TECHNICAL ASSISTANCE REPORT

TURKS AND CAICOS ISLANDS

Financial Stability Report Review, Credit Risk Modelling, and Stress Testing

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Prepared By

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Executive Summary

The missions focused on the review of the Turks and Caicos Islands Financial Services Commission (TCIFSC) Financial Stability Report (FSR), sectoral credit risk modeling, and solvency stress testing (ST). The first mission (January 29 – February 2, 2024) provided an assessment of the latest release of the TCIFSC Financial Stability Report and discussed financial stability indicators, corresponding financial stability risks, and essential elements of climate risk. It also covered credit risk modeling as a necessary precondition for new ST. The second mission (March 11-15, 2024) focused on constructing a new multi-factor and multi-period bank solvency ST tool based on macroeconomic scenarios. The financial system in Turks and Caicos is relatively large (275% of GDP) and is dominated by commercial banks (65% of the total financial system assets).

The TCIFSC's FSR has been assessed as relatively good. The TCIFSC has been publishing the FSR since 2015. The report provides a clear overview, motivation, macro-financial narrative, and discussion on the real sector. It covers the entire financial system supervised by the TCIFSC, including banks, investment businesses, domestic insurance companies, trust companies, and money service businesses. It provides the results of the banking ST and key initiatives of the authority.

Several credit risk models have been estimated to be used to project the impact of alternative macroeconomic scenarios on banks' non-performing loans (NPLs). The mission introduced the Bayesian Model Averaging (BMA) as a suitable approach to address uncertainty in modeling sectoral NPLs. It provided an R script with an initial estimate for four sectoral credit risk models – for loans to households, loans for the construction and land development sector, loans to the tourism sector, and other corporate loans.

Finally, a new multi-factor and multi-period solvency ST framework was developed. The mission reviewed available data, the regulatory framework, and constructed a new tool for the TCIFSC to stress test banks operating in Turks and Caicos Islands (TCI). It was tailor-made to fully respect the existing accounting, tax, and regulatory rules for TCI banks. The new framework is based on common explicit macroeconomic scenarios and the newly built credit risk satellite models for NPLs from the first mission. The calibrated macroeconomic scenarios – one baseline and two adverse – enter the NPL satellite models to project NPLs and, ultimately, credit losses. The tools provide scenario-specific macroeconomically-consistent projections of institutions' key balance sheet, profit & loss, and capital adequacy items over a period of up to three years.

Illustrative stress tests using December 2023 data were run to demonstrate the use of the new tool. The official TCI Ministry of Finance macroeconomic projection as of March 2024 was used as the baseline scenario, while the adverse scenarios were calibrated by expert judgment to capture the different severity of economic recessions. The results suggest that banks are generally resilient to economic stress given their relatively high initial capital adequacy and good pre-provision profitability.

The mission provided the TCIFSC with several recommendations in all three areas – the FSR, credit risk modeling, and bank ST. They covered (i) the content and structure of the FSR as well as its related financial stability analyses and processes, (ii) the use and update of credit risk models, and (iii) the regular conduct and further development of the new ST framework. These outcomes reflect both the structure of the organization in the TCIFSC concerning financial stability work as well as the composition of the financial system.

The FSR should be streamlined to organize the text more coherently around the central risk story. It should focus on key risk drivers and their transmission channels. The report could provide fewer nominal figures, using relative indicators instead. Some statistics could be moved to annexes. Moreover, mission/theme statements for each paragraph could be added to navigate readers throughout the text. A foreword from the Managing Director could also be added to spell out the key messages. The chapters on systemic risk and resilience of the banking

sector should be integrated into the financial sector development chapter. Overall, the key chapter on the financial sector developments should be less descriptive and be connected to financial stability risks. Moreover, the chapter on the macro-financial environment could be shortened and focus more directly on the TCI's economy. Finally, a discussion on new emerging risks, such as climate and cyber risks, should be added.

The relevant regulatory framework for different segments of the financial system should be discussed in the FSR. The FSR needs to be self-explanatory, allowing interpretation of the numbers provided. This can only be done by obtaining information on key elements of the regulatory framework relevant to understanding the different indicators presented. This information is critical, especially for the insurance sector, where, for example, solvency indicators might only be informative if a market valuation framework is in place.

The TCIFSC background financial stability analysis could be enhanced. Some additional information could be added to regular reporting to cover the key risks fully. Credit risk analysis could be strengthened by including information on the average probabilities of defaults and loss given defaults and collaterals (e.g., loan-to-value ratios). Similarly, non-banking analysis/discussion could be enhanced by adding critical information, e.g., duration, to assess market risk. In this respect, the FSR should reflect on the IFRS17 regulatory framework to clarify the discounting of liabilities and information on the type of reinsurance contracts in place. Hence, one person proficient in actuarial science could be hired.

The processes related to financial stability work, communication, and data management could be further enhanced. A production plan for FSR should be discussed before the production cycle starts and approved by the Managing Director. The external communication of the FSR should be regular (press releases, social media, interviews, etc.). The TCIFSC should consider setting up a centralized database for all existing data sources, including appropriate tools for analytics, and supporting a fully-fledged solvency stress testing system.

The TCIFSC should further test and improve the initial estimates of sectoral credit risk models. The team needs to become familiar with the R script provided in this context. The mission also initiated a discussion with the Ministry of Finance to generate baseline and adverse scenarios for stress testing based on the existing macroeconomic model, including six variables - tourist arrivals, inflation, real GDP, imports, real estate sector GDP, and government revenues. The initial models' estimates employ tourist arrivals, inflation, unemployment, and real GDP as explanatory variables. Although unemployment is not part of the macroeconomic model, it can be forecasted directly by the TCIFSC. Alternative sectoral credit risk model specifications with variables generated by the Ministry of Finance that are not included could be further checked. Moreover, historical and current write-off practices should be investigated to improve the projections.

The TCIFSC staff involved in ST and financial stability monitoring need to become familiar with the newly developed ST framework. The ST team should be able to update the tool with new macro-financial and institution-specific data regularly, calibrate the scenarios, and adjust additional assumptions and parameters to reflect potential changes in the economy and regulation. Cooperation with the Ministry of Finance in the area of scenarios should be strengthened, new satellite models should be developed, and the stress test results should be regularly published and shared with the bank supervisors to support risk-based supervisory practices further.

Recommendations	Priority	Timeframe[1]
Financial Stability Report		
1. The FSR should be streamlined to organize the text more coherently around the central risk story.	High	Near-term
2. Financial stability indicators need to be communicated together with the key aspects of the existing regulatory framework.	High	Near-term
3. New emerging risks, such as cyber and climate risks, should be consistently covered in the FSR.	High	Medium-term
4. The TCIFSC background financial stability analysis could be enhanced.	High	Medium-term
The processes related to financial stability work, its communication, and data management		
5. A production plan for FSR should be discussed before the production cycle starts and approved by the Managing Director.	High	Near-term
6. The external communication of the FSR should be regular (press releases, social media, interviews, etc.).	High	Medium-term
7. A centralized database for all existing and newly collected data sources, including appropriate tools for analytics, should be considered to support financial stability monitoring and a fully-fledged solvency stress testing system.	High	Medium-term
Credit risk modeling		
8. The team needs to become familiar with the methodology and corresponding R script provided.	High	Near-term
9. The team should further check for alternative specifications to improve the initial estimates of sectoral credit risk models.	Medium	Medium-term
10. The team should test the models for the macroeconomic scenarios generated by the Ministry of Finance.	High	Near-term
11. Historical and current practices for NPL write-offs should be investigated.	Medium	Medium-term
Stress testing		
12. The team needs to become familiar with the new stress testing framework.	High	Near-term

Recommendations	Priority	Timeframe[1]
13. Cooperation between the TCI FSC and TCI MoF in the area of macroeconomic scenarios needs to be developed.	High	Medium-term
14. Conduct regular (at least twice a year) top-down stress test exercises with the new framework, ideally in spring and autumn.	High	Near-term
15. Publish the aggregate stress test results of the spring exercise in the annual FSR and include a description of the new stress test framework as a "research note" in the FSR when the results are published for the first time.	High	Near-term
16. Share and discuss the stress test results with the Bank Supervision team and use them in the conduct of supervision and supervisory reviews.	Medium	Medium term
17. Consider developing additional models for banks' key items such as loan growth, deposit growth, interest rate, or non-interest income.	Medium	Medium term

[1]Near term: < 12 months; Medium term: 12 to 24 months.

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Acronyms and Abbreviations

CARTAC	Caribbean Regional Technical Assistance Centre
CCyB	Counter Cyclical Capital Buffer
FSR	Financial Stability Report
GDP	Gross Domestic Product
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
LGD	Loss given default
LTV	Loan-to-value ratio
NPLs	Non-performing loans
PD	Probability of default
ST	Stress testing
TA	Technical assistance
TCI	Turks and Caicos Islands
TCIFSC	Turks and Caicos Islands Financial Services Commission

Preface

At the Turks and Caicos Islands Financial Services Commission's (TCIFSC) request, two CARTAC missions were organized in person. The first one, conducted from January 29 to February 2, 2024, aimed to assist the TCIFSC with sectoral credit risk modeling and review the TCIFSC financial stability report (FSR). The second one, conducted from March 11 to March 15, 2024, constructed the new tool for the TCIFSC to stress test banks operating in the country.

Mr. Petr Jakubik conducted the first mission, while the second mission was conducted jointly by Mr. Petr Jakubik and Mr. Adam Gersl. The missions met with the TCIFSC Managing Director, Mr. Niguel Streete; TCIFSC Deputy Managing Director, Mrs. Kenisha Bacchus; the Head of Policy, Mrs. Shellyann Blackwood (she left the institution after the first mission); the Director, AML Supervision, Mr. Tamiko Smith; the Director of Insurance, Ms. Corine Bolton; Senior Policy Analyst, Policy Unit, Chivel Greenland; Senior Policy Analyst, Policy Unit, Xuxa Gordon; Senior Supervisor, Insurance Supervision, Ms. Coleen Hamilton and other TCIFSC staff. The mission wishes to thank all TCIFSC staff for their cooperation and productive discussions.

I. Introduction

1. **The TCIFSC is responsible for financial stability in the Turks and Caicos Islands (TCI).** The TCI is a British overseas territory with no central bank and the US dollar as the official currency. The TCIFSC supervises the whole financial system in TCI, covering both banks and nonbanks. The TCIFSC Policy Unit is responsible for macroprudential work. The unit comprises the head and two analysts with econometric skills who joined the authority in January 2024, shortly before the first mission was conducted. The head of the Policy Unit resigned after the first mission, and the position was not filled at the time of the second mission.

2. **The CARTAC technical assistance (TA) to the TCIFSC covered the TCI FSR review, sectoral credit risk modeling, and solvency stress test (ST) framework.** It was composed of two missions. The first one, conducted from January 29 to February 2, 2024, focused on sectoral credit risk modeling as a precondition for the multi-period and multi-factor ST. In addition, it also provided a brief review/assessment of the latest available release of the TCIFSC FSR. This TA aimed to support the TCIFSC's efforts to strengthen its ability to detect risks and vulnerabilities in the financial system and build capacity in the financial sector macroprudential oversight. The mission reviewed the existing credit risk data and their sectoral breakdown, provided a methodology to estimate sectoral credit risk models, delivered initial estimates and script for sectoral credit, and trained the staff of the TCIFSC to improve further and update the estimates over time. The second mission on bank solvency ST was conducted from March 11 to March 15, 2024. The TA followed up on the first mission on credit risk modeling as a necessary input for the multi-period and multi-factor ST. The mission introduced a multi-factor, multiperiod solvency ST framework for banks with a three-year forecasting horizon. It further assisted TCIFSC in fine-tuning initial estimates for sectoral credit risk models, a macro scenario design, and a narrative consistent with the key vulnerabilities in the financial system based on external economic shocks, significantly reducing the number of tourist arrivals. Finally, it trained the staff to use the ST tool proficiently. The mission included data gathering and compiling the templates with the inclusion of satellite models.

3. **The Policy Unit primarily received the technical assistance.** The unit is responsible for financial stability analyses and assessments, including drafting FSR and conducting stress tests. However, the team needs to cooperate with other TCIFSC teams, in particular supervision – bank & trusts, insurance, and AML teams. In addition, the Treasury Department of the Ministry of Finance provides a fiscal macroeconomic outlook and could help the unit design adverse macroeconomic scenarios for ST.

II. Macroeconomic and Financial Sector Background

4. **Real economic activity for the TCI extended its positive trend in 2023, albeit slowing marginally from 2022's figures as growth in key sectors normalized.** Real GDP is estimated to have grown by 13.7% in 2023, slightly lower than the previous year's growth of 14.1%. The deceleration in economic growth was underpinned by a normalization of tourism to pre-COVID-19 trends and a slowdown of the momentum in the construction, transport, storage, and communication industries. However, GDP was buoyed by real estate and financial sector improvements. The prompt and successful vaccination program enabled the authorities to ease entry requirements for incoming visitors to the TCI. As a result, tourism, the main income earner for the country, continued its upward path in 2023. Concurrently, labor market outcomes improved further, as the unemployment rate fell to 7.0% in 2023 from 8.0%in 2022. However, still elevated inflation continues to place pressure on businesses and consumers. Nonetheless, it should be noted that inflation is anticipated to fall in 2024-25 and reflects a broad-based decline in global core inflation because of still tight monetary policies, a related softening in labor markets, and fading pass-through effects from earlier declines in energy prices. However, the risks to the inflation outlook include the ongoing conflict in Ukraine, upheaval in the Middle East, and elevated prices in the US. These developments have the potential to indirectly impact TCI by keeping prices for key commodity imports inflated.

5. **In the short to medium term, economic growth is expected to be buoyed by momentum in the tourism, real estate, and construction industries.** Despite the global challenges, the TCI's tourism sector is expected to maintain its positive trend following the decline initiated by COVID-19. This improvement is largely predicated on effectively operationalizing the National Tourism Strategy and Implementation Plan for the TCI, published in March 2023. The plan aims to expand the tourism product by, among other things, increasing total tourist arrivals from 1.6 million in 2019 to 3.2 million in 2032; growing tourism revenue from $825 million in 2019 to $1.7 billion in 2032 while simultaneously stemming the decline in visitor spend; expanding the total registered accommodation rooms from 4,008 in 2019 to 6,143 by 2032. The plan also aims to improve air connectivity from Providenciales to all other tourism destinations within the island and diversify the current offering of tourism products. Furthermore, plans are underway to expand marketing in the current major tourist markets (USA, Canada, and UK) and gain market share in new potential markets in Europe (Germany, Italy, France, Spain, Benelux), Latin America (Brazil, Colombia, Chile, Argentina) and the Caribbean region. Furthermore, the construction and real estate sectors are anticipated to continue making significant contributions to the economy, evidenced by the recent completion of various resort and development projects and a robust pipeline of ongoing initiatives.

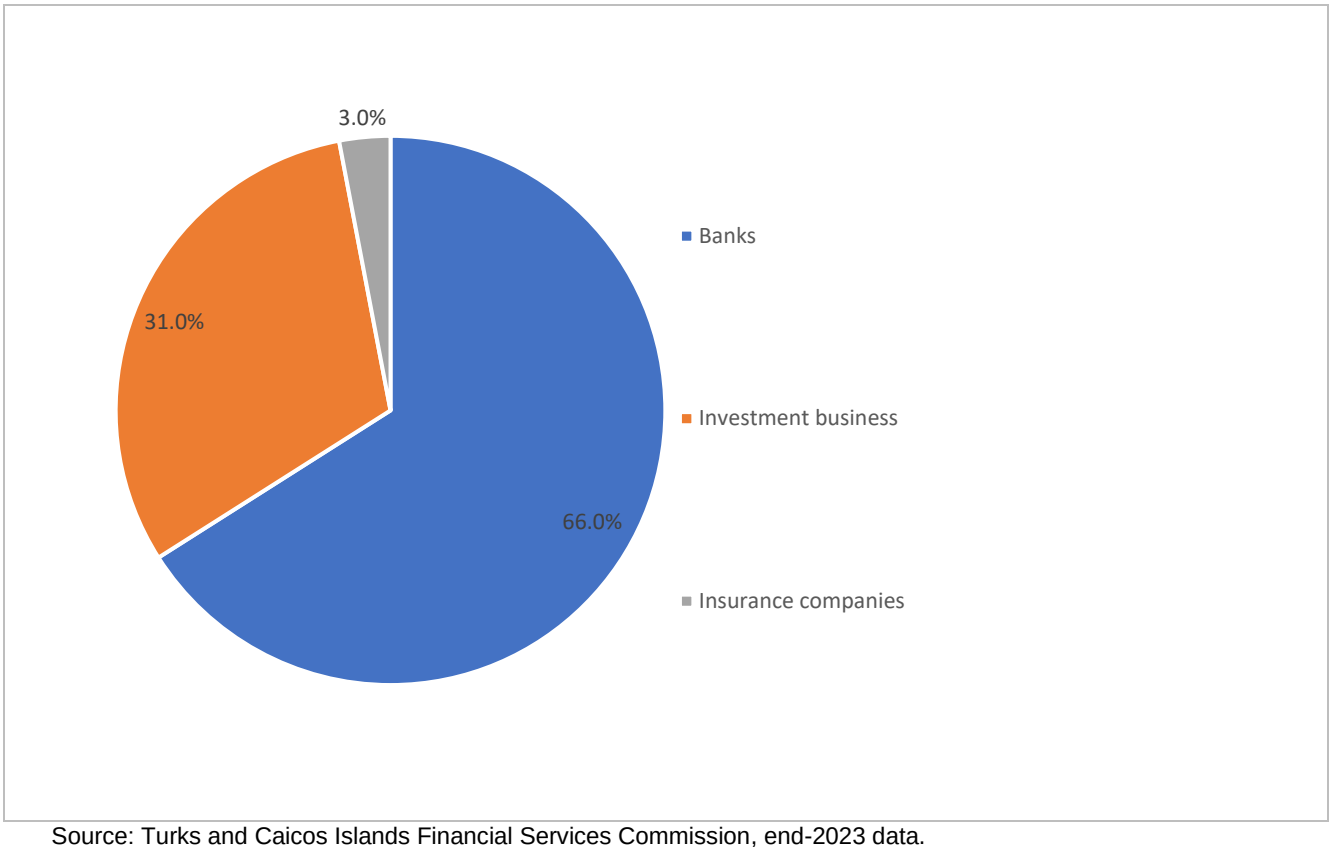
6. **Potential downside risks to the outlook include weather-related shocks, recession fears in the US, and ongoing geopolitical tensions in regions such as Europe and the Middle East that could adversely affect commodity prices and subsequently keep inflation elevated.** The TCI's vulnerability to weather-related events, given its location in the Atlantic hurricane belt, poses a significant risk to the outlook. Nevertheless, the impact of past major storms on growth, such as Hurricane Irma in 2017, was mitigated by TCI's strong financial reserves. Furthermore, the National Wealth Fund, established in 2016 to stabilize the economy against external shocks or natural disasters, stood at $51 million as of 31 December 2023. In addition, the government participates in the Caribbean Catastrophe Risk Insurance Facility (CCRIF)[1] to help mitigate any hurricane-related costs.

7. **The financial sector is large, corresponding to 275% of GDP at the end of 2023.** It is dominated by banks (65% of total financial assets, 6 banks), followed by investment businesses (31%, 5 investment dealers, 8

[1] CCRIF was designed as a regional catastrophe fund for Caribbean governments to limit the financial impact of hurricanes and earthquakes to Caribbean governments by quickly providing short-term liquidity when a policy is triggered.

mutual fund administrators), and insurance companies (3%, 18 companies). The banking sector is controlled by three Canadian banks (97% of total banking assets) and one British-Belizean bank. The largest banks operate via a traditional business model, with credit and liquidity as the main sources of risk. The other two banks are niche players specializing in offshore wealth management. All three Canadian Banks are large retail Systematically Important Banks (SIBs) for the TCI economy. Credit risk is crucial for the financial system to be properly assessed. However, interest rate risk could also be significant. The outcomes of the financial stability work have been regularly communicated in the TCIFSC FSR since 2015.

FIGURE 1. Distribution of Financial Sector Assets



Source: Turks and Caicos Islands Financial Services Commission, end-2023 data.

8. **The key financial stability risks are linked to credit risk related to a potential drop in tourist arrivals.** The country's economy heavily depends on tourism. Any sharp decrease in tourist arrivals might have significant implications for the financial sectors, especially for banks and their credit portfolios, due to increased NPLs. Such a development is connected to the external environment, especially in the US economy, as TCI is a popular destination for US citizens. In addition, non-life insurers might be negatively impacted by climate change risk and rising inflation, reflected in higher claims paid than expected.

III. Key Elements of Financial Stability Reports

9. **The mission highlighted the key elements of good financial stability reports based on the best international practices.**[2] The most important aspects and the gaps of the current report were discussed. In this respect, the following elements were covered: aims, objectives, and reasons; overall assessments; coverage of issues; data, assumptions, and tools; structure and other features.

10. **FSRs should explicitly state their objectives.** The reports should inform the public and encourage a constructive debate about financial sector developments and policies, holding public authorities accountable for their financial system surveillance. The information provided should facilitate a proper assessment of risks by investors active in the market.

11. **FSRs should be clear about what financial stability means.** The definition should include a dynamic perspective: a financial system is stable not only when carrying out its essential functions and services but also when capable of withstanding the shocks and strains that can be reasonably expected to affect it in the short and medium term. The report must clarify the operational benchmarks used to assess whether the system is stable, explaining what data, indicators, and types of information would be monitored for this purpose.

12. **The executive summary should be brief and easy to read.** A well-articulated executive summary is critical to inform and guide public opinion. A reader should not have to sift through the entire report to distill the main conclusions of the analysis and should be able to understand the report's key messages even if the reader is not financially sophisticated. The analytical chapters should cover more advanced and technical material, preferably in boxes or annexes. The function of the executive summary is to bring together the various strands of analysis developed in the rest of the report, presenting a panoramic and honest view of risks and vulnerabilities, including politically sensitive risks. The executive summary should also discuss how these risks have evolved since the previous issue of the report and provide a summary of the key recommendations.

13. **FSRs should integrate macroeconomic and financial analysis.** This analysis should flow in both directions, assessing the key macroeconomic trends that can impact the financial sector's stability as well as the key financial sector developments that can, in turn, impact the real economy. The report should identify the main transmission channels linking the financial and real economy and assess quantitatively how shocks in one area could reverberate in others.

14. **FSRs should not only explain but also properly justify the assumptions used.** This is especially relevant in the case of stress tests, whose meaning and interpretation depend critically on the assumptions made regarding the severity of the shocks, the speed and scale of the impact of shocks on default probabilities, the hurdle rates on capital and liquidity, dividend distribution, and other parameters of the test. Ideally, stress tests should be computed within a general equilibrium framework with the support of satellite econometric models that link macroeconomic and financial conditions. Simpler, partial-equilibrium, or even ad hoc tests can also be appropriate and could be the inevitable consequence of capacity or data constraints, but any limitations of this choice should be described and explained.

15. **FSRs should indicate the data and methodology used and make them easily available.** The sources and cut-off date of the data should be indicated clearly and in an easily identifiable place. The data displayed in the reports should also be made available to the public on the internet, on the same website where the

[2] See Lim, Ch. H., Klemm, A. D., Ogawa, S., Pani, M. and Visconti, C. (2017) Financial Stability Reports in Latin America and the Caribbean, IMF Working Paper, 17/73.

reports are published. The methodology used for projections, sensitivity analyses, and stress tests should be explained in clear and simple terms in the text, with more technical details provided in special boxes or annexes. In analyzing the data, the report should consider not only aggregate and average measures but also distributional indicators and, where appropriate, extreme or individual values (with proper safeguards to preserve confidentiality), highlighting, for instance, the position of the weakest or most vulnerable institutions or asset classes.

16. **The reports should follow a logical and integrated structure with unifying themes centered on the key risks.** The structure should enable the reader to identify which parts of the report contain specific information about different topics while also facilitating the discussion of cross-cutting topics. The structure should be consistent over time to allow the reader to compare the assessments. It should contain boxes or appendices dedicated to issues that either evolve slowly over time or reflect passing concerns. The reports should have an executive summary, several chapters devoted to external and domestic developments that affect the financial sector and changes in the financial infrastructure, including the regulatory and supervisory framework, and should preferably include a table of acronyms, a glossary of technical terms, a methodological annex, and a statistical annex.

17. **A well-designed communication strategy should support the publication of the reports** The current and past issues of the reports should be made available on the internet on a dedicated webpage that is easy to navigate and easy to find on the home page of the publishing authority; this page should also contain a database containing the data used as well as links to other relevant publications and other agencies and sources of information. An outreach campaign should support the report's launch by disseminating the main messages and recommendations through audiovisual broadcasts, press releases, public presentations, and press conferences. The format and medium of the communication should be adapted depending on the intended audience. The report's publication should follow a timely, regular, and predictable schedule. As financial sector conditions can change rapidly, reports should be published relatively shortly after a cutoff date for the data (preferably within three months), and the frequency changed over the medium term to two times a year to be in line with best international practices. The publication date should be announced in advance so that the readers know when to expect the next issue, and it should not change frequently. Publication dates should also be clearly indicated on the website to inform readers what information was available to the public at different times.

IV. Financial Stability Report Review

Organizational and Operational Setup of the FSR

18. **The structured cooperation on FSR should be enhanced.** The Policy unit regular meets with the Head of the Statistics Department in the Ministry of Finance every March before starting to work on the FSR. In addition, the team is in touch with the supervision teams (bank & trusts, insurance, and ALM) to be aware of any supervisory activities relevant from a financial stability point of view. Moreover, the Policy unit follows up on publications from external bodies, particularly the IMF Economic Outlook. To further enhance the synergies and internal cooperation among the teams, the Policy unit should prepare a detailed production plan and regular structural meetings with all relevant teams to agree on the exact timeline for the FSR production. The teams' representatives should attend the initial meetings with sufficient seniority.

19. **The senior management should approve the detailed FSR production plan.** It needs to include all important steps, including all cross-team meetings, data submissions, text contributions, and internal submissions for comments and approvals. The responsibility for each step must be clearly stated in the production plan. The report is commented on internally by the Director of the Bank & Trusts, Insurance, and ALM Supervision Departments, as well as the Managing Director. In addition, it is commented externally by the Head of the Statistics Department of the Ministry of Finance. The final discussion of the FSR in the TCIFSC Board needs to be scheduled before the final publication and stated in the production plan. Finally, a realistic publication date that allows all necessary steps must be reflected in the production plan.

External Communication of the FSR

20. **The TCIFSC should complement the FSR production plan with the communication strategy to promote the FSR as the key communication tool for financial stability.** The final version of the FSR is shared with all managers and staff and published on the website. It follows with a special meeting with the staff and the TCIFSC board members. The board receives the final version of FSR, but only sometimes does it happen before the publication date. The FSR is complemented by the press release prepared by the Policy Unit and sometimes sent to the media. However, the TCIFSC does not have a communication department or communication strategy to promote the FSR.

21. **The TCIFSC should consider setting up a communication team that would prepare a communication strategy for the FSR.** This could include the press conference on the publication day, followed by several interviews with key media and/or YouTube videos with the management and experts. The submission of the FSR, together with the press release to the media, should be set up as a rule. Moreover, it should be sent to the key representatives of the financial sectors. Shortly after the publication, the TCIFSC could also consider regularly organizing a seminar with the market participants/analysts to discuss the report's key findings. Moreover, all data displayed in the report in the form of charts or tables should be provided together with the report on the website. In addition, the Foreword from the Managing Director could be included in the FSR to communicate key messages. The quotes from the Foreword could then be included in the press release.

Structure and Content of the FSR

22. **The TCIFSC has regularly started publishing the FSR since 2015.** The report provides a clear overview, motivation, macro-financial narrative, and discussion on the real sector. It covers the entire financial system supervised by the TCIFSC, i.e., banks, investment businesses, domestic insurance companies, trust companies, and money service businesses. It provides the results of the banking stress test and key initiatives of the authority. The FSR includes the Preface section stating the aim/motivation and the reference date for the data used. In addition, the report acknowledges governmental institutions that provided different inputs. Moreover, the TCIFSC publishes the FSR highlights together with the report publication. The mission provided several recommendations to the TCIFSC to enhance the report further. They covered the content and structure of the FSR, as well as its related financial stability analyses and processes.

23. **The FSR should be streamlined to organize the text more coherently around the central risk story.** Overall, the report is based mostly on backward-looking indicators and descriptive statistics. The text could be streamlined and organized more coherently around the central risk story, focusing on key risk drivers. It should focus on the key risk transmission channels that need to be explained so that they can be easily followed by a reader who is not an expert in the field. The mission statements/themes could be added for each paragraph to help readers navigate throughout the text. Moreover, nominal values reported in the text should be substantially reduced, either replaced by relative indicators or moved to a statistical annex.

24. **The FSR could be restructured to better follow the key risks.** Overall, the key chapter on the financial sector development should be less descriptive and be connected to financial stability risks. The chapters on systemic risk and resilience of the banking sector should be brought earlier and integrated into the financial sector development chapter, which is currently too descriptive without stating a clear link to financial stability. In addition, the long chapter on the macro-financial environment currently focuses on the whole region. Instead, it should be shortened and focus more directly on the impact on the TCI economy. Moreover, a discussion on new emerging risks, such as climate and cyber risks, should be added. Finally, a foreword from the Managing Director could be added to spell out the key messages.

25. **A description of the relevant element of the existing regulatory framework for different segments of the financial system should be added.** This information is critical, especially for the insurance sector, where, for example, solvency indicators might only be informative if a market valuation framework is in place. The FSR needs to be self-explanatory, allowing interpretation of the numbers provided for readers unfamiliar with the financial system in TCI. This can only be done by obtaining information on key elements of the regulatory framework relevant to understanding the different indicators presented.

26. **The TCIFSC background financial stability analysis could be enhanced.** Some additional information could be added to regular reporting to cover the key risks fully. Credit risk analysis could be strengthened by including information on the average probabilities of defaults and loss given defaults and collaterals (e.g., loan-to-value ratios). Similarly, nonbanking analysis/discussion could be enhanced by adding critical information, e.g., duration. In this respect, the FSR should reflect on the IFRS17 regulatory framework to clarify the discounting of liabilities and information on the type of reinsurance contracts in place.

V. Credit Risk Modelling

27. **The financial stability analytical toolkit should be strengthened.** Over time, the TCIFSC should develop various econometric models to project key financial stability variables such as credit volumes provided to the private sector, nonperforming loans, or banks' interest and non-interest income and expenses. In this context, the mission presented to the TCIFSC staff the Bayesian Model Averaging (BMA) approach as a suitable methodology to tackle model uncertainty, limited-time series that are available for TCI, and the need to explore links between various macro-financial variables and banks' performance indicators. BMA's flexibility in considering multiple models also helps handle uncertainty in predictions and parameter estimates. It tackles challenges such as selecting the correct variables and understanding dynamic relationships, making it an effective method for drawing accurate conclusions even with limited data.

28. **Macro credit risk modeling is a crucial financial stability analytical toolkit component.** This is because of the important role of credit risk in the TCI and the need to project this risk under different macroeconomic scenarios as the necessary precondition for multi-period, multi-factor macro stress testing of the TCI banking sector. Thus, the mission concentrated on developing credit risk models that could be used at a later stage in macro stress testing. Given the different sectors' credit risk sensitivity to change in macroeconomic variables, the mission developed four sectoral credit risk models - particularly for loans to households (personal loans), loans for the construction and land development sector, loans to the tourism sector, and other corporate loans. As default rates time series are unavailable to the TCIFSC, nonperforming loan ratios for the four sectors mentioned were employed as a dependent variable.

29. **The four credit risk models were estimated using the BMA method.** Before they were used as dependent variables, the NPL ratios available for all mentioned sectors were first transformed using a logit transformation to make them suitable for use in linear models. We considered tourist arrivals, inflation, real GDP, and unemployment as explanatory variables. Data on NPL ratios and tourist arrivals are available quarterly. Real GDP, inflation, and unemployment are currently available only annually, so we constructed quarterly proxies via interpolation here. The mission provided the R script with an initial estimate for the four sectoral credit risk models mentioned. The final set of models for each sector is available in Appendix 1. In each sector, between 3-4 models were estimated, with the final sectoral projection being a weighted average of the individual model projections.

30. **The TCIFSC should further test and improve the initial estimates of sectoral credit risk models.** The team must become familiar with the R script provided in this context. The mission also initiated a discussion with the Ministry of Finance to generate baseline and adverse scenarios for stress testing based on the existing macroeconomic model, including six variables - tourist arrivals, inflation, real GDP, imports, real estate sector GDP, and government revenues. The Ministry of Finance's macroeconomic model projects tourist arrivals based on US GDP, and this then serves to estimate domestic GDP. Although unemployment is not part of the macroeconomic model, it could be forecasted directly by the TCIFSC. Alternative sectoral credit risk model specifications with variables generated by the Ministry of Finance that are not included in the initial estimates should be further checked. Moreover, historical and current NPL write-off practices should be investigated to improve the projections.

VI. Building the ST Tool

31. **The mission developed a new Excel-based macro ST tool for the banks in TCI.** The new framework explicitly projects the key balance sheet items (such as performing and non-performing loans across the main loan segments, loan loss provisions, total and risk-weighted assets, and capital) and P&L items (net interest income, other income and expenses, and credit losses) over a horizon of up to three years. The tool works with four key loan segments – tourism & entertainment, personal loans, construction, and others. The tool can be run on any end-quarter data and generate results using the evolution charts and contribution charts to visualize better the key drivers of changes in capital adequacy for banks. The tool also includes a detailed step-by-step guide in the form of a checklist for every new round of stress tests. A detailed user manual was prepared and shared with the authorities, too.

32. **The ST tool is tailored to the existing accounting, tax, and regulatory rules for banks in TCI.** In particular, when projecting loan loss provisions, the tool can handle both the traditional coefficient-based provisioning by individual asset quality classes and a possible IFRS 9 provisioning to which some banks have already moved. The definition of regulatory capital regarding what is included in Tier 1 and Tier 2 capital is fully respected. Finally, the tool acknowledges the 0% corporate income tax rate for banks.

33. **The new framework is based on explicit macroeconomic scenarios**. The baseline scenario should reflect the most recent official macroeconomic outlook prepared by the TCI Ministry of Finance. In contrast, two adverse scenarios (titled “moderate” and “severe”) should be calibrated to capture different intensities of an economic recession. The key macroeconomic variables that should always be projected for all three scenarios are those that can be projected by the TCI authorities and that are used directly or indirectly (as explanatory variables in credit risk models) in the stress testing framework – real GDP growth, inflation, unemployment rate, tourist arrivals, income from tourism, and US 3M T-bill rate. In the future, the macro projections could also include a credit forecast to the private sector, which is used as an input to calibrate loan portfolio growth for banks and leads to a dynamic feature of the stress test in which the institutions’ balance sheet size changes over time.

34. **The scenario-specific macroeconomic projections are used to predict NPLs with the newly constructed sectoral credit risk satellite models.** However, to acknowledge a certain level of non-linearity in the relationship between the macro variables and NPL ratios, the resulting BMA weighting schemes were adjusted by expert judgment to yield a more conservative projection of NPLs for more substantial recession. In particular, the weight applied on the most “reactive” NPL model (that would generate the most significant NPL increases for a given change in its explanatory variables) was set at the highest level for the severe scenario and the second highest level for the moderate scenario (at the expense of the remaining models) compared to the baseline projections.

35. **For each institution, the absolute change in the projected aggregate NPL ratio is applied to each loan segment's starting NPL ratio level.** Using absolute rather than relative changes ensures that even institutions with a 0% starting level of the NPL ratio in some loan segments are hit by new NPLs in times of adverse economic developments. Additionally, it is possible to provide additional expert-based adjustments of the projected NPL ratio and combine the NPL model projections with (i) explicit segment-specific NPL ratio add-ons and (ii) explicit bank-specific NPL ratio add-ons, enabling the stress of selected sectors or banks beyond the average impact of economic recession on NPLs.

36. **In addition to the NPL ratio, the ST tool also projects the special-mention-to-performing loans ratio for each institution and segment.** In adverse economic conditions, the proportion of special mention loans in performing loans, along with the NPL ratio, typically increases. Instead of estimating a separate model, the

projection for the special-mention-to-performing loans ratio is linked to the projection of the NPL ratio, using an elasticity specified as a parameter set by expert judgment, which can be changed if needed. The loan growth projection calibrated as part of the scenario and, for simplicity, applied equally across all loan segments and institutions, would then jointly with the credit risk projections (NPL ratio, special-mention-to-performing loans ratio) determine the paths of the good, special mention and non-performing loan exposures. Having three explicit loan quality classes in the tool facilitates a future complete transition to the IFRS 9 approach (with Stage 1-3 loan classes defined very similarly) or use for banks that have already started to use IFRS 9 loan classification and provisioning.

37. **The projection of loan loss provisions is based on the existing provisioning rules and bank practices.** The NPL provisioning levels are institution- and segment-specific, constructed for each year of the horizon as the starting NPL provisioning rate of the institution in that segment plus an assumed increase of around 10-20 ppts (cumulative) in both adverse scenarios (typically no change from the starting level for the baseline scenario). This shock can be set separately for each scenario and year and reflects a worsened quality status of NPLs and implicitly their migration into worse sub-classes requiring more provisioning (for banks not using the IFRS 9 approach) or a deterioration in the collateral value (for banks using the IFRS 9 approach). The same logic is applied to special mention (Stage 2) or good (Stage 1) loans – the starting observed level is respected and used for the baseline scenario. In contrast, an increase set by a parameter is applied in the adverse scenarios. Provisions created for good loans are considered general provisions and qualify as Tier 2 regulatory capital up to 1.25% of credit risk-weighted assets, which is in line with Basel standards, which is reflected in the tool.

38. **Final loan loss provisions impacting the P&L are derived from the projected stocks, considering scenario- and year-specific NPL write-offs.** These are calibrated by expert judgment using qualitative information about bank write-off practices. Even if the model projects unchanged NPL stocks, new provisions might still need to be created, accounting for the NPL inflows needed to keep NPLs stable amid NPL write-offs.

39. **Projections of additional financial assets other than loans, such as cash, claims on financial institutions, debt securities, and other assets, as well as deposits as the primary funding source, can be specified.** The calibration of these growth rates can follow the assumptions for loan growth but can also be done by expert judgment depending on observed developments and the scenario considered. The evolution of asset items is needed because they have an impact on total (and some also on risk-weighted) assets, and some also form a part of interest-bearing assets along the loans, so their growth would ceteris paribus also increase the projection of the net interest income. The projection of deposits is needed as it co-determines the evolution of interest expenses. However, when calibrating the growth of deposits and funding, the parameter needs to be set so that the assets equal liabilities (and thus may require some iterations).

40. **Market risk regarding the revaluation of securities can be assumed as an option.** Almost all securities held are foreign government bonds (typically US treasuries) and are normally held at amortized costs until maturity. The government securities are a source of interest income and also serve as a potential liquidity buffer. Their revaluation is thus not performed under normal circumstances but can be switched on as a sensitivity analysis in the tool. No domestic securities are issued – neither government nor private bonds; thus, no sovereign risk is included in the tool. For the FX risk, using USD as the currency in TCI and a virtual absence of other currencies in banks' operations practically removed the exchange rate risk in the institutions' balance sheets. It was thus not considered an item to be stressed.

41. **Concentration risk can be stress tested.** The exposure to one or more of the largest five borrowers can be stressed, assuming an LGD calibrated at any level between 0% and 100%. This traditional concentration risk stress test is typically applied as a sensitivity test and additional shock within one of the adverse scenarios.

42. **Pre-provision income is projected as a sum of interest and non-interest income minus interest and non-interest expenses, serving as the first line of defense against credit losses.** Interest income is projected as a product of time-varying average implicit interest rate modeled along the assumed scenario-

specific development of USD 3M T-bill rates (with a pre-defined passthrough) and interest-bearing assets, which typically decline in adverse scenarios amid the migration of performing loans into NPLs. Interest expenses are projected using the assumed path of deposit funding and the deposit interest rates, which themselves are set at the initial observed level but can include a shock to funding costs caused by possible funding liquidity pressure, which can be driven, for example, by concerns about the stability of the financial sector in times of bad economic developments. Non-interest income and expenses are projected to be a product of the institution-specific starting points and haircuts set by expert judgment, whereby they can be later linked to macroeconomic scenarios directly via newly constructed satellite models.

43. **Capital is projected consistently with the existing regulatory framework, changing over the horizon as a function of net income.** Negative net income – accounting loss – decreases capital. In contrast, positive net income is first subject to the distribution decision so that only the retained part (after the dividend payouts) is topping up the capital. The assumptions about dividend payouts are institution-specific, reflecting their typical dividend payout behavior.

44. **Total assets are projected as the sum of time-varying net loans and other financial assets, while credit risk-weighted assets (RWAs) are projected as a function of net exposures and the risk weight for key asset classes.** RWAs for market and operational risk are kept constant. Total assets and RWAs will thus be driven by credit growth, the evolution of the NPL ratio, and the assumption about the development of other asset items and provisioning, and both would typically decline in adverse scenarios amid very low or negative gross credit growth, migration of a large part of loans to NPLs, and higher average NPL provisioning, bringing the net value of loans down. This typically helps the capital ratios somewhat, but the effect is small compared to the effect of economic recessions on capital, especially if banks run large accounting losses.

45. **The tool reports the key results based on capital ratios.** Apart from the scenario-specific evolution of the overall capital adequacy ratio for banks (and also a simple capital ratio and Tier 1 ratio, for information), the tools show the factors that contribute to the changes in the capital adequacy ratio, such as net interest income (+), other income/expenses (+/-), credit losses (-), dividend payouts (-), and the change in the denominator of the ratio, i.e. (risk-weighted) assets (+/-). Also, several institutions in each year and scenario that are below a specified hurdle rate for the total capital adequacy ratio and their share in the sector's assets are reported, together with capital injections (expressed as a % of GDP) that are needed to bring all institutions to at least the minimum capital adequacy ratio of 11%.

46. **Table 2 summarizes the key components of the developed ST methodology for banks in TCI.**

Table 2. Overview of the Key Components of the Stress Testing Methodology

Component	Stress testing tool
Institutional perimeter	All institutions (6 banks, additional banks can be added)
Key variables in which macroeconomic scenarios are calibrated	Real GDP growth, y-o-y % Inflation, y-o-y % Unemployment rate, % Tourist arrivals, ths. Income from tourism, mil. USD US 3-month T-bill rate, %

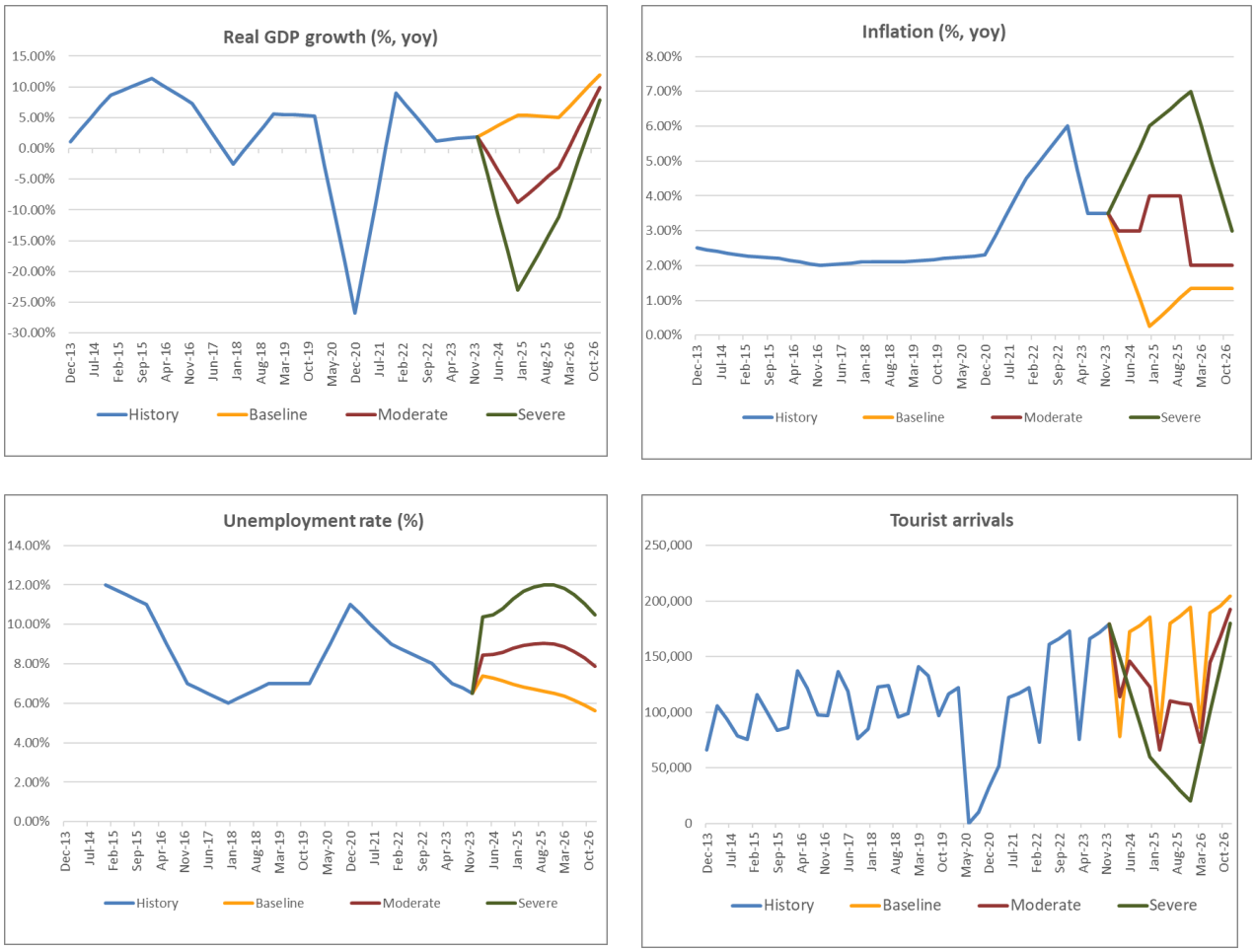
Component	Stress testing tool
Credit risk satellite models	Estimated by BMA as a suite of simple models, with the final projection being a weighted average of forecasts Dependent variable: logistic transformation of NPL ratio Explanatory variables (in various combinations, see Appendix): autoregressive term, GDP growth, inflation, tourist arrivals, constant
Additional credit and credit risk assumptions that need to be set	Private sector credit growth, y-o-y% Assumed (annual) NPL write-off rate, % Change in NPL provisioning from initial level, ppts Change in special mention loan provisioning from the initial level, ppts Change in good loan provisioning (general provisions) from the initial level, ppts Factor of special-mention-to-performing loans absolute increase compared to NPL ratio increase Bank-specific NPL add-ons Sectoral NPL add-ons
Assumptions for the development of balance sheet items	Annual growth, %, for: - Cash - Claims on financial institutions - Government securities - Other securities - Other assets (incl. fixed assets) - Deposits and other funding
Concentration risk	Need to specify: - which out of 5 largest borrowers fail - In which year of the horizon - in which scenario - loss given default (LGD) in %
Assumptions for pre-provision income	Passthrough coefficient from 3M USD T-bill rates to - US government securities - Other securities - Claims on financial institutions - Loans and advances Funding shock (change in deposit rates from the initial level) Scenario-specific change in non-interest income applied on institution-specific initial annual volume, % Scenario-specific change in non-interest expense applied on institution-specific initial annual volume, %
Additional assumptions	Dividend payout rate Minimum total regulatory capital ratio

Source: Mission team calculations.

VII. Results of Illustrative Stress Tests

47. **The mission prepared an illustrative ST using December 2023 data.** All six banks were covered. The macroeconomic scenarios were calibrated by the mission team in cooperation with the TCI Ministry of Finance and TCIFSC. The baseline scenario captures the official MoF forecast as of March 2023. The Severe scenario was calibrated to reflect a 3-standard deviation shock to the GDP growth, assuming a real GDP decline by around 20% at the bottom of the cycle. The Moderate scenario captures a milder recession, with GDP growth values set as averages of the baseline and the Severe scenario values (Figure 2). Both adverse scenarios reflect a possible deterioration in tourism revenues and a resulting economic recession hitting the economy similar to the 2009-2011 post-Global Financial Crisis period (drop in GDP by 20%) or the recent 2020-2021 COVID-19 recession (drop in GDP by 25%). Other variables were calibrated by expert judgment, assuming a global recession for the Severe scenario. Loan growth was assumed at 10%, 5%, and 0% annually for the Baseline, Moderate, and Severe scenarios, respectively.

Figure 2. Macroeconomic Scenarios Used for the Stress Test

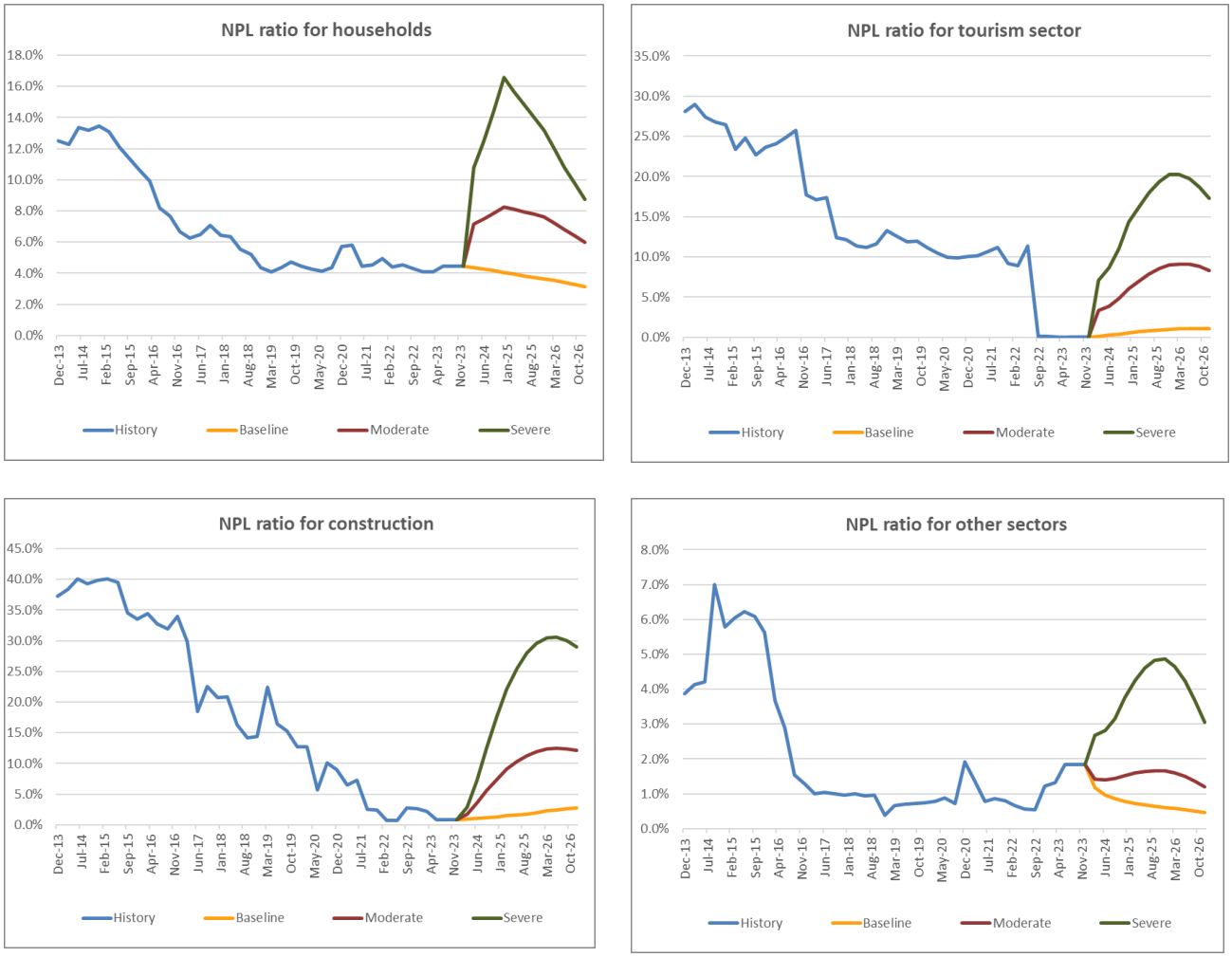


Source: Turks and Caicos Islands Financial Services Commission, mission team calculations

48. **The estimated NPL models project the NPL ratios in the four sectors.** For loans to households and loans to other corporate sectors, the baseline scenario assumes a slight decline in NPLs amid a relatively good projection of economic growth and a declining unemployment rate in this scenario (Figure 3). The credit risk models suggest a mild increase even in the baseline for the other two sectors. For both adverse scenarios,

there is an increase in the NPL ratio to the high levels experienced in post-GFC times around 2013. No sector-specific shocks or failures of the largest borrowers are assumed.

Figure 3. NPL Ratios in the Stress Test



Source: Turks and Caicos Islands Financial Services Commission, mission team calculations.

49. **Additional assumptions that significantly impact the projected loan losses are related to NPL provisioning.** A shock to NPL provisioning rate of 15 ppts in the Moderate scenario and of 30 ppts in the Severe scenario was assumed (cumulatively, with the first-year shock of 10 ppts and 20 ppts, and the second-year increase of 5 ppts and 10 ppts, respectively). On average, the starting NPL provisioning was 47%, so these rates would increase to about 87% for the Severe scenario. The shock was set to 1 ppts and 5 ppts for special mention loans, and for general provisions/Stage 1 loans to 0.5% and 1%. The NPL write-off rate was set to 10% for all scenarios.

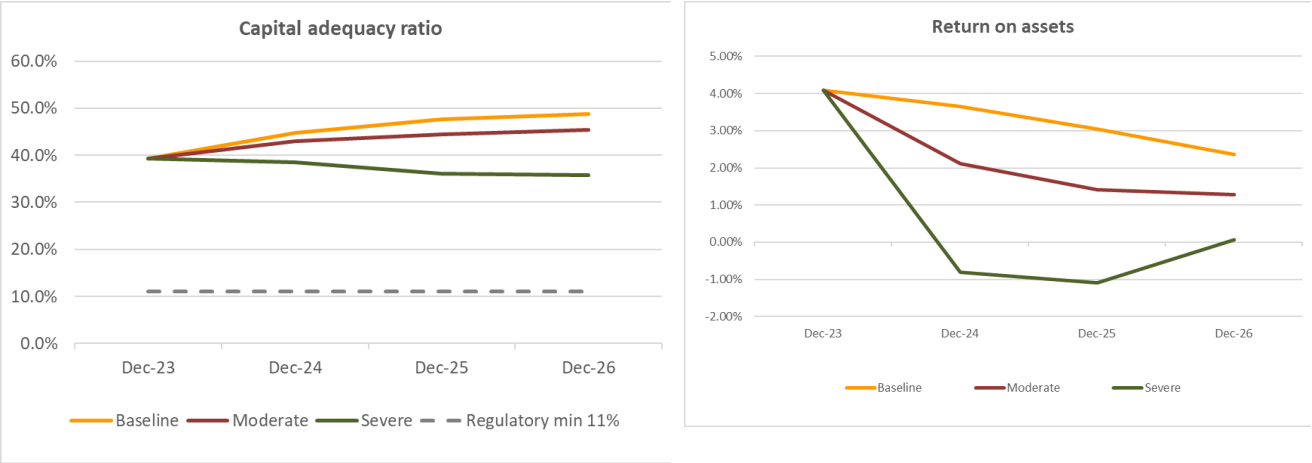
50. **Loan losses in both sectors would be relatively small in the baseline scenario but would increase dramatically in the Severe scenario.** In this adverse scenario, the stock of loan loss provisions would increase about four times over the 3-year horizon, reaching almost 13% of gross loans and with large new provisioning of around 6% per year on average in the first two years of the horizon (credit loss rate defined as new provisioning booked in the P&L over the initial stock of net loans). This contrasts with the baseline scenario's credit loss rate, which hovers around 0.5% annually.

51. **Pre-provision income would continue to serve as a first line of defense against credit losses but would be lower in adverse scenarios.** The net interest income would drop considerably in the Severe scenario due to declining interest-bearing assets (driven by lower-performing loans) and lower average loan interest rates due to a large decline in US interest rates. No funding shock was assumed, and other asset items, as well as deposits and funding, were assumed to remain at the initial level in this illustrative stress test for simplicity. The non-interest income was assumed to remain at last year's baseline level and drop by 15% and 30% in the Moderate and Severe, respectively. Non-interest expenses are assumed to grow somewhat (by 35 annually) in all scenarios. No revaluation of securities was assumed.

52. **Four larger banks would become loss-making only in the Severe scenario, while two smaller banks would experience negative profitability already in the Moderate scenario.** In total, all banks would, at one point, experience negative profits. Assuming no corporate tax and 20% dividend payout rate for all banks, the projected net income would impact the final capital stock. In parallel, risk-weighted assets (RWAs) would change following the implied trajectory of net loans and (unchanged) other asset items.

53. **The results suggest that TCI banks are generally resilient to economic stress, given their very high initial capital adequacy.** In aggregate, the capital adequacy ratio (CAR) would grow both in the baseline and the Moderate scenario due to a continuing aggregate profitability driven by the largest banks (Figure 4). Only in the Severe scenario would the sector's CAR drop, given a faster drop in capital than in RWAs (which are also declining in this scenario), but still remain comfortably above the limit. All banks would remain above the regulatory minimum for capital adequacy of 11% in all scenarios. The contribution of the individual factors in the Severe scenario over a 3-year horizon is shown in Figure 5.

Figure 4. Capital Adequacy and Profitability in the Stress Test



Source: Turks and Caicos Islands Financial Services Commission, mission team calculations.

Figure 5. Contribution chart – changes in the bank's aggregate capital adequacy

Source: Turks and Caicos Islands Financial Services Commission, mission team calculations.

54. **While the illustrative stress tests demonstrate how the new ST framework works, additional analysis and fine-tuning of the scenario calibration are needed before regular use of the ST tool.** The scenarios need to be prepared consistently and underpinned by a good narrative of the scenarios jointly developed by the TCIFSC and TCI Ministry of Finance. The calibration of several parameters, such as the credit growth, NPL write-offs, or the passthrough coefficient for interest rates, might need to be based on additional analysis and data.

VIII. Stress Test Recommendations

55. **The ST team at TCI FSC should become familiar with the new framework to make regular updates.** The staff must be able to update the tool with new macro-financial and institution-specific data regularly, calibrate the scenarios, and adjust additional assumptions and parameters to reflect potential changes in the economy and regulation. The new framework should be used for regular internal stress tests, ideally twice a year – once in the spring and once in the autumn.

56. **Other satellite models besides credit risk models can be constructed and included in the ST framework.** The TCIFSC should explore options to estimate models to project selected asset items, deposits, loan and deposit interest rates, loan growth, or non-interest income.

57. **Finally, the TCIFSC, in cooperation with TCI MoF, should further develop its ability to generate suitable adverse macro financial-consistent scenarios for ST.** The MoF internal macroeconomic projection framework is in place. Still, the calibration of additional macroeconomic variables for both the baseline and the adverse scenarios might be needed in the near future both to support the narrative of the scenarios and as additional explanatory variables for the improved and new satellite models.

58. **The TCIFSC should regularly conduct top-down ST exercises with the new framework at least twice a year.** Since the results of the stress tests are included in the FSR, which is published annually, one exercise should be conducted in the spring to ensure the report contains the most up-to-date data. A second exercise could be conducted in the fall for internal purposes, allowing the TCIFSC to monitor emerging risks and assess the resilience of the tested institutions.

59. **The aggregate ST results of the spring exercise should be published in the annual FSR.** Given that stress test results are a regular part of the FSR, it is important that the readers fully understand the differences between the results in the old and new frameworks. In this respect, a detailed description of the new framework, including all key assumptions, should be provided as a “research note” in the FSR once the results are published for the first time.

60. **ST results should be shared and discussed with the Bank Supervision team at the TCIFSC.** Stress tests are valuable not only from a macroprudential perspective but also from a microprudential viewpoint. Therefore, the results should be utilized in supervisory reviews and the overall supervision of individual banks. This approach would foster synergies between the financial stability and supervision teams, enabling further improvements in the calibration of the ST framework and better addressing changes within the banking sector.

IX. Data Sources and their Management

61. **The TCIFSC data sources consist of macroeconomic, supervisory, and market data.** Macroeconomic data are obtained from the Ministry of Finance in EXCEL format by email, typically around March, with potential yearly updates when needed. The available data since 2014 include quarterly statistics on public debt, government spending, current account balance, balance of trade, exports, imports, and inflation[3]. In addition, unemployment, balance of payment (BOP), and nominal and real GDP are available annually. Supervisory consolidated quarterly data are available in Excel containing time series from September 2014 (32 indicators) and, for some indicators, even from 2009. In addition, balance sheets and income statement data are kept separately in Excel files. The TCIFSC also uses market data from publicly available sources In particular, the Policy Unit uses the following indicators - US GDP growth, US 3-month treasury bill yields, the IMF World Economic growth index, JP Morgan global spreads, Chicago Board option, and exchange market volatility index.

62. **The TCIFSC should set up a centralized database for all existing data sources, including appropriate tools for analytics.** The current situation when all data are stored in Excel files and shared via the shared drive is not optimal. It requires a lot of manual work and, in practice, reduces financial stability work to a few indicators that are collected in time series. Balance sheet and income statement data are accessible to the Policy Unit for banks only. In this respect, one centralized database, ideally set up as a data warehouse, would increase efficiency in the institution and allow the policy Unit to enhance its analytical work further. It would also strongly support building a fully-fledged solvency stress testing system.

63. **The TCIFSC might consider setting up the data warehouse jointly with other governmental institutions to decrease the costs.** The confidentiality of different data sources should be set up via a system of access rights. A copy of the database (mirroring database) should be set up for analytical purposes. The statistical mirroring database must support analytical tools to process large data (e.g., Power BI, R), as data should be processed directly at the server. Any chosen data management solution needs to provide complete flexibility to conduct any complex analysis that might be impossible to foresee when setting up the TCIFSC data management system.

64. **Moreover, the TCIFSC should consider setting up a centralized credit register as a rich data source for analytical purposes.** Like the data warehouse, a fully flexible solution for data processing using an analytical mirrored database must be set up. This solution would allow the calculation of crucial credit risk parameters such as default rates and average LGDs for different segments of credit portfolios (e.g., mortgages, consumer loans, etc.). In this respect, it needs to be set up so that a complex analytical work could be conducted. Moreover, the system should allow combining data from the credit register and the data warehouse for analytical purposes.

65. **In the meantime, the TCIFSC could cover existing data gaps through different industry surveys.** The TCIFSC could initiate a survey with the industry to help overcome those gaps. Such surveys could especially cover information related to credit risk, given its prominent role in the financial system, and cyber risk, a new emerging risk that has yet to be monitored. Credit risk could be covered, for example, by a bank-lending survey.

66. **Such surveys should collect all crucial missing information related to the key financial stability risks, especially credit risk.** This also partially addresses the current need to use credit register(s). The surveys could cover especially the following information:

[3] Inflation started to be reported quarterly only in 2024, before it was annually.

- Average PD/default rate for corporate loans, consumer loans, and mortgages;
- Average loss given default for corporate loans, consumer loans, and mortgages;
- Average lending rates for corporate loans, consumer loans, and mortgages;
- Information for corporates could potentially be further broken down to SME, and large corporates;
- Information on the type of collateral – real estate, other assets, etc.
- Average deposit rates.

67. **Another potential survey could address the lack of information on cyber risk.** It could cover, for example, the following information:
    - Number of cyber incidents with the impact exceeding the defined threshold,
    - Total losses related to cyber incidents,
    - The information could be potentially broken down by type of cyber incidents, e.g., malware attack, phishing attack, insider threat, etc.

68. **Any other information/survey that would address the existing data gap based on the risk identified should be further considered.** This could reflect any potential new emerging risks or any existing data gaps beyond the mentioned examples.

X. Conclusions

69. **The TA provided to the TCIFSC has significantly enhanced its capacity to monitor and manage financial stability.** The missions focused on reviewing the FSR, developing sectoral credit risk models, and constructing a ST framework. These efforts have collectively strengthened the TCIFSC's analytical toolkit and its ability to detect and address financial vulnerabilities.

70. **The review of the FSR highlighted the need for a more streamlined and coherent presentation of financial stability risks.** Recommendations were made to focus on key risk drivers and their transmission channels, integrate systemic risk and resilience analysis into the financial sector development chapter, and include discussions on emerging risks such as climate and cyber risks. Enhancing the FSR's structure and content will improve its effectiveness as a communication tool for financial stability.

71. **The development of sectoral credit risk models using the BMA approach has provided the TCIFSC with robust tools to project the impact of macroeconomic scenarios on banks' NPLs.** These models are essential for the new multi-factor and multi-period solvency stress testing framework, which projects key balance sheet and profit & loss items over a three-year horizon. The illustrative STs demonstrated that the TCI banking sector is generally resilient to economic stress, given its high initial capital adequacy and good pre-provision profitability.

72. **The new ST framework, tailored to the specific regulatory and economic environment of the TCI, allows for comprehensive scenario analysis and provides valuable insights into the resilience of the banking sector.** Regular updates and enhancements to the framework, including the development of additional satellite models and improved macroeconomic scenario generation, will further strengthen the TCIFSC's ST capabilities.

73. **Overall, the TA has laid a solid foundation for the TCIFSC to enhance its financial stability monitoring and ST practices.** Continued efforts to refine the FSR, credit risk models, and ST framework will ensure that the TCIFSC remains well-equipped to address evolving financial stability challenges.

XI. Appendix

Credit risk models estimated via BMA approach and the applied scenarios-specific weighting schemes

Only models with PIP of more than 5% were included

Explanation of abbreviations: *un = unemployment, gdpg = yoy GDP growth, logit_npl(-1) = lagged dependent variable, ta = tourist arrivals*

Loans to Households

Weights

	Model 1	Model 2	Model 3
Baseline	**0.828**	**0.172**	**0.00**
Moderate	**0.5796**	**0.1204**	**0.30**
Severe	**0.3312**	**0.0688**	**0.60**

Model 1

Constant	GDPG	logit_npl(-1)
-0.01198	-0.3717	0.9993

Model 2

Constant	infl	logit_npl(-1)
-0.07698	0.975	0.9863

Model 3

Constant	GDPG
-1.875482	-3.18829

Loans to the Tourism Sector

Weights

	Model 1	Model 2	Model 3
Baseline	**0**	**1**	**0**
Moderate	**0.1**	**0.8**	**0.1**
Severe	**0.2**	**0.6**	**0.2**

Model 1

Constant	ta	logit_npl(-1)
0.3378	-0.000002486	0.6879

Model 2

Constant	un-un(-4)	logit_npl(-1)
-1.02226	7.605	0.75723

Model 3

Constant	GDPG
-0.798593	-3.422374

Loans to the Construction and Land Development Sector

Weights

	Model 1	Model 2	Model 3
Baseline	**0.922**	**0.078**	**0**
Moderate	**0.5532**	**0.0468**	**0.4**
Severe	**0.11064**	**0.00936**	**0.8**

Model 1

Constant	ln(ta)	logit_npl(-1)
1.56	-0.1449	0.9449

Model 2

Constant	ta-ta(-4)	logit_npl(-1)
0.09689	-0.0000019	0.9463

Model 3

Constant	un	logit_npl(-1)
-0.964482	6.723755	0.626678

Loans to Other Corporate Sectors

Weights

	Model 1	Model 2	Model 3	Model 4
Baseline	**0.535**	**0.246**	**0.219**	**0**
Moderate	**0.214**	**0.0984**	**0.0876**	**0.6**
Severe	**0.107**	**0.0492**	**0.0438**	**0.8**

Model 1

Constant	un	logit_npl(-1)
-3.015	**15.76**	0.5989

Model 2

Constant	un(-1)	logit_npl(-1)
-3.665	18.54	0.5026

Model 3

Constant	un-un(-4)	logit_npl(-1)
-2.678	12.03	0.6161

Model 4

Constant	un
-7.156286	35.23449