of) Caculation/Analysis of model-implied tax boyancy/elasticities Caculation/Analysis of model-implied fiscal multipliers Fiscal rule. Implementation.
			Extension 3: Real sector
03/26/25	43		Supply vs demand decomposition
04/02/25	44		Higher frequency inputs
04/09/25	45		Higher frequency inputs
Easter break			
04/23/25	46		Higher frequency inputs
04/30/25	47	**7**	Model combination: supply and demand projections
05/07/25	48		*Buffer week*
			Extension 4: External and monetary sector
05/14/25	49		External financing contraints
05/21/25	50		External financing contraints (cont)
05/28/25	51		Domestic financing contraints
06/04/25	52		Domestic financing contraints (cont)
06/11/25	53		*Buffer week. TA delivery performance assessment*
			Extension 5: Debt projections and analysis
06/18/25	54		Interface with CARF debt sustainability tool
06/25/25	55		Interface with CARF debt sustainability tool
			Extension 6: Potential output integration
07/02/25	56		Interface with CARF potential output
07/09/25	57	**8**	Interface with CARF potential output
In-person Mission 4 August 4-8			**Final presentation to CARF members.** Preparation of charts/tables for the presentation. Write-up/presentation of extensions Final presentation to CARF members. Final documenation.

B. Results Framework

Objective: Develop capacity in macroeconomic forecasting and policy analysis to support policy decision making and communications - MFR			
Outcome: **Authorities have a baseline understanding of their existing forecasting and analytical capabilities and opportunities for improvement**			
Annual Assessment Rating:			
Outcome Rating Date: 8/30/2023			
Outcome Indicator	**Baseline Value**	**Target Value**	**Current Assessment Value**
Diagnostic/scoping produced a baseline workplan of CD engagement, including a tentative timeline for the CD project, indicative schedule for training and TA missions, and expected key outcomes and deliverables	No Baseline	A project plan to establish macroeconomic forecasting capacity	Fully achieved as of 8/9/23
Milestone Name	**Target Completion Date**	**Milestone Actual Completion Date**	**Milestone Rating**
Authorities discuss and agree with scoping mission team the diagnostic on existing capacities and the Action Plan to further improve them and develop a macroeconomic projection tool.	6/30/2023		Fully Achieved as of 8/9/23
Outcome: **Analytical models and forecasting tools are developed and operational**			
Annual Assessment Rating:			
Outcome Rating Date: 8/30/2023			
Outcome Indicator	**Baseline Value**	**Target Value**	**Current Assessment Value**
A user manual on MPT and other auxiliary models and tools is prepared and is readily available to all staff.	No user manual exists.	A user manual of the MPT is available to all staff.	Not achieved as of 8/30/2023
Centralized forecasting database is established and is linked to the forecasting system	There is no central forecasting database.	A centralized database is established and linked to the forecast tool.	Not achieved as of 8/30/2023

Macroeconomic Projection Tool (MPT) is developed in the form of a general equilibrium model with mainly adaptive behavior.	There is no forecast tool.	A forecast tool, including all key features, is fully developed.	Not achieved as of 8/30/2023
Milestone Name	**Target Completion Date**	**Milestone Actual Completion Date**	**Milestone Rating**
An easy-to-update macro-fiscal database to feed the MPT is built.	12/15/2023		
The core team can calibrate the MPT and assess model properties.	8/30/2024		
The first version of the MPT manual is produced and a calendar of projections is already in place.	10/15/2024		
The MPT user manual is finalized and available to all staff.	8/15/2025		
Outcome: **Improved analytical skills, and better macroeconomic forecasting and policy analysis capacity**			
Annual Assessment Rating:			
Outcome Rating Date: 8/30/2023			
Outcome Indicator	**Baseline Value**	**Target Value**	**Current Assessment Value**
Analytical framework centered around the MPT is used to produce medium-term forecasts, scenarios as well as risk and policy analysis	No baseline	A MPT is fully operational and used for policy analysis.	Not achieved as of 8/30/2023
Roles and responsibilities identified/streamlined/clarified within the core forecasting team	No baseline	A forecast coordinator is designated. A forecast schedule with roles and responsibilities followed.	Fully achieved as of 8/9/23
Relevant staff demonstrates the capability to independently operate the MPT and other auxiliary analytical models and tools	No baseline.	Core team integrate satellite models into the MPT and use it to produce inputs required for fiscal planning.	Not achieved as of 8/30/2023
Milestone Name	**Target Completion Date**	**Milestone Actual Completion Date**	**Milestone Rating**
A team coordinator is appointed. Sectoral responsibilities and a system of backup staff is put in place.	7/31/2023		4 Fully Achieved as of 8/9/2023

The core team can produce baseline medium-term macroeconomic projections and conduct scenario analysis using the MPT.	8/30/2024		
The core team can introduce uncertainty in their baseline projections.	12/27/2024		
The core team can integrate their satellite tools into the MPT.	6/2/2025		
The forecast process is institutionalized, including the use of a projection calendar and the production of a user manual for the MPT.	6/2/2025		
The core team can effectively communicate macro-fiscal projections to senior management and independently assess MoF macro-fiscal projections.	6/2/2025		

C. Main behavioral relationships underpinning the CAEM.

The macroframework for the economy consists of four key sectors interconnected by economic behavioral relationships and accounting identities. The CAEM aims to strike balance between the simplicity of the framework for projections and realistic properties customized for each economy the model is applied to. The framework is flexible and allows users to impose their expert judgement in a consistent way, thus providing a common language to discuss economic issues and risk scenarios.

The key behavioral relationships, see the table below, reflect standard macroeconomic theory and guarantee a well-defined balanced growth path and stable “great ratios” in the medium and long term. The baseline version of the framework assumes that expectations are adaptive or reflect the expected medium-term values of the variables (e.g., known inflation target, trend real appreciation of the exchange rate, and others).

Domestic demand, in the short and long run, is reflective of both income and price developments. Private consumption is mainly driven by households' disposable income and real lending rates. In contrast, private investment relies on the standard accelerator mechanism and the lending rate. Exports are determined by foreign demand and the relative price of domestic export goods vis-à-vis their foreign competition. Finally, real imports of goods and services depend on the import intensity of domestic demand and the relative price of imported goods.

The economy's production side is represented by a potential output – a level of economic activity that would not accelerate inflation beyond the central bank's inflation objective. Through a traditional Phillips curve, the excess demand in the economy over its supply capacity (output gap) fuels inflation on top of foreign goods' prices, commodity prices, and other supply factors.

On the monetary side, short-term interest rates and the nominal exchange rate depend on the policy regime of a country, which can operate under a fixed exchange rate, flexible exchange rate, or a variation of these. Under a flexible exchange rate, monetary policy follows a standard Taylor rule where the policy rate path reflects inflation’s deviation from its target, the cyclical position of the economy, or other relevant factors. The strength of the arbitrage relationship between domestic and foreign interest rates depends on the degree of capital mobility, leading to possible deviations from a simple uncovered interest rate parity.

Fiscal accounts are intertwined with the rest of the economy in a complex way, with revenues depending on nominal income and demand, the cost of debt service depending on current and past interest rates at home and abroad, and government spending influencing demand for goods and services.

The customization of the model will reflect the specifics of the economy (e.g., oil production, wage negotiations, trade specifics, remittances income, etc.) and key economic policies (e.g., fixed versus floating exchange rate, etc.).

Variable	Behavioral relationship / methodology
Private consumption	$\Delta c_t = \beta_0^c + \beta_1^c \Delta c_{t-1} + \beta_2^c \Delta y_t^d - \beta_3^c \hat{r}_t^L - \lambda^c (c_{t-1} - \bar{y}_{t-1} - \gamma_0^c) + \varepsilon_t^c$
Private investment	$\Delta inv_t = \beta_0^{inv} + \beta_1^{inv} \Delta inv_{t-1} + \beta_2^{inv} \Delta y_t - \beta_3^{inv} \hat{r}_t^L$ $-\lambda^{inv} (inv_{t-1} - \bar{y}_{t-1} - \gamma_0^{inv}) + \varepsilon_t^{inv}$
Exports	$\Delta x_t = \beta_0^x + \beta_1^x \Delta x_{t-1} + \beta_2^x \Delta y_t^* + \beta_3^x \Delta rpx_t$ $-\lambda^x (x_{t-1} - \bar{y}_{t-1} - \gamma_1^x \overline{rpx}_{t-1} - \gamma_0^x) + \varepsilon_t^x$
Imports	$\Delta m_t = \beta_0^m + \beta_1^m \Delta m_{t-1} + \beta_2^m \Delta y_t - \beta_3^m \Delta rpim_t$ $-\lambda^m (m_{t-1} - \bar{y}_{t-1} - \gamma_1^m \overline{rpim}_{t-1} - \gamma_0^m) + \varepsilon_t^m$
Interest Rate Rule	$i_t = \rho i_{t-1} + (1-\rho)[r_t^* + \pi_t^e + \alpha_1 (\pi_t^e - \bar{\pi}) + \alpha_2 \hat{y}_t] + \varepsilon_t^i$
Expected inflation	$\pi_t^e = \omega \pi_{t-1} + (1-\omega)\bar{\pi}$
Nominal exchange rate	$s_t = \underbrace{\phi (i_t^* + Prem - i_t)}_{deviations\ from\ UIP} + \underbrace{s_{t-1} + 2[\Delta \bar{z}_t + (\bar{\pi} - \bar{\pi}^*)]}_{s_{t+1}^e\ anchored\ by\ long-run\ fundamentals} + \varepsilon_t^s$
Money demand	$\Delta m_t^d = \alpha \pi_t - \alpha_i \Delta i_t^L + \alpha_y \Delta y_t + \varepsilon_t^m$
Consumer Inflation	$\pi_t = \theta_1 \pi_{t-1} + (1 - \theta_1 - \theta_2)\pi_t^e$ $+\theta_2 [\pi_t^{*M} + \Delta s_t - \Delta \overline{rpim}_t] + \theta_3 \hat{y}_t + \varepsilon_t^\pi$
Potential output	Hodrick-Prescott filter or production function