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THE BAHAMAS

SELECTED ISSUES

May 2018

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THE BAHAMAS

SELECTED ISSUES

April 19, 2018

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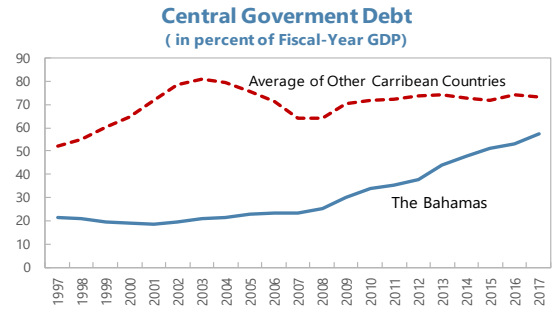
CONTENTS

DESIGNING A RULES-BASED FISCAL FRAMEWORK FOR THE BAHAMAS[1]

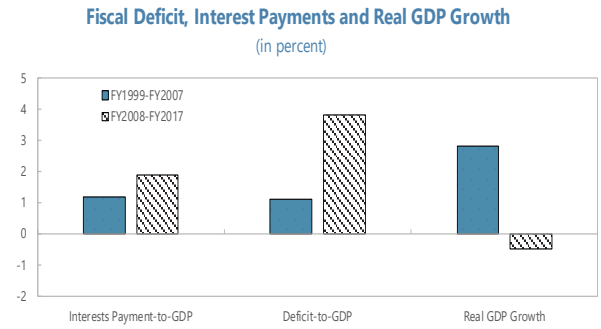
This paper makes the case for a rules-based fiscal framework for The Bahamas and discusses its design, calibration, and implementation. The proposed framework includes a headline deficit target coupled with a cap on the growth of current spending, both calibrated to guide debt towards a proposed medium-term anchor. The framework also allows some flexibility for countercyclical policy and builds in space for savings towards a natural disaster fund.

BACKGROUND AND MOTIVATION

1. High fiscal deficits over the past decade, in the context of weak economic activity, have led to rapid accumulation of public debt. The average deficit of the central government reached 3.8 percent of GDP over 2008-2017, compared to 1.1 percent of GDP during 1998-2007. The sharp increase in the deficit led central government debt to double in size over the past ten years, growing also more rapidly than the average for its Caribbean peers.

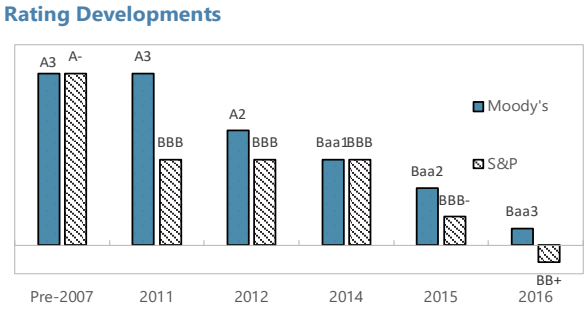


Source: IMF World Economic Outlook



Sources: Ministry of Finance, and IMF staff calculations.

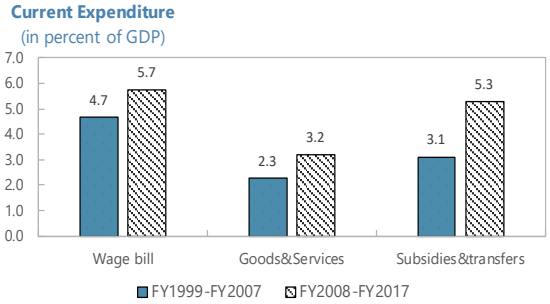
2. Rapid increases in public debt prompted downgrades of the sovereign credit rating. Under the Moody's scale, The Bahamas' sovereign rating was downgraded from A3 in 2007 to Baa3 in 2016, the lowest investment grade level. Under the Standard & Poor's scale, similar rating actions took place, with The Bahamas losing its investment grade status in 2016 to receive a rating of BB+.



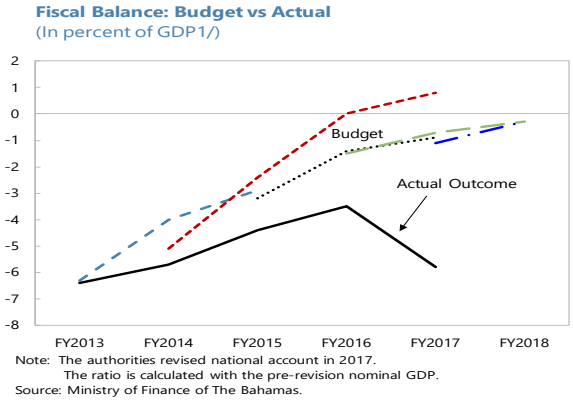
Source: Moody's and Standard & Poor's

[1] Prepared by Qiaoe Chen (WHD) and Samba Mbaye (FAD). We would like to thank the Bahamian authorities for comments and discussions conveyed during a seminar, Fabian Valencia and Luc Eyraud for guidance, and IMF colleagues for comments.

3. While the deteriorating fiscal situation was in part the result of weak economic activity, it also followed from rapid increases in spending. The successful introduction of the value-added tax (VAT) in 2015 and revenue administration reforms helped boost tax revenues by 4.4 percent of GDP between FY2014 and FY2017. Consequently, total revenue increased by 2.6 percent of GDP on average over 2008-2017 relative to the period of 1998-2007. However, current spending rose at a more rapid pace, keeping fiscal deficits high.



4. The lack of an effective fiscal framework and anchor allowed rapid increases in spending and to repeated misses of targets set in the budget. The occurrence of natural disasters over the past decade often led to unplanned increases in spending and borrowing. However, budget deficit targets were often missed even in years when there were no significant budgetary consequences from external shocks.



Note: The authorities revised national account in 2017.
The ratio is calculated with the pre-revision nominal GDP.
Source: Ministry of Finance of The Bahamas.

5. Designing and implementing an effective fiscal framework would fill an important gap in The Bahamas' policy framework. A well-designed fiscal framework should help increase fiscal discipline, transparency, and accountability. But political will would remain a critical ingredient in the pursue of fiscal sustainability.

DESIGNING AND CALIBRATING A FISCAL-RULE FRAMEWORK FOR THE BAHAMAS

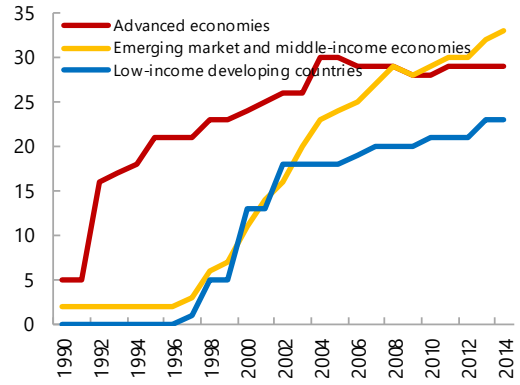
A. Rule Design

6. Rules-based fiscal frameworks have spread around the world, especially among emerging markets and developing countries (Figure 1). The number of countries with a fiscal rule has grown from 6 to 96 over the last three decades, of which about 2/3 are emerging markets and developing countries (EMDCs). Countries typically combine multiple rules to leverage complementarities between types of rules and overcome potential tradeoffs between policy objectives –e.g., debt sustainability, economic stabilization, operational guidance, and transparency.

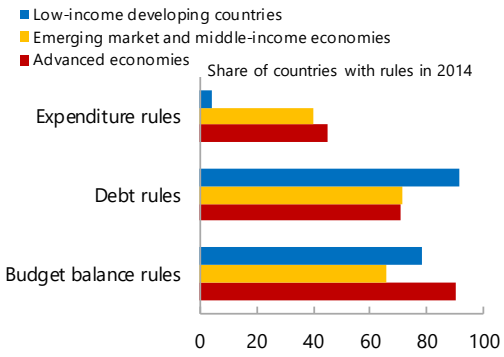
7. Well-designed frameworks are typically structured around two elements: a medium-term anchor and one (or several) operational target(s) to guide annual budgets. A natural anchor is the public debt ratio to GDP, which helps guide expectations and (if prudently calibrated) ensures the sustainability of public finances. However, debt anchors alone do not provide sufficient guidance to annual budgets. They need to be complemented with operational targets, such as deficit and spending ceilings, that guide policies towards the medium-term fiscal anchor.

Figure 1. The Bahamas: Fiscal Rules Around the World

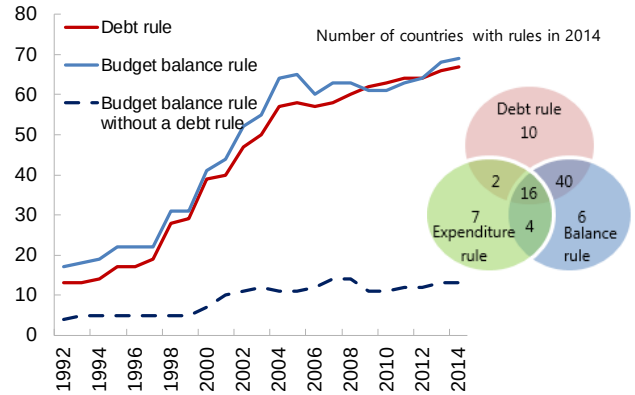
(a) Number of EMDEs with fiscal rules has surged in the past two decades



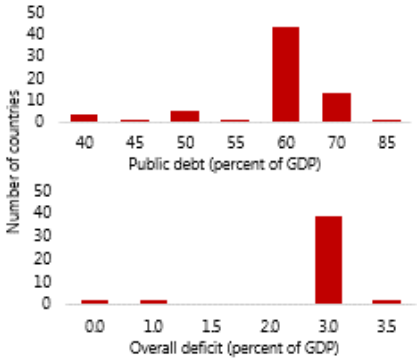
(b) Budget balance (deficit) and debt rules are the most commonly adopted national fiscal rules



(c) Countries typically combine budget balance and debt rules, both of which are directly linked to debt sustainability



(d) Most overall deficit ceilings are less than 3 percent of GDP, and most debt ceilings range between 40-70 percent of GDP



Source: Moreno-Badia et al. (2017)

8. In the case of The Bahamas, the fiscal rules should prioritize sustainability and operational feasibility, while allowing space for countercyclical policy. The rapid increases in public debt documented in section I justify having fiscal sustainability as one of the main objectives of a rules-based framework. But this overarching objective should be balanced, to the extent possible, with the need to allow some room for countercyclical management, especially given The Bahamas' exposure to external shocks. In addition, the proposed framework needs to be tailored to existing capacity constraints. Thus, structural balance rules, which require relatively accurate estimates and forecasts of potential GDP, are ruled out.

9. Staff recommends adopting a headline deficit ceiling and a cap on current expenditure growth, both calibrated to guide debt towards a suitable medium-term anchor while allowing room for stabilization. A headline deficit target is simpler to communicate and monitor than a

structural balance rule. Constraining the growth of current spending would also make it less procyclical during upturns. Such a framework would allow expanding capital spending, up to the limit provided by the deficit ceiling, in the event of improvements in revenue performance. Moreover, in line with best practices, the framework should be anchored around a pre-defined medium-term debt target that will guide the calibration of proposed operation rules. Finally, to limit the strong procyclicality bias associated with nominal rules, staff recommends building in some room for countercyclical policies in the calibration of the deficit ceiling.

B. Rule Calibration

10. As discussed in Eyraud et al. (2018a), the calibration of fiscal rules should preferably follow a sequenced approach, from the medium-term anchor to the operation targets. As the main anchor of fiscal policy, the medium-term debt anchor should preferably be set first, guided by debt sustainability considerations and the need to guard against adverse shocks. The calibration of the operational rules should then follow from the debt anchor, in line with accounting identities that link debt, deficits, and spending. In what follows, we will successively calibrate each element of the proposed rules-based framework, with a view of ensuring consistency between the different targets.

Setting a Debt Anchor

11. There is no consensus on the appropriate approach to determining the "optimal" level of public debt. Existing methods generally fit into two broad categories. A first approach consists in using full-fledged theoretical models to calibrate the optimal debt stock according to a growth or welfare criteria (e.g., Teles and Mussolini, 2014). These models are generally applied to country-case studies and allow for a much richer analysis of the different factors at play. However, estimates tend to be highly sensitive to a few calibrated parameters. A second category relies on various empirical methods ranging from historical averages to estimates based on reduced-form debt equations. As illustrated in IMF (2003), the estimated debt thresholds tend to exhibit a wide range depending on the methodology of choice, thus highlighting the need for experimenting with different methodologies.

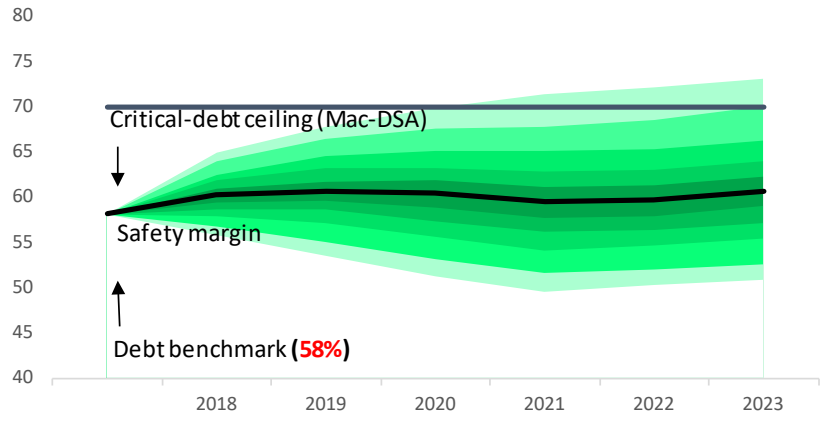
12. Staff estimates, based on various approaches, suggest that a central government debt anchor of 50 percent of GDP would be appropriate for The Bahamas. This level corresponds to the lower bound of estimates under three different approaches. The first approach consists in using as debt anchor the median public debt ratio among emerging markets with investment-grade sovereign rating across all three major rating agencies. The second approach relies on the DSA framework which identifies a "critical-debt" benchmark of 70 percent of GDP for emerging markets. From that benchmark, we derive an estimate of the debt anchor by subtracting a safety margin based on stochastic simulations of potential macroeconomic shocks (Figure 2).[2] Finally, the

[2] Potential shocks are derived from an estimated joint distribution of macroeconomic variables (growth, interest rates, the real effective exchange rate, and the primary balance) based on The Bahamas's history over the last two decades. The safety margin is calibrated to ensure –with a 95 percent probability– that debt does not cross the critical ceiling in the event of macroeconomic shocks.

third approach estimates the "critical debt" level as the maximum debt ratio that can be credibly sustained in the event of a large prolonged economic slowdown and assuming that primary balances are bounded upward.[3] The debt anchor is then derived by subtracting a safety margin from the estimated "critical debt", as in the second approach (Figure 3). These methods yielded estimates of debt anchors ranging from 50 (the first method) to 71 percent of GDP (the last method). Staff favors the lower bound of these estimates for the following reasons:

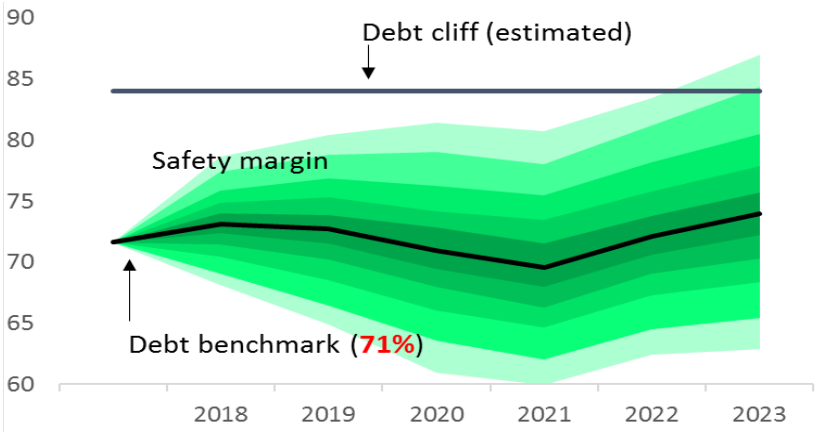
- The median debt ratio among investment grade emerging market economies declines to 42 percent of GDP if floating exchange rate regimes are excluded.
- Sizable fiscal contingent liabilities, primarily associated with the 14 percent of GDP in SOE's debt as of 2017, call for a prudent anchor for central government debt.
- It implies putting debt on a downward trajectory relative to the current level of 58 percent of GDP, helping create space to respond to shocks and maintain market confidence.

Figure 2. The Bahamas: Debt Anchor Calibration: Approach 2



[3] A large macroeconomic shock is defined as the 75th percentile of the distribution of interest rate-growth differentials in The Bahamas' history. The maximum primary balance is standardized at 2 percent of GDP for emerging markets based on Escolano and others (2014). Both the shock and the primary balance reaction are simulated to last 5 years. For reference, the highest primary balance sustained over a rolling 5-year period in The Bahamas' history is 0.9 percent of GDP.

Figure 3. The Bahamas: Debt Anchor Calibration: Approach 3



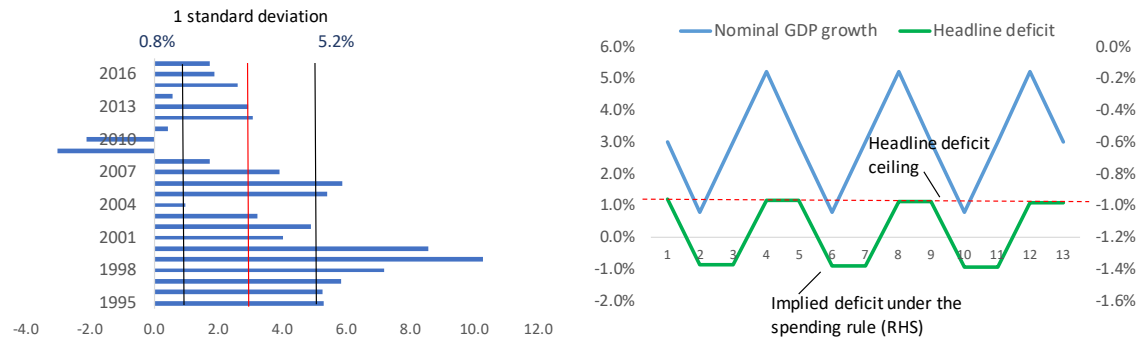
Calibrating Operational Targets

13. The proposed deficit is calibrated to guide debt towards its anchor within a decade, following a 3-year transition period. The deficit ceiling (b^*) is derived from the debt anchor (d^*), based on the following standard equation (see Eyraud et al., 2018a for details):

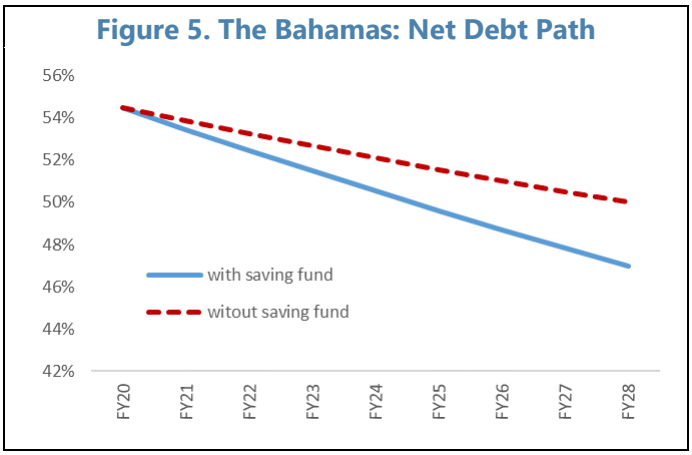
$$b^* = \frac{\lambda}{(1+\lambda)^N - 1}\left[d_0(1+\lambda)^N - d^*\right] (1)$$

where $\lambda = -\lambda/(1+\lambda)$ is a function of the expected long-run nominal GDP growth (γ), d_0 stands for the initial debt stock, and N denotes the convergence horizon, in number of years, after which debt is expected to hit its medium-term anchor. Staff's baseline proposal includes a 3-year transition period, consistent with the authorities' announced targets for FY2018-FY2020, to allow for the gradual reduction in deficits from the current level of 5.8 percent of GDP in FY2017. Equation (1) suggests that a deficit target of 1 percent of GDP would need to be maintained at the end of the transition period, assuming an estimated medium-term nominal growth of 3 percent, a medium-term debt anchor of 50 percent of GDP, and a convergence horizon of 10 years including the transition period. To accommodate staff's proposal for a savings fund for natural disasters, additional savings of 0.5 percent of GDP would need to be generated each year, suggesting a headline deficit target of 0.5 percent of GDP.

Figure 4. The Bahamas: Allowing Space for Countercyclical Policy



Source: Authors' calculations



14. Similarly, the proposed current spending ceiling follows from the deficit ceiling. For a given deficit ceiling (b^*) and average tax pressure (r^*), the implied expenditure ratio (e^*) naturally follows as:

$$e^* = r^* - b^* \quad (2)$$

which implies that:

$$\Delta e^* = \Delta r^* - \Delta b^* \quad (3)$$

Assuming a stable revenue ratio ($\Delta r^* = 0$), and that the country already complies with the deficit rule ($b = b^*$and $\Delta b^* = 0$), the two equations above show that the deficit rule requires spending growing at the same speed as nominal GDP growth, or alternatively, that spending is constant as a share of GDP. To operationalize this rule, staff recommends calibrating the current spending cap to set it equal to long-term nominal growth in GDP, i.e., 3 percent.

C. Implementation Strategy

15. There are several key elements that are critical to the successful implementation of the framework laid out above.

16. The transition period could be handled through transitory clauses in the legislation. These clauses, embedded in the law, should stipulate a timetable for the implementation of the rule, including a transition path for the deficit. This transition path could follow the path announced with the FY2018 budget of 1.8 percent of GDP for FY2019, and 0.8 percent of GDP for FY2020. Moreover, the spending rule should begin to bind only at the end of the transition period, i.e., once spending has been put on a sustainable footing.

17. Clear safeguards are needed to ensure that the additional room for countercyclical policy is not misused. These safeguards could take the form of legislative provisions clarifying conditions for the use of the additional fiscal space provided by the difference between the deficit target and the deficit ceiling. Another option, which avoids overcomplicating the rule, is to rely on reputational costs associated with repetitive unjustified deviations from initial budgets –which would

be required, ex ante, to comply with the 0.5 percent-of-GDP deficit target. In this case, policymakers would use the additional space provided by the ceiling of 1 percent of GDP, only when necessary.

18. An effective fiscal framework requires strong Public Financial Management (PFM) systems. Rules-based frameworks put a premium on the availability of timely, exhaustive, and accurate fiscal information to efficiently guide policies. In addition, strong expenditure controls and credible budgets are essential, as policy makers need to have a tight handle over fiscal outcomes to ensure compliance with the rule. Frequent and large ex-post revisions of budget plans and outcomes could put the credibility of the fiscal rule framework in jeopardy. Finally, a strong technical forecasting capacity is also required to credibly inform policy planning.

19. Reporting on the fiscal rules should be mandated in the law and take place at all three stages of implementation (ex-ante, in-year, and ex-post). First, early in the budget process, fiscal documents should report on the ex-ante compliance with the fiscal rule and detail the macroeconomic assumptions (e.g. GDP growth, interest rates, revenues) underlying the assessment. Similarly, reporting on fiscal outcomes should also systematically include an assessment of the compliance with the fiscal rules and discuss any potential factors that contributed to the observed outcome. Finally, in-year reports on the fiscal rules could also be helpful in guiding expectations and improving transparency.

20. Experience has shown that political buy-in and a good track-record are the most important factors of credibility, although some designing and institutional features can also help. Stock-taking analyses on fiscal rules consistently find that political buy-in and countries' track records are the best predictors of success in implementing fiscal rules (Kumar et al., 2009, Eyraud et al., 2018b). However, other factors have also been found to foster credibility, such as (i) the presence of independent monitoring institutions (fiscal councils, parliament budgetary committees), (ii) a broad institutional and economic coverage to monitor and control a large part of government fiscal activity, (iii) a calibration that is in line with sustainability and stabilization objectives, and (iv) well-defined escape clauses to deal with tail events (Mbaye and Ture forthcoming, Caselli et al., 2018).

21. Exceptional circumstances clauses should be well defined to avoid undermining credibility. Triggering events typically include natural disasters, states of emergency, and large economic recessions, which often also include pre-defined intensity thresholds. Procedures for triggering exceptional circumstances clauses could include parliament approval. The application period of the escape clause along with the path to the reinstatement of the rule should be clearly defined ex-ante.

22. Procedures for future recalibrations/revisions of the rule could also be embedded in the law. Periodic recalibrations of the rule can be helpful to ensure that the underlying macroeconomic parameters are still adequate. However, they should not be too frequent to avoid undermining credibility –e.g., Kosovo provides for a revision of its rule framework every 5 years. As discussed in Eyraud et al. (2018c), benefits from the revision of the fiscal rules should be weighed against the potential costs, e.g., loss of credibility; legal, borrowing and political costs.

23. A well-crafted communication strategy would be an important element to generate support for the fiscal rules. Best practices tend to involve (i) simple but clear messages aimed at educating the public about the objectives of the fiscal rules, (ii) inclusive process of consultation with major stakeholders to build buy-in and guarantee institutional entrenchment, (iii) early and wide dissemination through multiple vehicles (speeches, press interviews, conferences) to multiple audiences (politicians, private sector, civil society, investors).

D. Conclusions

24. The proposed rules would fill an important gap in The Bahamas' policy framework. The lack of an effective fiscal anchor and framework has in part allowed rapid increases in spending and in public debt. The proposed framework, if implemented effectively, should help anchor fiscal policy. However, political will remains a critical ingredient in ensuring sustainable public finances.

25. The proposed calibration would need to be revised periodically as circumstances change. The proposed framework aims at striking a balance between several policy objectives, including (i) ensuring fiscal sustainability, (ii) allowing enough flexibility for stabilization over the business cycle, (iii) building some buffers to deal with natural disasters, and (iv) adapting to existing (technical) capacity constraints. As the economy experiences permanent changes affecting this balance, a recalibration of the rule would be warranted.

AN OVERVIEW OF THE BAHAMIAN LABOR MARKET[1]

The Bahamas has experienced persistently high unemployment rates, averaging over 10 percent, in the past 2 decades. The youth unemployment rate has been stubbornly high, falling only to 22 percent in November 2017. This paper tries to brush a comprehensive picture of the labor market, and untangle the key barriers that affect employment and derive policy implications accordingly. It argues that labor market regulations do not appear to be the main culprit of high unemployment, whereas the narrow economic base, the insufficient skill sets among the young, and inefficient job placement services appear to be more important factors. Therefore, expanding vocational and apprenticeship programs should help reduce the youth unemployment rate. Improving skill databases and job placement services more generally should help improve the matching process between employers and job seekers. More broadly, enhancing the quality of general education should facilitate sustaining employment in the long term.

A. A Snapshot of the Bahamian Labor Market

Demographics

Demographics Comparison

Country/Group of Countries	Age dependency ratio,old (% of working-age population)	Population, female (% of total)	Population ages 15-64 (% of total)
The Bahamas	9.2	51.6	66.8
Caribbean small states	11.5	50.4	66.1
Upper middle income	11.4	49.6	70.9
High income	22.8	50.4	67.3

Source: World Development Indicators for 2010 of World Bank; 2010 Population Census of The Bahamas

1. The Bahamian population is relatively young. The 2010 census by the Department of Statistics, the latest available, shows a median age of 29.4 years. The old age dependency ratio stood at 9.2, approaching the Caribbean small states average of 11.5, but far below the 22.8 for high-income countries. The working age population (age 15-64) accounts for 66.8 percent of the total population, almost 1 percentage point higher than the Caribbean small state's average of 66.1, with the young (age 15-24) representing about 25 percent of the working age population.

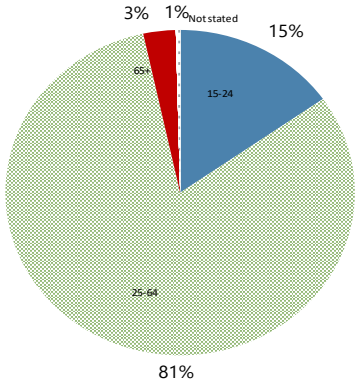
2. The labor force is dominated by people with secondary education. 81 percent of the working-age population participated in the labor market in 2017, significantly surpassing the average labor force participation rate in Caribbean peers (around 65 percent in 2017 according to

[1] Prepared by Qiaoe Chen (WHD). The author is sincerely grateful to Mr. Fabian Valencia for his guidance, and appreciate assistance from Ms. Paula Cifuentes Henao (WHD), Mr. Fernando Yitzack Pavon (IDB), Ms. Leona Wilson and Ms. Cypreanna Winters (from the Department of Statistics of The Bahamas).

the World Bank World Development Indicators). Around 59 percent and 29 percent of the labor force have completed secondary and tertiary education, respectively. The relatively high education background, despite a substantial brain drain problem,[2] is a result of higher-than-world average education attainment, because education from primary to secondary school (or people age at 5 to 16 years old) is compulsory and free in the public schools and students could automatically rise to secondary school.[3]

Labor Force Age Structure

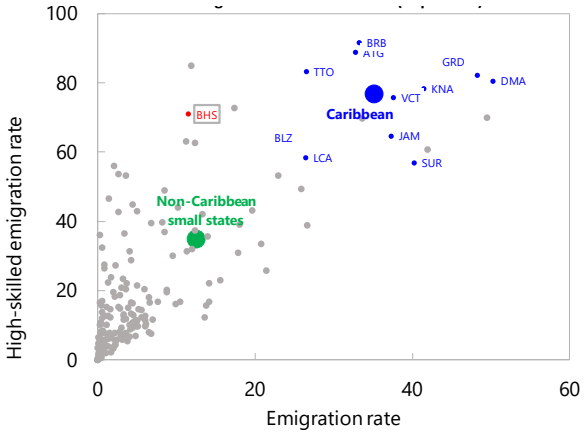
(In percentage)



Sources: Department of Statistics of The Bahamas, and IMF Staff

Emigration in the Caribbean

(In percentage)



Note: Emigration rate is the share of nationals living abroad. High-skilled are nationals with teriary education.

Source: The Institute for Employment Research

Employment and Wages

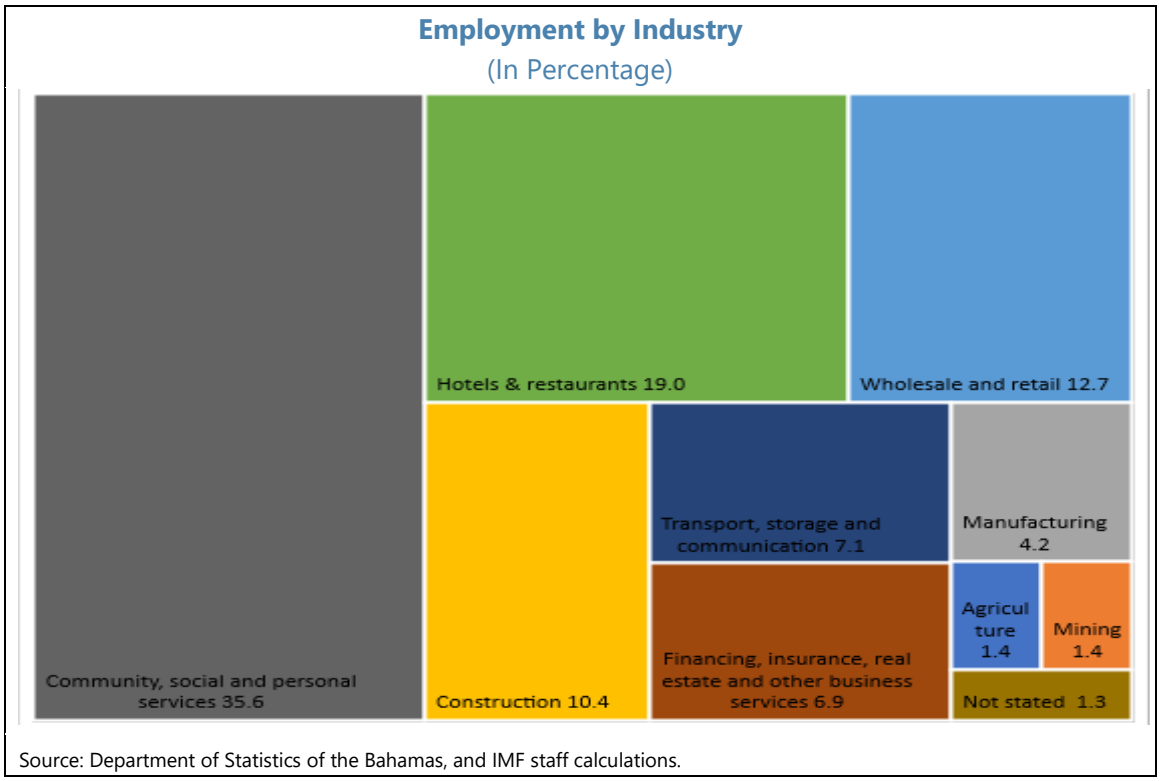
3. Most of the employed work in the services sector.[4] Based on the November 2017 labor market survey, published by the Department of Statistics, tourism-related industries (which cover most of hotel& restaurants, wholesale and retail and construction sub-sectors) and financial services are the two major labor absorbers in the private sector. Hotel and restaurant is the single largest industry, accounting for 19 percent of the total employment. Although the community, social and personal services industry absorbs 36 percent of the employment, most of the jobs within this category are in the public sector, accounting for 21 percent of the total employed.[5]

[2] More than 70 percent of Bahamians with tertiary education emigrated to OECD countries in 2010. In addition, high-school graduates with excellent academic achievements tend to choose to continue studying in US universities.

[3] According to the World Bank, Bahamians have a higher-than-world-average education attainment ratio in lower-secondary (about 90 percent) and upper-secondary education (82 percent) in 2010.

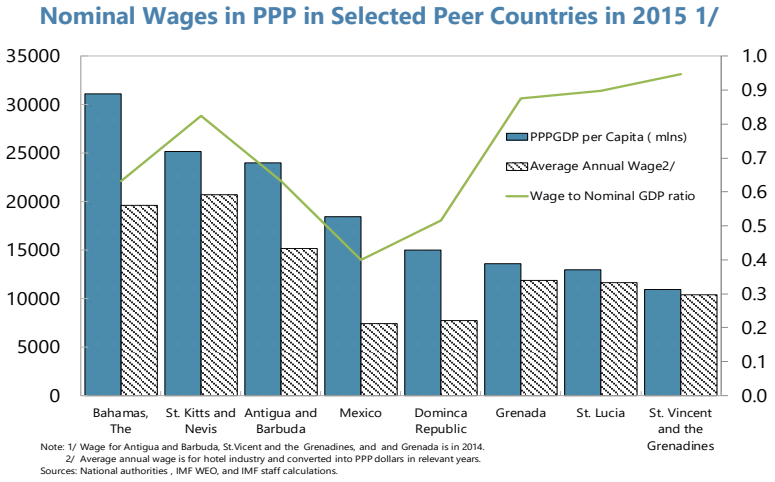
[4] The Department of Statistics conducted labor force survey twice per year in May and November, respectively. The survey results could be heavily impacted by the movement in seasonal industries, such as hotels and restaurants.

[5] Under the International Standard of Industrial Classification for all economic activities (ISIC)Rev.2, public administration and defense is within the community, social and personal services industry.



Source: Department of Statistics of the Bahamas, and IMF staff calculations.

4. Bahamians earn relatively high nominal wages. Taking the tourism industry as an example, the nominal wages in the hotel and restaurant industry in Mexico and Dominican Republic are the lowest, and the wage in The Bahamas is higher than ECCU countries, except St. Kitts and Nevis.

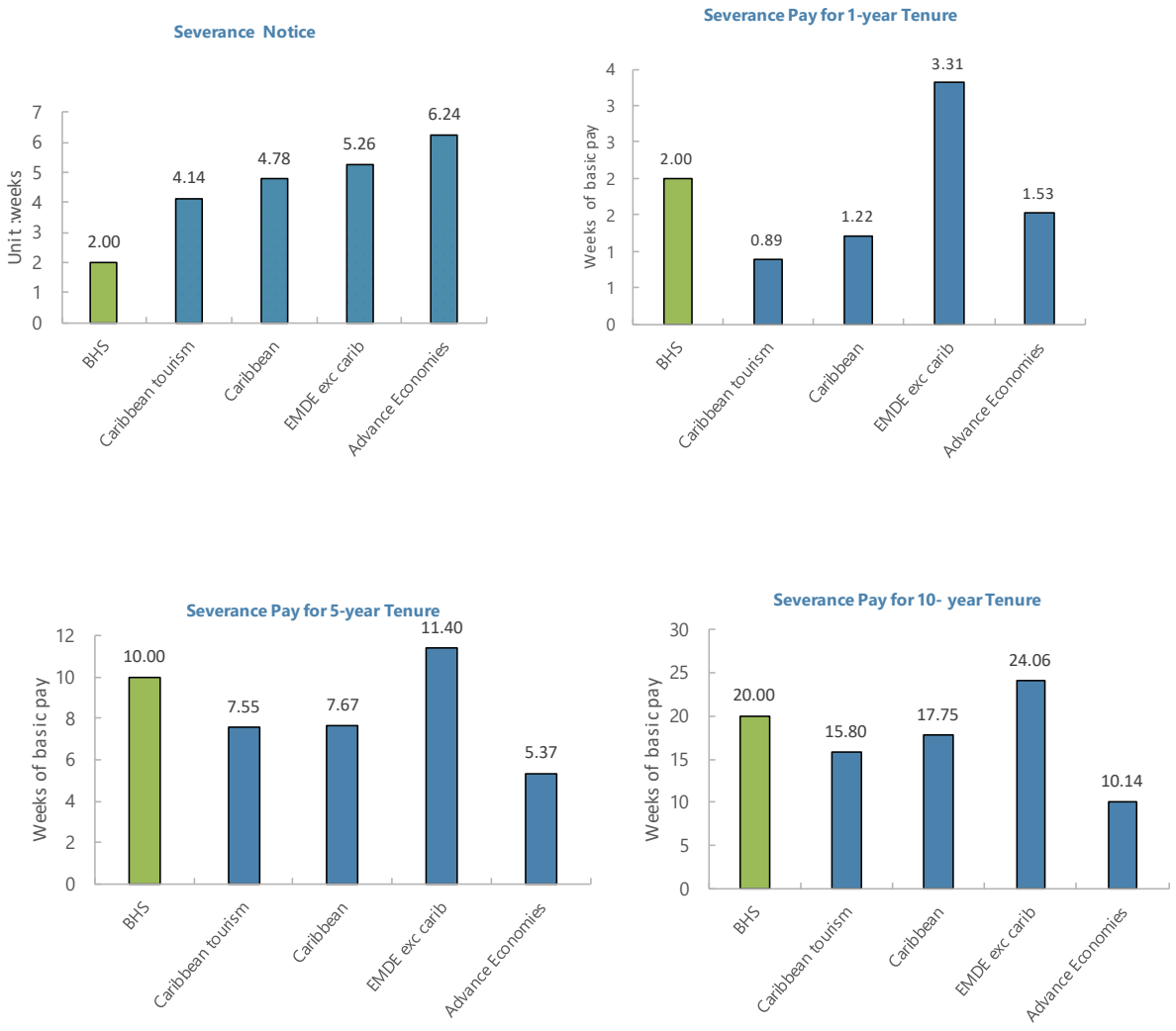


Labor Market Regulation

5. The Employment *Act* is the main law governing the labor market. It allows for part-time employment and does not require a minimum number of working hours per week. It stipulates a severance payment, to an employee working for a year or more, of 2 weeks of the basic pay per year with a maximum payment of 24 weeks. The *Employment Amendment Act* of 2017 added new provisions to allow the hospitality industry (or more broadly, a seasonal industry as designated by the Minister of Labor) to lay off employees during the off-peak season without paying severance pay. Compared with other regions, based on the information collected by the World Bank,

The Bahamas has shorter period of notice but higher average severance payment (Figure 1).[6] Disputes over dismissals is solved by the Industrial Tribunal, but the process can be lengthy as the law does not stipulate time limits. Other labor market regulations include the *Health and Safety Work Act, the Industrial Relation Act, The Trade Union and Labor Relation Act, and The Immigration Act.*

Figure 1. The Bahamas: Severance Notice and Payment

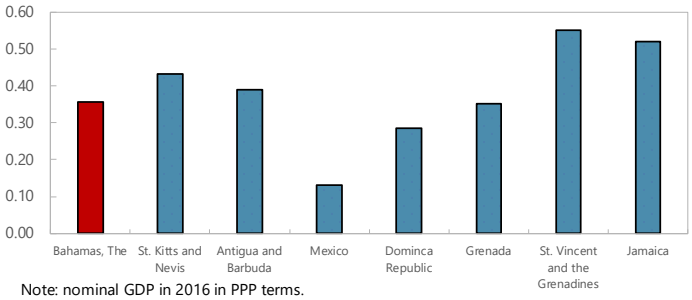


Note: Caribbean tourism countries include Antigua and Barbuda, The Bahamas, Babados, Dominica, Jamaica, St.Kitts and Nevis, St. Lucia and St. Vincent and Grenadines.
Source: World Bank Doing Business Report 2017 and IMF staff calculations.

[6] The World Bank collects every year detailed information on labor market regulation for the service sector.

6. The minimum wage was introduced in 2002. The minimum wage is guided by the Minimum Wage Act and was initially established in 2002 at $4.00 per hour and was raised to $5.25 in August 2015. Compared with its peers in the Caribbean region, both minimum wage and the ratio of PPP-adjusted minimum wage to GDP per capita in The Bahamas do not stand out as outliers in the region.

Minimum Wage to GDP per capita1/



Note: nominal GDP in 2016 in PPP terms.
Source: National Authorities, IMF World Economic Outlook and staff calculations.

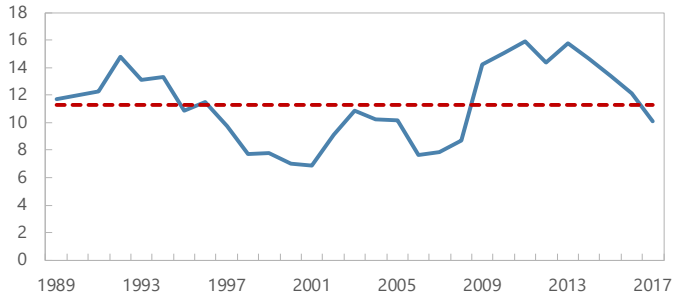
7. Employees' social security benefits are governed by the *National Insurance Act*. Under the Act, qualified Bahamians are entitled with disablement and death, funeral, injury, invalidity, maternity, retirement, sickness, survivorship, and unemployment benefits. The social benefits contributions for employees and employers are 3.9 percent and 5.9 percent of insurable earnings at present, respectively. The unemployment benefits are paid weekly at 50 percent of the unemployed 'average weekly insurable income for a maximum period of 13 weeks within a 52-week period.

B. Recent Developments in the Labor Market

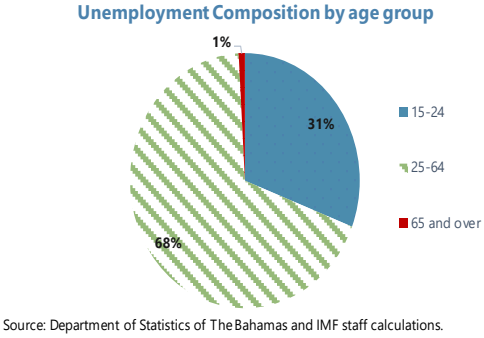
8. The Bahamas has benefitted from a demographic dividend with labor force participation on an upward trend since 1980. According to the latest census, the total population reached about 351 thousand, of which the share of working age population corresponded to 66.8 percent, up from 57 percent in 1980. While population aging has led to a decline in the share of young people (age 15-24) to 22.4 percent, down 6 percent since 2005, The Bahamas has continued to see trend increases in the labor force participation, despite a temporary dip around the global financial crisis to 72 percent, to reach 81 percent in November 2017.

9. The unemployment rate has been persistently high, especially for the young. The unemployment rate averaged 11.3 percent since 1991, peaking at 16 percent in 2011, with most of the unemployed having completed at least secondary education. The youth unemployment rate is particularly high, hovering around 20 percent from 2005 to 2017. As of November 2017, the youth unemployment rate of 22 percent was almost three times higher than the unemployment rate for the rest of the population of 8 percent.

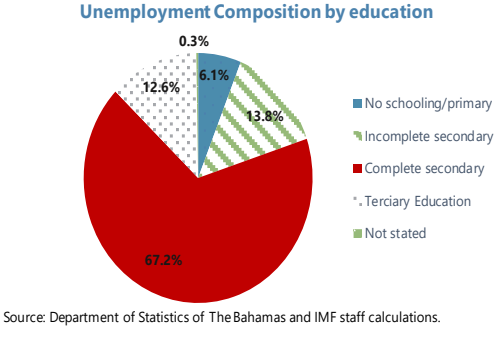
Unemployment Rate



Source: World Economic Outlook.



Source: Department of Statistics of The Bahamas and IMF staff calculations.



Source: Department of Statistics of The Bahamas and IMF staff calculations.

10. The average education level is increasing, but progress in improving the quality of education seems slow. The share of low-skilled labor (no schooling or only primary education) in the total labor force declined significantly from 11.6 percent in 2006 to 4.3 percent in 2017, and the share of labor with tertiary education increased from 25.1 to 28.6 percent. Fifty-nine percent of the labor force in 2017 had completed secondary education, up from 53.8 percent in 2006. However, the quality of education, when measured in terms of graduation rates or test scores for the high-school students, the Bahamian General Certificate of Secondary Examination (BGCSE), the improvement has been slow. For example, according to the Bahamian Youth report, the average grade for high school students was "D-", with only 18 percent of public high school students having passed the math exam and 45 percent students having passed the English language exam under BGCSE in 2006.[7] In 2016, the average grade moved up to "D", and only 5.7 percent of high-school students scored a "C" or above in math, English, and a science subject under the BGCSE, while the average score for math and English was "E" and "D+" respectively.[8] Moreover, the IDB found that in November 2015, out of 1798 enrolled students in The Bahamas Technology and Vocation Institute (BTVI), only 253 students graduated in school year 2014-15.[9] Data from the latest labor market report by the Department of Statistics shows that in 2016-2017 school year, 187 students graduated from BTVI, with one third concentrated on office administration, and 12 or 6 percent of the total earned degrees on information technology.

C. Empirical Assessment of Labor Market Flexibility

11. Estimates of the Okun's coefficient for The Bahamas are used to judge the degree of labor market flexibility. The Okun's coefficient determines the sensitivity of unemployment to changes in the aggregate demand, and it can be obtained from estimating the following equation: $U_t - U_t^* = \beta(Y_t - Y_t^*) + \varepsilon$, where U is the unemployment rate, Y is the natural logarithm of real GDP, β is the Okun's coefficient, and * indicates the long-run level of the corresponding

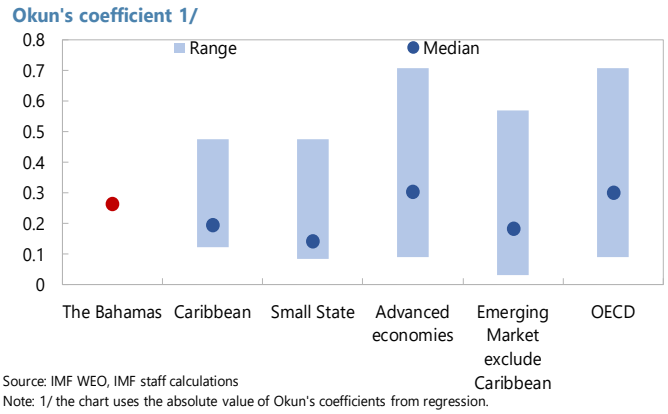
[7] According to *Bahamian Youth-The Untapped Resource*, report No. 2 September 2007. The grade is from A to G, below D is considered as failed. The Bahamians do not participate in the OECD Program for International Student Assessment (PISA) test or the Caribbean regional test, Caribbean Examination Council (CXC) test. High school students are required to take the BGCSE to attend university or study for professional qualifications.

[8] http://www.tribune242.com/news/2017/sep/01/results-expose-failing-schools/.

[9] *Determinants of The Main Binding Factors for Shortage of Skilled People*. Inter-American Development Bank.

variable, while t is a time subscript, and ε denotes a random disturbance. Long-run values are approximated by the Hodrick-Prescott filter and all data come from the IMF's World Economic Outlook.

12. The estimated Okun's coefficient for The Bahamas suggests a level of flexibility in labor markets close to the global average. The Okun's coefficient was estimated for a sample of 107 countries, with annual data from 1995 to 2016. The results for The Bahamas show a coefficient of -0.26, which is equal to the global mean of -0.26. After grouping countries according to various characteristics, it appears that The Bahamas' Okun's coefficient is higher than the regional and small state average, suggesting that fluctuations in unemployment tend to track relatively more closely the evolution of output in The Bahamas than in those two country groups. Intuitively, this means that firms can adjust somewhat more flexibly their labor force to the ups and downs of the business cycle. However, this stylized fact happens in the context of a relatively high average level of unemployment, of around 11 percent, well above the total sample average of 8.5 percent, but close to the average of small states (10.9 percent) and Caribbean countries (11.7 percent).



Source: IMF WEO, IMF staff calculations
Note: 1/ the chart uses the absolute value of Okun's coefficients from regression.

13. Labor market regulation does not appear to be a major culprit behind the high levels of structural unemployment. According to the 2018 World Bank Doing Business indicators on labor market flexibility, firing costs in The Bahamas, in terms of severance payments, are in between those for advanced and emerging economies (Figure 1). An enterprise survey conducted by the World Bank in 2010 also indicated that the private sector in The Bahamas does not view labor market regulation as a major obstacle to their business.[10] These results are broadly consistent with our findings on the Okun's coefficient, where The Bahamas does not stand out as an outlier.

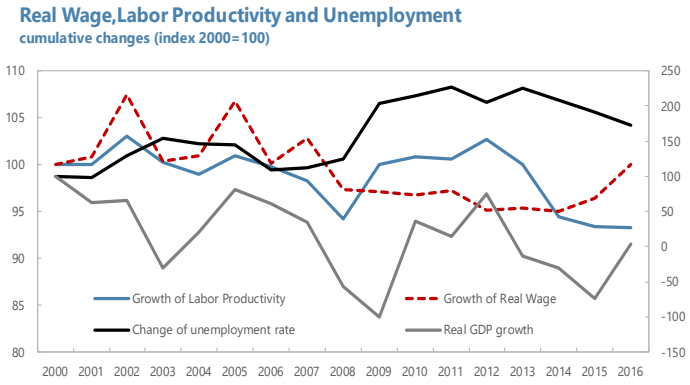
14. Skills gaps are regarded as an important barrier for businesses expansion. The Private Sector Assessment Report (PSAR) (2013) concluded that "Bahamian enterprises agree that their major problem is an inadequately educated workforce" and "the workforce shows deficiencies of required skills". The IDB report (2012) also showed that firms most frequently cited difficulties in hiring new staff was related to specific skills or "underqualified applicants", followed by applicants' lack of experience and applicants' lack of soft skills.[11] The report also noted that the main reason for dismissals is the lack of soft skills. For example, it pointed out that electricity, gas, AC and water,

[10] Private Sector Assessment Report (PSAR) for the Commonwealth of the Bahamas (2013).

[11] In Pursuit of Employable Skills-Understanding Employers Demand (2012). Soft skills refer to personality traits such as responsibility and commitment, common sense and integrity. They also include abilities that can be practiced, such as communication, team work, leadership, good manners and sociability.

wholesale and retail trade and accommodations and food service industries employed the greatest percentage of young employees, and they cited that the lack of soft skills are the sole reason for dismissals.

15. Faster real-wage growth than labor productivity growth may have also hindered job creation in recent years. Real wages grew faster than labor productivity before 2007, but deviations were short lived. The global financial crisis introduced a break in the evolution of real wages and productivity, with real wages falling initially, in line with productivity, and then remaining broadly stagnant over 2008-2014. In turn, productivity recovered temporarily over 2009-2012, reflecting the rebound from the global financial crisis and the initial phase of construction of Baha Mar. This temporary recovery in productivity reversed from 2013 on, with real wages picking up and in recent years diverging from productivity growth estimates.[12] The change in labor productivity over 2000 to 2016 was driven mainly by real GDP growth, suggesting that employers adjusted labor costs mainly by reducing the number of employees, and to a less extent by controlling nominal wage increases, which tend to be constrained by existing contractual arrangements.



Sources: The Department of Statistics and Fund staff calculations

16. Collective bargaining influences importantly the evolution of wages. The Bahamian Constitution specifically grants labor unions the right to free assembly and association. These rights are exercised extensively, particularly in state-owned industries and in the hotel industry (where 80 percent of the employees are unionized). The statutory provisions also allow trade unions to negotiate collective agreements. Trade unions conduct collective bargaining on wage increases every three to five years—and actual wage increases could be spanned over this period or increased by one-time lump-sum payments, which may explain the recent divergence of average real wages from productivity growth. But unions have at times accepted wage freezes in response to unfavorable economic times, for example, real wages remained flat between 2008 and 2014.

17. The structurally high level of unemployment may also reflect a narrow economic base. The Bahamas' strong dependence on tourism industry makes it vulnerable to external shocks (including natural disasters), with limited room in other sectors to pick up the slack when tourism weakens during a prolonged period. This feature affects the employment dynamics significantly. Although there is a consensus on the need for increased economic diversification in The Bahamas,

[12] Wages only represent the average in accommodation and hotel industry. The wage range in the accommodation and hotel industry is quite wide, from $191 per week for a waiter or bartender to $1912 per week for a managing director according to a survey conducted by the Department of Statistics in 2009.

given the geography of the country, tourism will most likely continue to play a major role in the economy.

18. Finally, frictions in the matching process between employers and job seekers may have contributed to persistence in unemployment. In the IDB report[13], the data show that the public employment system run by the Department of Labor only captures 12 percent of listed businesses' vacancies, while only 2 percent of registered job-seekers found jobs through this system.

Ongoing efforts to reduce skill gaps and improve labor market efficiency

19. The authorities are taking steps to enhance technical and vocational training. The authorities created the National Training Agency (NTA) in 2013, to provide high-school graduates or drop-out students with vocational and soft skill training. Up to now, the NTA has trained 4,500 participants, and more than half have been able to find their first jobs. It complements the role played by The Bahamas Technical and Vocational Institute (BTVI), in place since 1980. The curriculum for public high schools has been revised to better meet the skill demand from the private sector.

20. The authorities are also taking steps to improve the matching process between job seekers and employers. Since July 1, 2017, the Department of Labor revamped the Employment Exchange (an online platform) to collect information on both vacancies and job-seekers, and launched job fairs in targeted areas to increase public awareness of the new system, facilitate on-line registration, and assist employers to interview candidates. The recent "Labor on the Blocks" job fairs attracted 4,000 participants, mostly unemployed young people, 900 of whom were hired.

D. Conclusions

21. Labor market regulations do not appear to be a major determinant of high unemployment. The high structural unemployment appears to be driven mainly by insufficient and low-quality skillsets of the young, coupled with difficulties in the matching process between employers and job seekers poor skill match and limited labor market information. The labor market regulations do not seem to be a major constraint to labor market flexibility, though continued improvement and modernization of regulations would ensure improved efficiency and flexibility.

22. Moving forward with the expansion of vocational and apprenticeship program would help reduce skill mismatches and youth unemployment. [14] The National Apprenticeship Program (NAP), funded and designed by the IDB, will target young workers with a one-year on-the-job and off-the-job training in three identified key areas: internet technology, marine, and medical services. It will also bring the NTA, Chamber of Commerce, BTVI together to design the program, supply mentors from industrial experts for trainees, and establish an apprenticeship skill council to

[13] The Bahamas: Skills for Current and Future Jobs in The Bahamas (BH-L1037).

[14] An apprenticeship refers to a job that includes a structured on-the-job training combined with a share of related technical off-the-job training to learn a skilled occupation that is certified upon completion.

guarantee the quality. The NTA will focus on the 4-month pre-apprenticeship training to select qualified candidates for the following apprenticeship training. Under the NAP program, 1,350 trainees will benefit from it if they could complete the training. The program would also help the authorities to accumulate experiences to improve its vocational training capacity.

23. Improving the quality of general education should help sustain long-term employment. Research shows (Box 1) that while vocational training could smooth entry of the young into the labor market, developing strong cognitive skills through general education could help sustain long-term employment. [15] Boosting the quality of high school education, including on math and English skills, is a critical step in this direction. In this regard, the authorities are tapping information technology to mitigate teacher shortages in remote islands and taking actions to improve teaching quality. Conditional cash transfer programs could also better incentivize low-income households to keep their children in school and reduce school drop-outs.

24. Improving skill databases and job placement services could enhance the matching process between job seekers and employers. The recent improvement in the online skill database and job placement services are steps in the right direction. Going forward, the authorities should expand the public awareness of the skill database and encourage employers and job seekers to use it. In addition, facilitating firms to find proper match through regular pre-screening and other placement services should further improve the matching process.

25. Improving labor market information is necessary to assist decision-making and deepen labor market analysis. To this end, the Department of Statistics (DOS) should increase the frequency of labor force survey to gather more information on development in the labor market and provide more reliable and timely data. Ensuring adequate staffing and resources at the DOS is important to improve the availability and quality of data. In addition, improved data availability and quality should help better inform the collective wage bargaining negotiation process, including by facilitating the work of the planned national productivity council. A better-informed bargaining process could help better align real wage growth with productivity gains.

26. More generally, advancing structural reforms to improve competitiveness would foster investment and job creation. While to some extent, diversifying the economy and broadening its base is feasible, the geography of The Bahamas implies that tourism will continue to play a major role in the economy. Therefore, actions to reduce structural bottlenecks would help spur investment and job creation.

[15] Hanushek, Schwerdt, Woessmann and Zhang (2017).

Box 1. Literature Review on Apprenticeship Programs

Apprenticeship programs are common around the globe. Some countries choose to integrate apprenticeship program into their formal education system, such as Austria, Germany, and Switzerland, and others provide apprenticeship training for out-of-school youth, such as the United Kingdom, Australia, Canada, or the United States. The economic, legal, and educational systems/models vary among such countries, and they are key to the outcomes in terms of employment, transition from school to work, mobility and income level during apprentice's work life cycle.

Although vocational and apprenticeship training could help the young to smooth entry into the labor market, it cannot substitute for strong quality in general education. Hanushek, Schwerdt, Woessmann, and Zhang (2017) compared employment rates across different ages, for individuals with general and vocational education. They found that vocational education has a positive impact on the transition from the school season to work. Individuals with a general education were found to be initially 6.9 percent less likely to be employed than those with a vocational education, but this advantage on employment diminishes with age. They emphasized that vocational training should not substitute for providing strong basic skills, because modern economies require developing general cognitive skills to serve as the foundation for further learning and on-the-job training.

Research on German apprenticeship programs also shows that apprentices who stay with their training firms are more likely to earn higher salaries than those who leave. German firms voluntarily offer apprenticeships to their workers, even though the skills provided in these programs are very general and firms bear considerable costs of training. Acemoglu and Piscke (1998) calibrate a structural model using microdata from German companies to find that firms could benefit from providing apprenticeship training because their apprentices are more likely to stay longer at the firm and earn higher salaries than those who leave. Korpi and Mertens (2003) also concluded that people with vocational training and university degrees then to stay at their firms longer than those without upper secondary education. Moreover, income levels and employment for young workers is impacted by the amount of schooling and vocational training they have received.

References

Andrew S. Downes, Nlandu Mamingi, Rose-Marie Belle Antoine, 2004, "Labor Maret Regulation and Employment in the Caribbean", *National Bureau of Economic Research,* http://www.nber.org/books/heck04-1.

Daron Acemoglu, and Jörn-Steffen Pischke (1998), "Why Do Firms Train? Theory and Evidence," *The Quarterly Journal of Economics,* Vol 113, No. 1 (Feb. 1998) pp. 79-119, (The MIT Press).

Era Dabla-Norris, Giang ho, Kalpana Kochhar, Annette Kyobe, and Robert Tchaidze, 2013, "Anchoring Growth: The Importance of Productivity-Enhancing Reforms in Emerging Market and Developing Economics," *IMF Staff Discussion Note*, (Washington: International Monetary Fund).

Eric A. Hanushek, Guido Schwerdt, Ludger Woessmann and Lei Zhang, 2017, "General Education, Vocational Education, and Labor-Market Outcomes over the Lifecycle," *The Journal of Human Resources*.

Pavon, F. et al., 2016, "The Bahamas: Skills for Current and Future Jobs in The Bahamas (BH-L1037)", Inter-American Development Bank.

Guillermo R. Alborta, 2013, "Private Sector Assessment Report (PSAR) for The Commonwealth of The Bahamas."

Kathrin Hoeckel 2008, "Costs and Benefits in Vocational Education and Training," OECD. http://www.oecd.org/education/skills-beyond-school/41538706.pdf.

Klaus F. Zimmermann, Costanza Biavaschi, Werner Eichhorst, Corrado Giulietti, Michael J. Kendzia, Alexander Muravyev, Janneke Pieters, N'uria Rodr'iguez-Planas, and Ricarda Schmidl, 2013, "Youth Unemployment and Vocational Training," *Foundations and Trends in Microeconomics* Vol.9. Nos. 1-2(2013)-1-15.

Laurence Ball, Daniel Leigh and Prakash Loungani 2017, "Okun's Law: Fit at 50?" *Journal of Money, Credit and Banking* (The Ohio State University)

Maria Victoria Fazio, Etoile Pinder, 2012, "In Pursuit of Em0ployable Skills: Understanding Employers' Demands: Analysis of The Bahamas' 2012 Wage & Productivity Survey," Inter-American Development Bank.

Paul Ryan,2001, "The School-to-Work Transition: A Cross-National Perspective," *Journal of Economic Literature* Vol. XXXIX: 34-92.

Regina Dionisius, Samuel Muehlemann, Harald Pfeifer, Günter Walden, Felix Wenzelmann, and Stefan C. Wolter, 2009, "Costs and Benefits of Apprenticeship Training: A Comparison of Germany and Switzerland," *Applied Economics Quarterly* Vol. 55. Nº 1 (2009).

David Soskice, 1994, "Reconciling Markets and Institutions: The German Apprenticeship System," *National Bureau of Economic Research* 94 (1): 25-60, http://www.nber.org/chapters/c8776.pdf.

Stefan C. Wolter and Paul Ryan, 2011, "Chapter 11-Apprenticeship," *Handbook of the Economics of Education* Vol. 3, pp521-576.

Suzanne Duryea and Marcos Robles, 2016, "Social Pulse in Latin America and the Caribbean", Inter-American Development Bank.

Tomas Korpi, and Antje Mertens,2003, "Training Systems and Labor Mobility: A Comparison between Germany and Sweden," *Scandinavian Journal of Economics* 105(4), 597-617.

The Coalition for Education Reform, 2007, "Bahamian Youth: The Untapped Resource. Report No.2.

The Government of The Bahamas, 2017, "Commercial Enterprises Act," http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/2017/2017-0019/CommercialEnterprisesAct2017_1.pdf.

The Government of The Bahamas, 2001 "Employment Act," http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/2001/2001-0027/EmploymentAct_1.pdf.

The Government of The Bahamas, 2017, "Employment (Amendment) Act," http://www.ilo.org/dyn/natlex/docs/ELECTRONIC/104827/128028/F-113428152/BHS104827.pdf.

The Government of The Bahamas, 1971, "Industrial Relations Act,", http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1970/1970-0014/IndustrialRelationsAct_1.pdf

The Government of The Bahamas, 2002, "Minimum Wage Act,", http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/2002/2002-0001/MinimumWagesAct_1.pdf.

STRENGTHENING NATURAL DISASTER RESILIENCE: A SAVINGS FUND PROPOSAL[1]

The Bahamas is disproportionately exposed to natural disasters – both in terms of frequency and associated costs. An appropriate disaster risk-management strategy should be wide ranging, from strengthening resilience through capital and infrastructure investments, having a multilayer disaster risk financing plan, and strengthening fiscal and external buffers. Along these lines, staff proposes the creation of a natural disaster savings fund of a target size of 2-4 percent of GDP.

A. Introduction

1. The Caribbean countries are among the most vulnerable in the world to natural disasters (NDs). The Bahamas, due to the geographical spread of the islands, is particularly exposed. Over the last 30 years, The Bahamas has recorded more frequent NDs and annual average damages, including both public and private losses, at 1.4 percent of GDP, higher than the Caribbean regional average of 1.2 percent. Four out of the eight hurricanes that hit The Bahamas since 1990 resulted in estimated total damages—public and private—of at least 5 percent of GDP, resulting in an implied probability of a disaster of that magnitude of close to 15 percent in any given year.

Natural Disaster Damage for the Caribbean Region 1/
(percent of GDP)

	Averages	
	1990-2016	2000-2016
The Bahamas	1.4	1.6
Barbados	0.0	0.0
Belize	2.3	3.7
Dominican Republic	0.4	0.1
Jamaica	0.5	0.8
Trinidad and Tobago	0.0	0.0
ECCU	3.7	2.5
Caribbean Average	1.2	1.3

Sources: EM_DAT (adjusted for GDP revisions), WEO, IMF Calcultions

1/Reports on Damages due to storm disasters

2. Staff proposes the creation of a ND savings fund as part of a multilayer disaster risk financing strategy. This proposal is in line with the layered approach proposed by the World Bank in 2016 —an approach including different financial instruments for different layers of risk, as well as the IMF paper on small states resilience to natural disasters and climate change (December 2016). In line with this approach and consistent with the results of staff's quantitative analysis, staff suggests the creation of a savings fund of 2-4 percent of GDP to ensure funding to cope with the fiscal consequences of natural disasters. This fund would stabilize at a low risk of depletion with annual inflows of 0.5 percent of savings, during non-disaster years.

3. This paper is organized in six sections. Section B provides the background and context for disaster risk mitigation and strategies in The Bahamas. Section C gives a more detailed description

[1] Prepared by Marushia Li Gislén (SEC) and Alejandro Guerson (WHD). We are grateful to The Bahamian authorities for comments and discussions during a seminar at the Ministry of Finance.

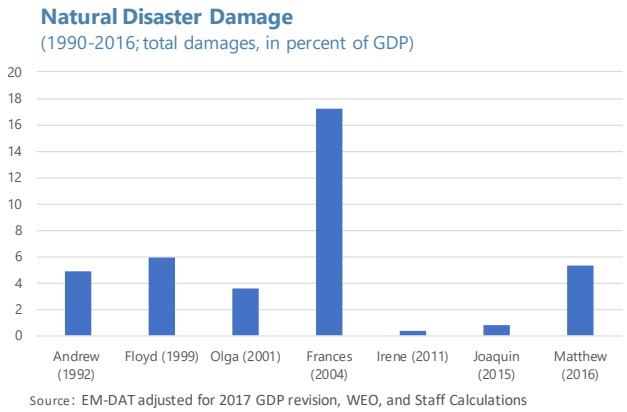
of existing financing options, in line with the proposed framework. Section D presents the methodology used in the simulation exercise and includes the calibration of the case of The Bahamas. Section E presents the results, and section F provides recommendations.

B. Context

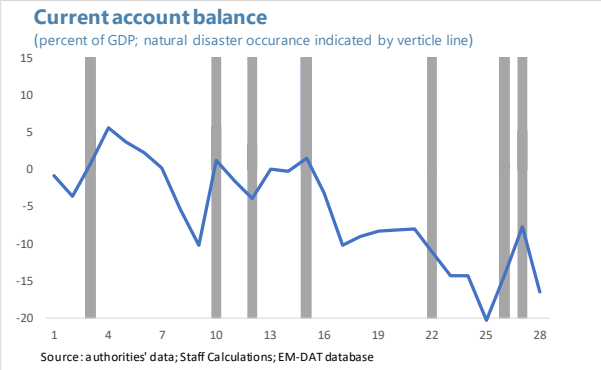
4. Small states are more vulnerable to NDs than larger countries. The average damages for small states is nearly 13 percent of GDP, compared to less than 1 percent of GDP for larger states. A greater part of the population in small states are also affected compared to larger states, 10 percent versus 1 percent respectively (IMF, Small States Resilience Paper, 2016). It is therefore critical that the governments of small island states take steps to strengthen resilience and ensure adequate buffers to smooth the impact of NDs.

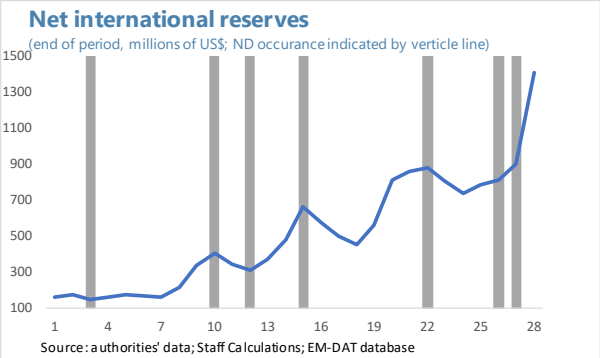
5. The economic consequences of NDs are far-reaching. The impact of NDs include everything from emergency cash handouts to the reconstruction of uninsured or underinsured infrastructure, including critical infrastructure such as roads, bridges or ports, as well as foregone fiscal revenue due to temporary tax relief measures. In addition, the pressures on spending from the overnight destruction of a country's infrastructure can result in higher borrowing costs, lower credit ratings, reduced investment, and lower productivity and output.

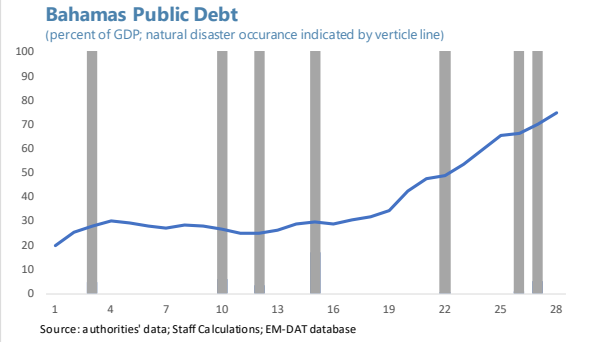
6. The Bahamas has traditionally absorbed ND shocks through the re-priotization of public spending and borrowing. The Bahamian government has often resorted to budget reallocations or debt issuance to cover the full cost of immediate reconstruction needs. The economic impact is seen primarily through worsening current account, declines in foreign reserves and widening fiscal deficits. Public assets remain uninsured to this day. In 2004, The Bahamas was hit by Hurricane Frances and recorded public and private sector losses of almost 20 percent of GDP. At the time, foreign insurance payments amounted to 3.5 percent of GDP. Since then, insurance coverage in the hotel industry has been extended to include wind and flood damages**.** Additional post-hurricane reconstructions were then financed by donations and budget reallocations, and thus had limited impact on the fiscal balance. Local insurance companies report widespread underinsurance among households, with homeowners' insurance being prevalent only when there is a mortgage or among wealthy individuals.

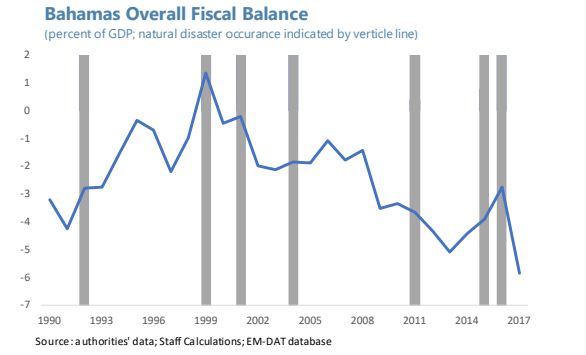


Source: EM-DAT adjusted for 2017 GDP revision, WEO, and Staff Calculations









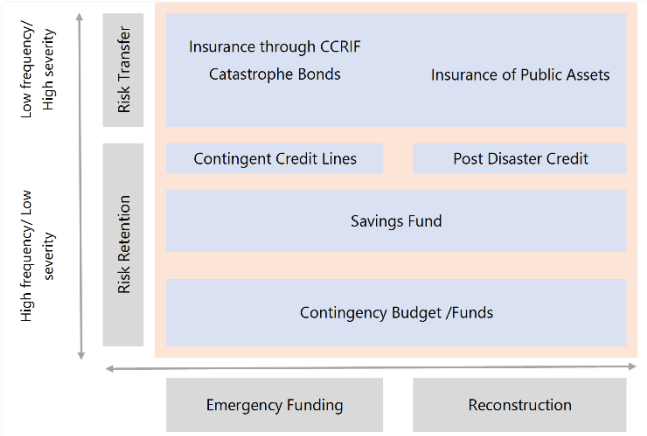
7. Because of its elevated exposure to NDs, the Caribbean region has been proactive in developing new risk transfer tools. The Caribbean Catastrophe Risk Insurance Facility (CCRIF) was created in 2007 by 16 Caribbean countries with technical assistance and initial capitalization provided by the World Bank. The CCRIF provides parametric insurance and works by pooling risks into a single diversified portfolio. According to CCRIF, insurance costs are less than half of what individual countries would pay if buying the same coverage or by accessing international markets. Governments can buy coverage of maximum USD100 million per disaster and year. Between June 2007 and October 2017, the CCRIF disbursed a total of US130.5 million to affected countries. Payments are determined by the coverage a government buys and the deductible selected. Damages are estimated through an index in which hazard levels are used as a proxy for losses. The Bahamas tapped the CCRIF following cyclone Irma in the autumn of 2017, for which it received a payment of USD397 598, covering only a small part of the estimated total damages, at USD135 million (CCRIF webpage; authorities' estimates).

C. Managing Disaster Risk – A Layering Approach

8. A comprehensive framework to mitigate risks from NDs is needed. Fund policy on small states' resilience to NDs and climate change dictates that ex-ante risk reduction should be the priority in order to reduce financing uncertainty in the event of a disaster, but also to reduce ex-post damages (IMF, 2016). Policies include risk identification, strengthening engineering and building standards, appropriate legislation; zoning laws to prevent building in flood plains, supportive business environment, and ensuring adequate safety nets to ensure adequate protection of the most vulnerable.

9. Layering of financing strategies minimizes the cost of disaster management. Clark and others (2016) use a country case, similar to that of The Bahamas, to model the most cost-efficient disaster financing strategies. Overall, the framework specifies that ex-ante measures to strengthen resilience are critical, together with the extended insurance coverage of public and private assets. Low-impact, high-frequency disasters are best funded by budget reallocations or savings, in the form of a pre-financed reserve fund, which can be complemented with, contingent credit lines or post-disaster credit when appropriate.[2] In principle, a government could allocate fiscal savings to debt reduction (of an amount commensurate to the expected cost of reconstruction) and save on interest expenditures, and then borrow when hit by a ND to cover reconstruction costs. However, it can take up to nine months from the time of a disaster takes place to the time of accessing resources. If the disaster impacts the asset quality of financial institutions, or if deposits start to decline as the population spend for reconstruction, borrowing costs may also increase. For a small economy such as The Bahamas, disaster borrowing might also affect marginal interest rates. The Bahamas' high-income status prevents it from accessing financing on concessional terms.

A Layered Financing Approach



Sources: GFDI Sources: GFDRR and World Bank Group (2014).

10. For the most severe NDs, ex-ante risk mitigation is critical, in conjunction with greater penetration of private and public insurance. Greater insurance is associated with far lower output and income losses from NDs, as noted by Melecky and Raddatz (2011) and von Peter and Saxena (2012). It is also less costly than relying on revenue measures or expenditure allocation for large scale disasters. Market insurance and re-insurance are effective ways to cover losses in the private and public-sector assets. While the hotel industry is covered for losses related to NDs, evidence show that 20-25 percent of homeowners remain under, or uninsured. Public sector assets, including infrastructure, remain uninsured. Additional protection, for the most extreme events, could be provided by catastrophe (CAT) bonds, which enables the government to transfer the risk to international investors. The bond structure typically involves a special purpose vehicle (SPV) that signs a reinsurance contract which pays premiums to the investors in exchange for coverage.

[2] In March 2018, The Bahamas requested a 5-year USD100 million contingent credit line to the Inter-American Development Bank (IDB). This facility does not require any initial payment, but can be drawn upon under specific parameters following ND.

D. Methodology to Determine the Size of a Savings Fund

11. The first step is to estimate a model for The Bahamian economy that captures the dynamics of output and the main fiscal variables in response to NDs. For this purpose, staff uses a vector auto-regression (VAR) model with historical data for 1985-2016. The endogenous variables in the VAR include the cyclical components of GDP; government revenues; including tax and non-tax revenue; current primary expenditures, and capital expenditures.[3] Control variables are included to account for other major sources of shock. The estimated distribution of residuals is then used to map random ND shocks. These control variables include US real effective exchange rate (to capture competitiveness pressures given that the Bahamian dollar is pegged to the U.S. dollar); U.S. real GDP growth – the main source of tourism revenues; oil prices (as these account for a large part of Bahamian imports); and dummies for the September 2001 shock that significantly disrupted tourism arrivals; the bankruptcy of Baha Mar in 2015; the introduction of the value-added tax in 2015, which impacted revenue performance; and for election years (that are associated with widening fiscal deficits). The underlying assumption is that the control variables "remove" the main alternative shocks to be left only with NDs as the most significant remaining ones.

12. The second step is to run a Monte Carlo experiment. Using the distribution of residuals from the VAR, staff ran one thousand simulations, each corresponding to 15-year periods and representing a plausible path for the cyclical component of the endogenous variables in the model, i.e. fiscal revenues and expenditures. The simulations generate data that mimic historical patterns in terms of the volatility, persistence, and co-movement of the cyclical components of GDP in response to shocks that are independent of the controls (and therefore include NDs as the main shock and other smaller chocks). Using the simulated paths, staff focused on events with a probability of occurrence of 15 percent or less. To account for re-prioritization of spending, staff assumed that disasters of this magnitude induce a re-allocation of spending for 0.5 percent of GDP, on average. This is implemented by adding 0.5 percent of GDP to the simulated paths of the cyclical component of primary expenditure.

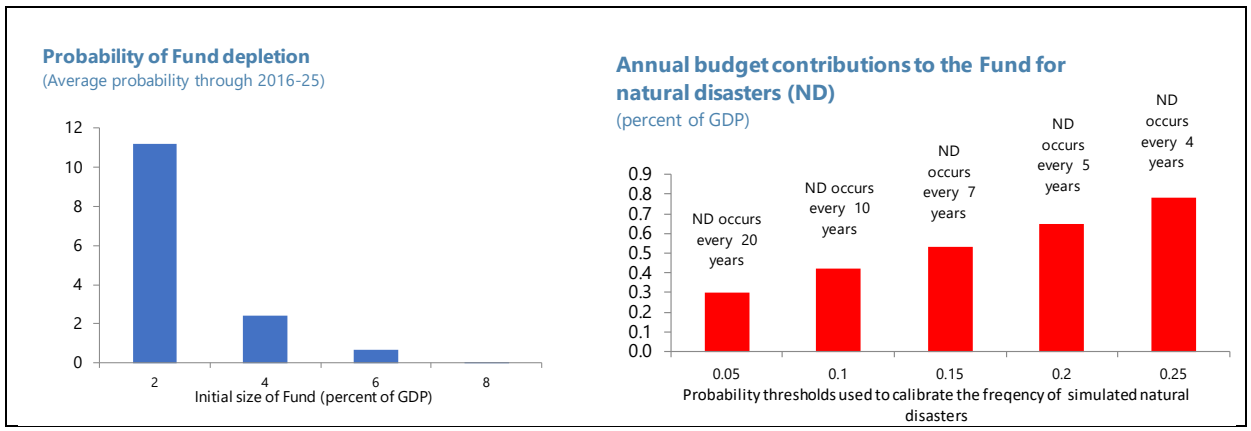
13. The inflows to the fund that are required to stabilize the fund balance are equal to the average fiscal impact in any given year of a disaster of the chosen probability. Data collected by the World Bank show that NDs, with damages of at least 5 percent of GDP, occur on average every seven years in The Bahamas, implying a probability of 15 percent in any given year. On average 150 out of the 1000 simulations in each year would be identified as a ND.

E. Results

14. A savings fund of 2-4 percent of GDP and annual savings of ½ percent of GDP would achieve sustainability with a low probability of depletion. The outcome shows that a savings

[3] The cyclical components used in the empirical model are calculated as the ratio of the variable with respect to its estimated trend, where the trend is approximated by the Hodrick-Prescott filter on 1985-2016 annual data. Al variables are transformed into real terms using the GDP deflator and expressed in natural logarithms. The identification of shocks is performed according to the Choleski decomposition, according to the ordering presented.

fund of between 2-4 percent of GDP is needed to obtain a probability of depletion within the subsequent ten years of 11 percent or less, after reaching the target size. To stabilize the fund at the target size, under the historical probability distribution of natural disasters, the fund requires inflows for ½ percent of GDP during non-disaster years. The above charts show the sensitivity of the results to changes in the probability of disaster. With the probability set to 0.15, annual savings of 0.5 percent of GDP are needed to achieve financial sustainability of the fund over time. As the frequency of disasters increases, higher inflows are required to stabilize the fund at the target size. In the 2 percent of GDP scenario, there is a 11 percent risk of depleting the fund over the ten-year period after reaching the target size. In the 4-percent scenario, the probability falls significantly to 2 percent.



F. Conclusions

15. A comprehensive disaster risk management strategy, including adequate financial protection, is critical to confront the consequences of natural disasters. To this end, and as part of a multilayer disaster risk-financing strategy, a savings fund of 2-4 percent of GDP, with annual inflows for ½ percent of GDP during non-disaster years, would enhance fiscal and macroeconomic resilience. Insuring public sector assets and encouraging the broader use of insurance among households would offer additional layers of protection.

16. The savings fund should be government by clear rules on inflows and outflows as well as transparency requirements. Clear objectives and disbursement rules and triggers based on verifiable criteria are critical. The fund should have prudent and transparent investment policies and should be consolidated with budgetary information to allow assessment of the overall fiscal situation. At a minimum, the fund balance should appear in financial statements, and drawdowns should appear in budget execution reports.

References

Acevedo, S. 2014. "Debt, Growth and Natural Disasters: A Caribbean Trilogy" IMF Working Paper 14/125

Acevedo. 2016. Gone with the Wind: Estimating Hurricane and Climate Change Costs in the Caribbean".

CCRIF Annual Report 2016-2017

Clarke, Mahul, Poulter, Theu. 2016. Evaluating Sovereign Disaster Risk Financing Strategies – A Framework. Policy Research Working Paper 7721. World Bank

Dominica. 2016. IMF Selected Issues Paper.

ECCU. 2016. IMF Staff Report. 16/133

Melecky, Raddatz. 2011. How do Governments Respond after Catastrophes? Natural-Disaster Shocks and the Fiscal Stance. Policy Research Working Paper 5564. World Bank.

Von Peter, Dahlen, Saxena. 2012. Unmitigated disasters? New evidence on the macroeconomic cost of natural catastrophes. BIS Working Paper.

2014. Financial Protection against Natural Disaster: from products to comprehensive strategies and Operational framework for disaster risk financing and instance. GFDRR and World Bank Group.

2016. Small states' resilience to natural disasters and climate change – role for the IMF. IMF Policy paper.