

A BACKGROUND PAPER >> PRIVATE AND FINANCIAL SECTOR

360° Resilience

A Guide to Prepare the Caribbean
for a New Generation of Shocks



European Union



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Global Facility for Disaster Reduction and Recovery



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Private and financial sector resilience in the Caribbean

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This note has been prepared by Oliver Masetti (Financial Sector Economist, ELCFN) with inputs from Holti Banka and Jose Angel Villalobos. The author wants to thank Guillermo Ruiz for outstanding research assistance and Abha Prasad, Eric Strobl, Julie Rozenberg and Martijn Regelink and for valuable comments.

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Introduction

The private sector in the Caribbean is crucial for economic growth and job creation and economic resilience is thus heavily determined by the shock absorbing capacity of individual firms and households. As the definition of the private sector is generally broad and includes economic agents of various size operating across different sectors, the assessment conducted in this chapter is multifaceted and considers different elements that determine vulnerabilities and resilience to exogenous shocks. The focus of the analysis is on the private sector's vulnerability to tropical storms, the type of disaster most prevalent in the region, but the discussion of risks and vulnerabilities is also more broadly applied to other types of shocks, such as the COVID-19 pandemic.

The assessment starts by mapping the importance of different sectors for the Caribbean economies and an econometric analysis of the vulnerability of these sectors to tropical storms. By linking sectoral vulnerabilities with the importance of a certain sector for economic activity, it builds a new country-level index for economic vulnerability. The conclusion of this analysis is that the heavy reliance of the Caribbean on tourism, mining and quarrying or agriculture - all sectors that either contract in response to a storm event or require a high degree of social interactions- is a threat to private sector resilience and calls for risk-sharing instruments and increased diversification. However, insurance penetration is low and economic diversification is often hampered by a weak business environment, difficulties in obtaining credit and a slow adoption of the digital economy.

A sector of particular relevance for economic resilience in the Caribbean is finance. Financial sector assets in the region stand at almost 170 percent of GDP and financial crises in the past had devastating impacts on the Caribbean's economy. The chapter assesses the resilience of the financial sector by focusing on its exposure to economic sectors vulnerable to disasters and looking at the financial sector's soundness to gauge its shock absorbing capacity. Results show that banks, the dominant type of financial institutions in most Caribbean countries, are particularly exposed through personal loans and any shock that impacts the household sector's debt repayment capacity would thus be particularly severe. The chapter also builds an index of financial sector vulnerability to natural disasters by linking lending data at the sectoral level with the sectoral disaster vulnerabilities. The results highlight that banking sectors with high lending exposure to hotels & restaurants as well as the mining sector are particularly vulnerable. Risks are compounded by weaknesses in bank asset quality in many countries that are likely to be exacerbated by the COVID-19 pandemic. As final aspects of financial sector resilience, the chapter discusses existing financial sector safety nets to protect the most vulnerable and mitigate the economic costs of financial sector turmoil, as well as the crucial role of payment systems continuity.

Based on the diagnostic and assessment of vulnerabilities, the last section of the chapter proposes six areas to strengthen private and financial sector resilience. These areas include i) fostering economic diversification through digitization, ii) expanding insurance coverage and instrument range for the private sector, iii) improving the business environment and access to credit, iv) reducing financial sector vulnerabilities, v) strengthening financial sector safety nets, and vi) ensure payment systems continuity.

1. Diagnostics

1.1 Which sectors are economically important in the Caribbean?

Although countries in the Caribbean region share many common features, such as a relatively small size of domestic markets and no land border to main export partners, the economic structure varies substantially across countries. The 17 countries covered in this chapter can be roughly grouped in three categories based on their economic structure (see Table A1 in the Appendix for a detailed GDP decomposition by sector).

- **Tourism-dependent economies.** The first group of countries includes small island states that rely strongly on tourism. This group of countries includes St. Lucia, Antigua and Barbuda, Anguilla, Barbados, Bahamas, Dominican Republic, Grenada, St. Kitts and Nevis. In all of these countries the share of the *hotels & restaurants* sector exceeds 8 percent of gross value added (GVA) and reaches up to 26 percent in St Lucia.¹ *Hotels & restaurants* capture only a part of tourism related activities, which are often also linked to the travel sector as well as indirectly to domestic retail and services sector.² However, due to regional classifications and data availability this chapter uses the share of the *hotels & restaurants* sector as a proxy for the tourism sector well noting that this is only the lower boundary of tourism's contribution to the economy. The tourism sector is labor intensive and provides direct employment to 413,000 workers in the Caribbean, which presents roughly 18 percent of total employment (ILO, 2020).
- **Commodity-dependent economies:** The second group of countries includes the commodity rich countries in the Southern Caribbean, Guyana, Trinidad and Tobago and Suriname. The economies of these three countries exhibit a high share of the *mining & quarrying* sector in total GVA. This is primarily linked to large hydrocarbon sectors in Trinidad and Tobago and Guyana, as well as gold in Suriname and Guyana. While hydrocarbon production has matured in Trinidad and Tobago, Guyana only recently discovered vast offshore oil reserves, which are among the largest in the world on a per capita basis. Oil production in Guyana started in 2019 and it is projected that the hydrocarbon sector will expand rapidly over the next years. The presence of extractive commodities also supports relatively large manufacturing sectors in these three countries that are often comprised of downstream processing of hydrocarbon and mining products.
- **Agriculture-dependent economies:** The third group consists of countries with a high share of agriculture in total GVA. These countries include Haiti, Guyana, Dominica, Belize, Suriname.³ The socio-economic importance of the *agriculture* sector in many countries is higher than indicated by its share in GVA as agriculture is labor intensive and the share of agriculture in total employment is often significantly higher than its share in output. For example, it is estimated that

¹ Using a broader definition of tourism, the ILO estimates that tourism directly accounts on average for 13 percent of GDP in the English and Dutch Caribbean (ILO, 2020).

² For example, the World Travel and Tourism Council (WTTC) definition of tourism includes sectors which deal directly with tourists, including hotels, travel agents, airlines and other passenger transport services, as well as the activities of restaurant and leisure industries that deal directly with tourists.

³ Guyana and Suriname can be classified both as agriculture dependent as well as commodity dependent due to the high share of agriculture as well as mining and quarrying.

more than 40 percent of the labor force in Haiti is engaged in, mostly small-scale, agricultural activities⁴ while the agriculture's share in GVA is 19 percent.

Besides these heterogeneities in terms of sectoral focus, GVA data also show a high importance of the *wholesale and retail trade sector* (median share of 13 percent), *the transport and communication sector* (median share of 12 percent), *real estate, renting and business activities* (median share of 11 percent) as well as *education, health and other social and personal services* (median share of 11 percent) in most countries of the region. This suggests that despite the apparent differences between the three groups of countries, there also exist a substantial degree of similarity across Caribbean economic structures.

1.2. Which sectors are particularly vulnerable to natural disasters and other shocks?

1.2.1. Natural disaster vulnerability

In this section we model the impact of tropical storms on sectoral growth to discuss economic vulnerability to the type of natural disaster most prevalent in the region – out of the 280 country specific disaster events recorded over the past two decades in the Caribbean, 158 were storms.⁵ The approach used is a modification of the model suggested by Hsiang (2010) using more granular data on sectoral economic activity, a larger set of Caribbean countries as well as more recent time-series data. Sectoral gross-value added (GVA) data at constant prices are collected from local sources as well as the UN database.⁶ Overall, we extract GVA data for 14 economic sectors for 13 countries for the period 1990-2018.⁷ The data have an annual frequency and y-o-y growth rates are estimated to obtain the dependent variable *sectoral growth* $_{it}^j$ where i indicates the country, j the sector and t the year. Sectoral growth is then regressed in a fixed-effects panel regression for each sector separately on a measure of storm damage and controls as stated in the following equation:

$$\text{sectoral growth}_{it}^j = \alpha_i + \sum_{l=0}^2 \beta_l^j f_{i,t-l} + \tau + \theta + \epsilon_{it} \quad (1)$$

τ is a linear time trend, θ is a dummy which takes the value of 1 for the year 2009 and 0 in all other years to control for the impact of the Global Financial Crisis. α_i indicates country fixed effects. The coefficients of interest are β_l^j , which indicate the contemporaneous and lagged impact of tropical storms on sectoral growth. Rather than using a dummy variable indicating only the occurrence of a tropical storm in a given year and country, we construct for each tropical storm event a continuous wind damage function f which estimates the fractional loss of value. This allows to differentiate the effects based on the severity of the storm. Following the approach outlined by Emanuel (2011) maximum wind-speeds observed during a storm are used to calculate a loss function, which is based on the premise that damage from windstorms is observed to increase quite rapidly with wind speed. Empirical studies relating wind to damage suggest a high power-law dependence of damage on wind speed (Pielke, 2007) and it is often assumed that damages vary as the cube of the wind speed over a threshold value. Furthermore, the literature has shown that winds below a certain speed rarely cause damage and thus the damage function proposed by

⁴ World Bank (2020). Haiti: Country Private Sector Diagnostic.

⁵ <https://www.emdat.be/>

⁶ The sectoral classification follows the ECCB methodology as most data are taken from the ECCB database.

⁷ For Belize, DR, Guyana, Suriname and Saint Mateen no wind data are available, and the countries are thus not included in the regression.

Emanuel (2011) produces positive values only for winds speeds in excess of a specified threshold. Based on these considerations the loss function is defined as

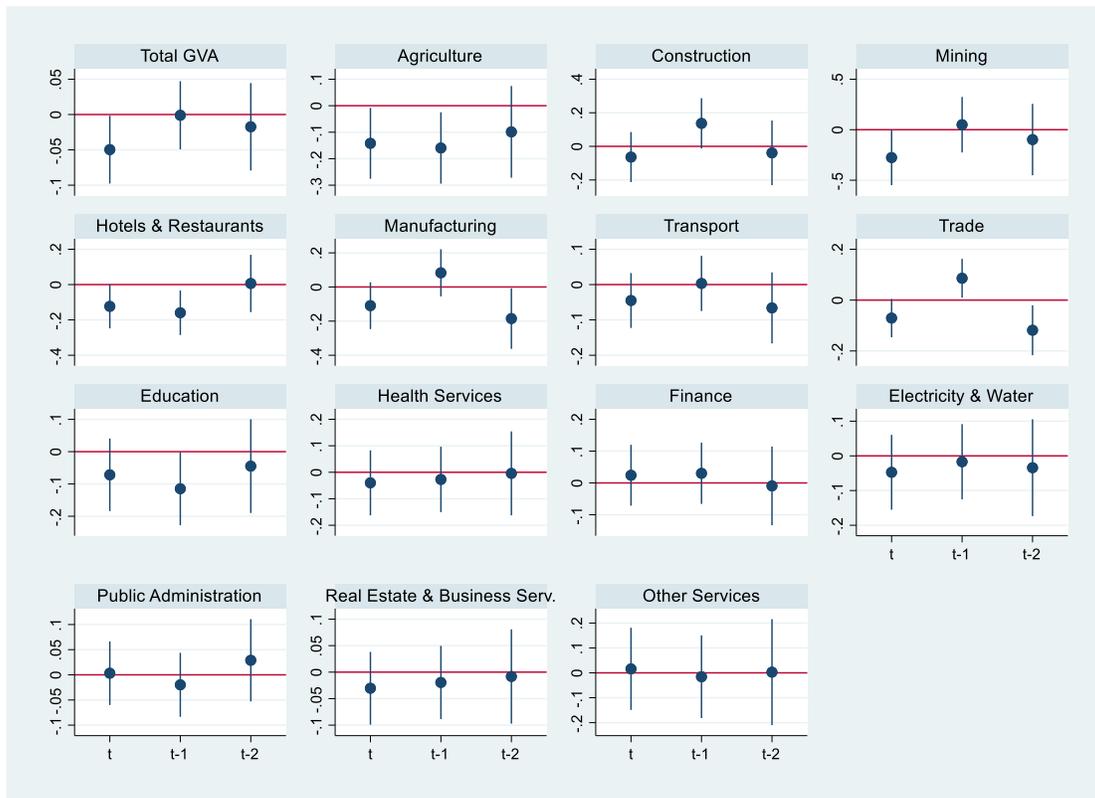
$$f_{it} = \frac{v_{it}^3}{1 + v_{it}^3}$$

With

$$v_{it} = \frac{\max[(V_{it} - V_{thresh}), 0]}{V_{half} - V_{thresh}}$$

where V_{it} is the maximum wind speed observed in country i and year t , V_{thresh} is the wind speed below which no damage occurs, and V_{half} is the wind speed at which half the property value is lost. Following calibrations by Emanuel (2011) the following values are used: $V_{thresh} = 50kts \triangleq 92km/h$ and $V_{half} = 110kts \triangleq 203km/h$. This methodology gives 129 non-zero country-year observations for the loss function f_{it} and thus covers over 80 percent of all storm events reported in the EM-DAT database.^{8,9}

Figure 1: Coefficient plot of storm impact on sectoral GVA growth



Notes: The dot indicates the point estimates and the vertical line the 95 percent confidence interval of the β_1^j coefficients from Eq. 1.

⁸ The loss function is specified in a way that f can take values from 0 to 1. The mean value of the non-zero f observations is 0.129, the standard deviation is 0.214, the minimum 0.001 and the maximum 0.844.

⁹ The small difference in the number of non-zero observations for the loss function and the number of storms reported in EM-DAT stems from the fact that slightly more countries are included in EM-DAT and that the loss function is only non-zero for storms above the threshold V_{thresh} .

The results of Equation 1 are reported in Table A2 and A3 in the Appendix and summarized in the coefficient plot above (Figure 1). It can be seen that in the year of a storm event the growth of aggregate gross-value added declines significantly (top-left panel). The coefficient of -0.05 means that 50 percent damage (as measured by the loss function f) would reduce the growth rate by 2.5 percentage points (-0.05×0.5). Using the average and maximum historical loss values of f (see footnote 8) this implies that growth of total GVA falls by 0.6 percentage points following an “average” storm event and by 4.2 percent following a very strong storm event. The effect however is not persistent as the one- and two-year lags of a tropical storm have no significant effect on GVA. The impact of storms on aggregate GVA hides important sectoral heterogeneities. In the year of the storm, GVA in the *agriculture* (-0.142), *hotels & restaurants* (-0.123), *mining & quarrying* (-0.276) as well as *trade sector* (-0.071) declines significantly, while other sectors experience no statistically significant impact. The negative impact of a storm persists and continues to depress growth in the *agriculture* as well as the *hotels & restaurants* sectors one year after the storm event as indicated by the statistically significant coefficients of the first lag. In contrast, the *construction* sector seems to rebound one year after a storm, probably due to enhanced reconstruction activity. This rebounding effect of the construction sector has also been found by Hsiang (2010). Similarly, the trade sector experiences a significantly positive impact one year after the storm and appears to recover its contemporaneous losses.

The estimations of the sectoral impact of tropical storms can be used to construct a country-specific measure of economic vulnerability. For this purpose, we combine the importance of a sector for total GVA in a country with the vulnerability of this sector to tropical storms. The β_t^j coefficients from Equation (1) serve as the measures of vulnerability of a given sector to tropical storms. In particular, we multiply the sum of all significant coefficients for t and $t-1$ ¹⁰ with the share of the respective sectoral GVA in total GVA¹¹ and take the sum over all ten main sectors as described in Equation (2)

$$Economic\ Vulnerability_i = \sum_{j=1}^{10} (|\beta_0^j + \beta_1^j|) \frac{GVA_i^j}{GVA_i} \quad (2)$$

if β_0^j, β_1^j are statistically significant at the 10 percent level in Equation 1.

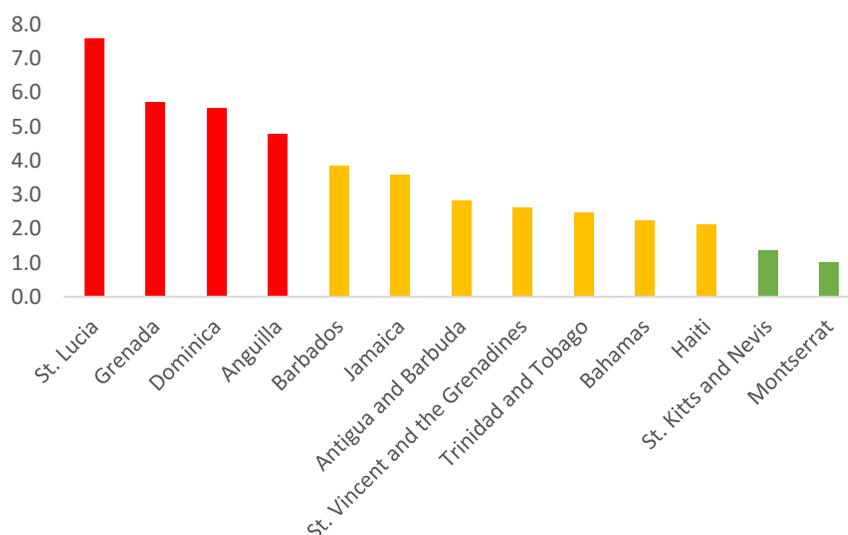
The index is structured so that higher values indicate higher vulnerabilities to storms. Importantly, the index does not consider the historic occurrence or frequency of storm events or the likelihood of future storms. It only relates the countries’ current economic structure with the average vulnerability of a given sector to storms in the Caribbean. Since it is based on historic correlations between storms and economic activity it is also not designed to capture the impact of climate change that might alter these relations. Applying this methodology results in the economic structure vulnerabilities as indicated in Figure 2, which shows that the country with the highest structural vulnerability is St. Lucia. The high value of its

¹⁰ Six out of the 14 sectors included in the regression have statistically significant effects either in t and/or $t-1$ at the 10 percent confidence levels. These sectors are: i) agriculture, livestock, forestry and fishing; ii) mining and quarrying; iii) construction, iv) wholesale, retail trade; v) hotels and restaurants; and vi) education. See Appendix for detailed regression outputs. The Economic Vulnerability index does only consider the impact on those sectors and assumes that other sectors are not affected.

¹¹ The average sectoral weight over the last three years is taken to control for potential endogenous effects of storms on sectoral weights.

vulnerability index can be explained by the high share of *hotels & restaurants* in St. Lucia’s GVA. As growth in this sector is vulnerable to storms (see beta coefficients in Table A2) the index is high. Other countries with high index values are Grenada, Dominica and Barbados. In contrast, countries with lower structural economic vulnerabilities are St. Kitts and Nevis and Montserrat.

Figure 2: Economic structure vulnerability to storms



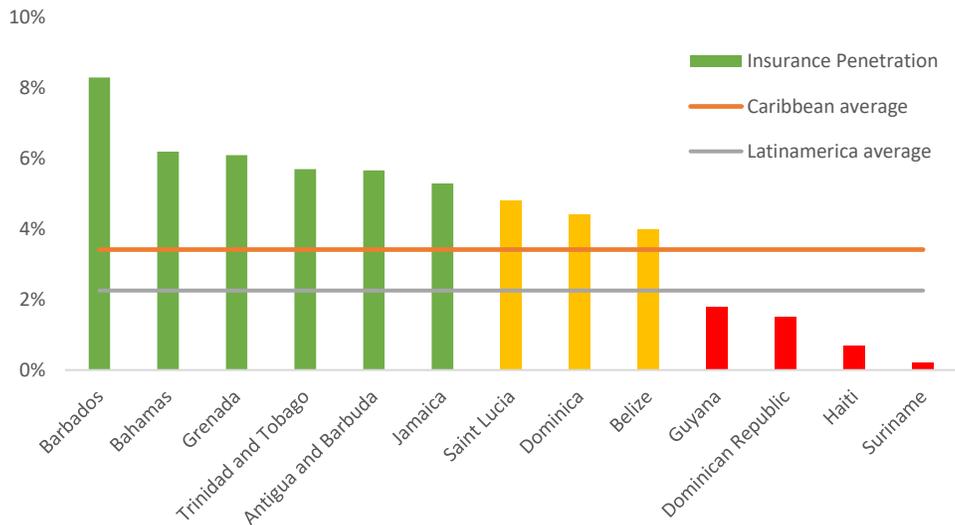
Notes: Red bars indicate an economic structure vulnerability index ≥ 4 , orange bars indicate an economic structure vulnerability index < 4 and ≥ 2 , green bars indicate an economic structure vulnerability index ≤ 2 .

1.3 Insurance protection against disasters

Given the high exposure to natural disasters in the region, private sector resilience would benefit from risk sharing and insurance instruments that mitigate the economic costs faced by businesses and households in the aftermath of a disaster event. However, insurance penetration in the Caribbean, while varying substantially across countries, is generally low. Premiums written account for 8 and 6 percent of GDP, respectively in Barbados, the Bahamas and Grenada, but the ratio is only around 1.5 percent in Guyana and the Dominican Republic and below 1 percent on Haiti and Suriname.¹² Insurance penetration in some Caribbean countries is affected by the reinsurance and captives’ companies which underwrite mostly overseas business instead of protecting local economy, implying that insurance protection of the private sector is lower. Most of the insurance coverage relates to non-life instruments, which is often dominated by motor insurance, while property insurance or other instruments more suitable to protect against disasters are scarce.

¹² Insurance Information Institute (2019). Insurance Fact Book.

Figure 3: Insurance Penetration (Premiums as a percentage of GDP)



Notes: Green bars indicate insurance penetration ≥ 5 percent of GDP, orange bars indicate insurance penetration < 5 and ≥ 2 percent of GDP, red bars indicate insurance penetration ≤ 2 percent of GDP.

Source: Insurance Information Institute

Low insurance penetration in the Caribbean is due to a combination of supply and demand-side impediments. Supply-side constraints stem from an underdeveloped insurance industry that does not fully conform to international best practices, which inhibits its ability to offer adequate coverage to the private sectors. The insurance sector relies heavily on reinsurance, particularly for catastrophic protection. International firms, in some countries, meet over 90 percent of domestic insurance demand, and the international reinsurance sector, as risk-capital provider, plays a key role in mitigating domestic insolvency risks. Demand-side constraints to higher insurance uptake are linked to limited insurance awareness and understanding despite the repeated occurrence of disasters. Basic features such as deductibles and the concept of underinsurance are not always well understood and people are quick to cancel insurance, e.g., if they have not claimed in a year. Hence there is a tendency towards self-insurance and individuals and business often take out insurance only if required, for example together with a loan or mortgage.

1.4 Constraints to building private sector resilience: Challenging business environment, slow adoption of digitalization and limited access to finance

Economic resilience generally benefits from a dynamic private sector that allows firms and households to adapt to risks and opportunities. However, in the Caribbean region this dynamic is often hampered by challenging business environments, a slow adoption of the digital economy and limited access to finance. These factors make it difficult for entrepreneurs to start new businesses and diversify the economy away from more vulnerable sectors.

As shown in Figure 4, the business environment in most Caribbean countries is challenging. The average Caribbean score in the 2020 World Bank Ease of Doing Business ranking is below the LAC average by 1.7 points. The best performing countries in the Caribbean are Jamaica and St. Lucia while Suriname and Haiti score lowest. Looking at the DB's individual sub-components reveals that the region is particularly lagging

Figure 4: Business Climate (0-100)

	Starting a business	Dealing with construction permits	Getting electricity	Registering property	Getting credit	Protecting minority investors	Paying taxes	Trading across borders	Enforcing contracts	Resolving insolvency	Overall ease of doing business score
Antigua and Barbuda	82.6	65.7	83.5	56.7	25.0	58.0	58.9	68.7	68.1	35.6	60.3
Bahamas, The	87.0	70.9	76.7	30.8	30.0	56.0	81.7	53.1	59.1	53.4	59.9
Barbados	86.4	56.6	66.2	58.0	30.0	38.0	72.3	62.8	38.9	69.8	57.9
Belize	72.0	64.3	73.7	52.4	20.0	28.0	79.9	68.2	50.1	46.1	55.5
Dominica	89.3	70.1	82.5	33.5	30.0	58.0	75.6	74.3	57.5	34.7	60.5
Dominican Republic	85.4	70.7	68.0	67.2	45.0	34.0	57.4	83.5	50.6	38.0	60.0
Guyana	85.6	52.5	45.9	55.7	55.0	56.0	65.7	58.3	57.9	22.4	55.5
Haiti	36.4	44.2	57.2	30.4	35.0	18.0	57.6	76.9	51.6		40.7
Jamaica	97.4	71.9	65.0	65.3	85.0	62.0	64.9	61.5	53.7	70.1	69.7
Suriname	61.6	66.3	57.7	46.8	10.0	28.0	69.4	75.0	25.9	33.8	47.5
St. Kitts and Nevis	85.9	73.5	70.2	28.9	25.0	52.0	64.4	81.0	65.5		54.6
St. Lucia	89.4	76.4	83.0	59.8	25.0	58.0	75.5	73.9	59.7	35.9	63.7
St. Vincent and the Grenadines	87.0	74.4	71.2	43.1	25.0	58.0	71.1	77.4	63.7		57.1
Trinidad and Tobago	88.6	64.1	84.3	46.7	65.0	64.0	53.5	62.6	35.6	48.4	61.3
Caribbean average	81.0	65.8	70.4	48.2	36.1	47.7	67.7	69.8	52.7	44.4	57.4
LAC average	79.6	63.2	71.7	54.9	52.0	47.3	60.5	69.1	53.5	39.2	59.1

Notes: Ease of Doing Business Score 2020. An economy's ease of doing business score is reflected on a scale from 0 to 100, where 0 represents the lowest and 100 represents the best performance. For example, an ease of doing business score of 75 means an economy is 25 percentage points away from the best regulatory performance constructed across all economies and across time.

Source: World Bank Ease of Doing Business Report 2020

in the area of *Registering Property* (6.7 points below the LAC average). It takes on average 87 days in the Caribbean to register property compared to an average of 64 days in Latin America and only 21 days in Europe and Central Asian (ECA) countries. In Haiti and St. Kitts and Nevis it even takes up to 319 and 224 days, respectively, to register property. Registration is also costly at an average cost of 8.1 percent of the property value. The key obstacles often lie in burdensome procedures and inefficient, still paper-based land registries. Electronic data bases for checking encumbrances (liens, mortgages, restrictions and the like) or recording boundaries, checking plans and providing cadastral information (geographic information system) are missing in most countries as are transparent information and on immovable property.

Another important constraint for a dynamic and resilient private sector is the lag of the regulatory and infrastructure foundations for the digital economy.¹³ The COVID-19 pandemic has underlined these digital deficits even more, exposing the region's lack of preparedness to move government operations, education, communications, and commerce online. While recent fiber-optic infrastructure upgrades have improved capacity and reach of networks, access to broadband still remains challenging for many individuals and businesses, and service quality remains unreliable. These challenges disproportionately impact the poorest individuals, micro and small enterprises and vulnerable or marginalized groups, which continue to be locked out of the digital economy as a result.

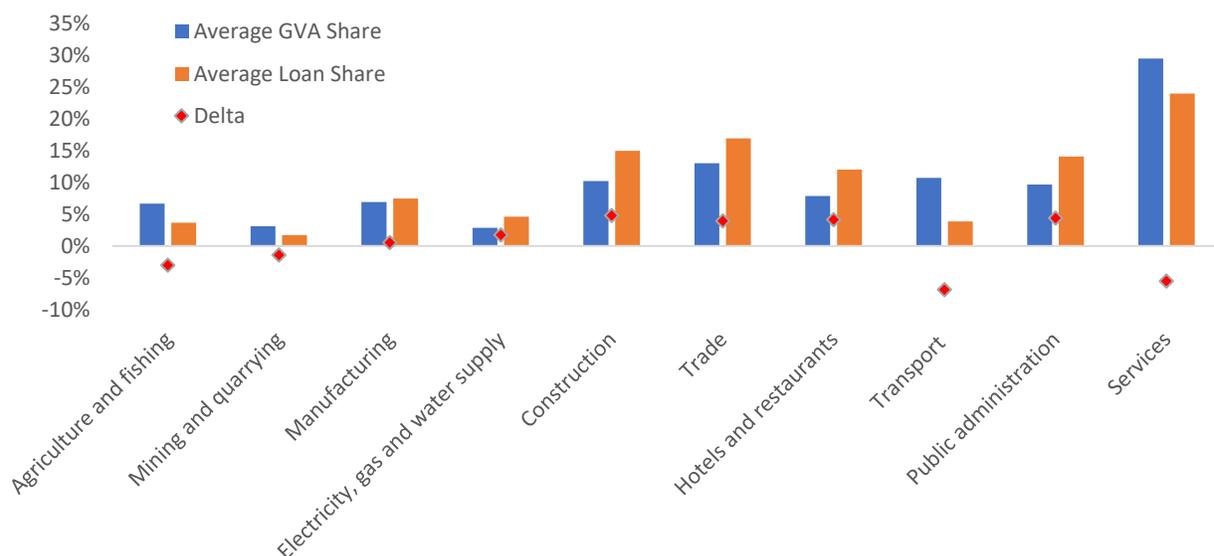
The Caribbean countries also show shortcomings in the category *Getting Credit* (15.9 points below the LAC average). A particular weakness relates to the credit information infrastructure as only four countries, Trinidad and Tobago, Jamaica, Dominican Republic and Guyana, collect information on borrowers through a credit bureau.¹⁴ In the other countries it is not possible to readily access a prospective borrower's credit history and the resulting information asymmetries often make it difficult to obtain credit at affordable rates. This problem is especially acute for micro, small and medium-sized enterprises (MSMEs) and start-ups that often do not have an established banking relationship. Access to credit seems particularly limited in the *service, transport* and *agriculture* sectors, as these sectors receive a lower share of total credit than indicated by their share in total gross value added (see Figure 5). Attempts to address these issues, such as the establishment of a regional credit bureau in the Eastern Caribbean Currency Union, have stalled. The gaps in credit infrastructure are in many cases compounded by the absence of modern collateral registries, no dedicated framework for secured transactions and shortcomings in the legal systems. The Doing Business Reports ranks most Caribbean countries low regarding *Resolving Insolvency* (median rank 132), which also presents an impediment to access to finance, and by preventing a speedy rehabilitation of viable firms and liquidation of non-viable firms, can slow the economic recovery following a shock.

Further, the utilization and acceptance of digital payments is very low across the region, preventing individuals, and businesses from transacting online. High costs for opening and maintaining bank accounts, transaction fees for "traditional" digital payment methods such as credit and debit cards and steep Automatic Teller Machine (ATM) withdrawal fees drive a preference for cash transactions and avoidance of interaction with the formal banking system. These challenges in the credit information systems, insolvency frameworks and payment system infrastructure are thus among the reasons that many firms in the Caribbean struggle to obtain access to credit despite the region's large financial systems (see Section 1.5).

¹³ World Bank (2020) *Project Appraisal Document for Caribbean Digital Transformation Project*.

¹⁴ In the Bahamas legislation for the establishment of the credit bureau has been passed and the registry is expected to become operational in 2021.

Figure 5: Sectoral financing versus economic importance¹⁵



Notes: Orange bars show the average across countries of a sectors' share in total bank lending; blue bars show average across countries of a sectors' weight in Gross-value Added (GVA). The delta indicates the difference between the two series.

1.5. Focus on the financial sector

A sector of particular importance for resilience in the Caribbean is finance. Financial sectors in the Caribbean are very large, much larger than indicated by the share of financial intermediation in gross-value added, with total financial sector assets accounting for 169 percent of the regional GDP.^{16 17} The size of the financial sector is even around 200 percent of GDP in Barbados, Trinidad and Tobago, and the Eastern Caribbean Currency Union¹⁸. Some countries, such as the Bahamas and Barbados, also have significant offshore banking sectors that are equivalent to 72 and 11 times of their respective economies (Ogawa et al., 2013). In absolute terms, the financial sector of the Caribbean region accounted for around 137 billion USD in 2018. Trinidad and Tobago and Jamaica, the largest economies in the region, also have the largest financial sectors, with 37 and 21 percent of total financial sector assets in the Caribbean, respectively.

¹⁵ As pointed out by Rajan and Zingales (1998), the dependence on external finance differs across sectors so the overserved differences in the share of credit and GVA can not entirely be interpreted as credit constraints for certain sectors.

¹⁶ As of 2018. The country sample includes Trinidad and Tobago, Jamaica, Barbados, Belize, Guyana, Bahamas, the Eastern Caribbean Currency Union (ECCU), Haiti, and Suriname. The sample represents CARICOM members and Anguilla (member of the ECCU).

¹⁷ The average ratio of banking sector assets to GDP among the largest 20 economies in LAC is 91 percent.

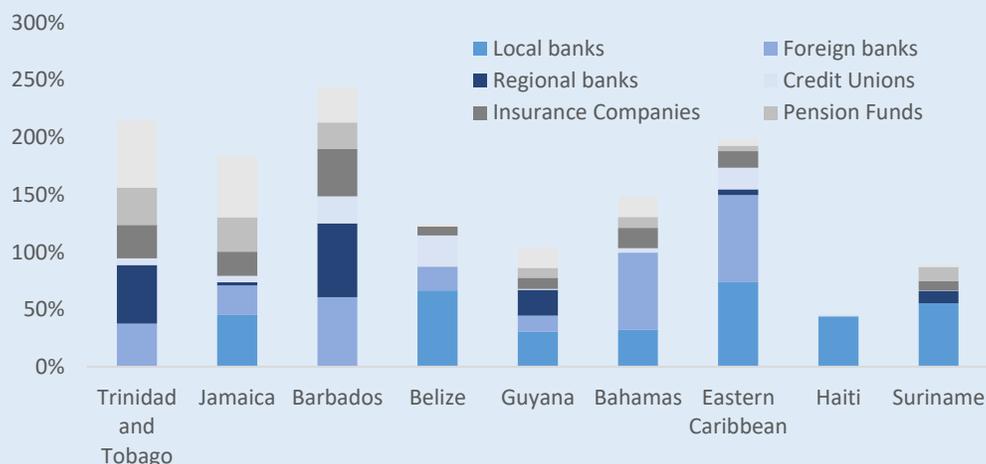
¹⁸ The eight member territories of the Eastern Caribbean Currency Union (ECCU) include Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, Saint Kitts and Nevis, Saint Lucia and Saint Vincent and the Grenadines

Box 1: Structure of the Caribbean financial sector

The Caribbean’s financial sectors are dominated by banks as in most countries the banking sector accounts for more than 50 percent of total financial sector assets. The dominance of the banking sector is the highest in the less developed financial sectors of Haiti and Suriname, while the more developed financial centers, such as Trinidad and Tobago or Jamaica, also have a significant presence of non-bank financial institutions. There are two important features of the Caribbean banking sector. First, foreign, primarily Canadian, and regional banks play an important role in most of the countries. For example, Barbados does not have any local bank operating in the market. In Guyana, the Bahamas, and the Eastern Caribbean Currency Union, foreign and regional banks account for more than 50 percent of total banking system assets. Second, banking systems are concentrated and interconnected. No country has more than 8 banks and, in addition, there are 5 big banks (Royal Bank of Canada, Scotiabank, CIBC, Citibank, Republic Bank) that operate in multiple countries.

Data on the non-bank sector are rather scattered and do not allow to fully capture the size of the sector. The estimates suggest that Trinidad and Tobago, Jamaica, and Barbados have rather sizable non-banking sectors of more than 100 percent of their respective GDP. Insurance companies and pension funds represent a significant part of the non-banking sector. While being sizable, the insurance market in the Caribbean has a potential for further growth. Due to limited financial literacy and in some instances low trust in financial institutions, firms and households seem to be somewhat reserved towards taking out insurance and tend to only take insurance if necessary, for example together with a loan or mortgage. In addition, the operation environment in the Caribbean region is rather challenging due to significant losses of the insurance companies because of adverse weather events as well as lack of the economy of scale combined with complex regulatory environment and not harmonized regulations across the multiple Caribbean jurisdictions.

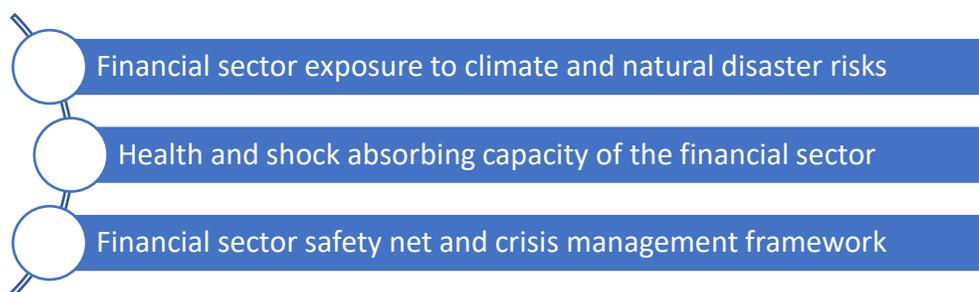
Figure 6: Total assets of the financial sector, as % of GDP



Source: Country authorities and author’s calculations, World Bank. Note: data for Eastern Caribbean is as of 2017, for Suriname – as of 2014, and for other countries – as of 2018. Calculations exclude offshore banking. Regional banks are Republic Bank (Trinidad and Tobago), First Citizens Bank (Trinidad and Tobago), and JMMB Bank (Jamaica). Foreign banks are Royal Bank of Canada (Canada), Scotiabank (Canada), CIBC (Canada), Citibank (USA), and Bank of Baroda Baroda (India).

A socio-economically important part of the financial sector are credit unions. Despite comprising just a small share of total financial sector assets, membership in credit unions is very high across the region. For example, in 2018, the number of members as a percentage of the labor force comprised around 133 percent in Barbados, 104 percent – in Trinidad and Tobago, 93 percent – in Belize, 68 percent – in Jamaica, and 19 percent – in the Bahamas. It suggests that credit unions might play an important role in serving specific groups of customers, namely low- and medium-income households as well as local entrepreneurs. However, in most Caribbean jurisdictions credit unions are not subject to the same level of oversight and prudential regulation as banks, which poses risks.

In order to access the resilience of the financial sector in the Caribbean to climate and natural disaster related risks we look at three dimensions:



1.5.1 Financial sector exposure to climate and natural disaster risks

There is increasing global recognition that climate change and environmental challenges can lead to risks for the financial sector. Globally, more and more central banks are incorporating climate related risks into their financial stability frameworks and 83 central banks and financial sector regulators have joined the *Network for Greening the Financial Sector (NGFS)* as of December 2020. To date, no Caribbean central bank has joined the NGFS, but the Central Bank of Trinidad and Tobago recently initiated first steps towards joining.

Climate and natural disaster related financial risks originate from two types of sources:

- *Physical risks originate from natural disasters and global warming that can lead to economic costs and financial losses.* Physical sources of risk can either be gradual in nature, such as rising temperatures and sea level, and changes in precipitation; or abrupt, as in the case of extreme weather events, such as tropical storms or other natural disasters. Such shocks can cause protracted negative growth and large losses for banks and other financial institutions. NPLs tend to increase and capital ratios fall after a natural disaster. The deterioration in banks' health often forces them to reduce lending after a natural disaster hits, which puts a further strain on economic activity and slows the recovery.
- *Transition risks are related to economic adjustment costs during the transition towards a greener, carbon-neutral economy.* These risks could be related to climate mitigation efforts, whereby abrupt policies to reduce CO₂-emissions and therewith limit climate change, could have a significant impact on the economy. On a broader note, policy pressure to tackle environmental

pollution and improve livelihoods, can also lead to significant adjustment costs for companies and households. Disruptive technological change, for example in moving to cleaner sources of energy, as well as changing consumer and market behaviors towards ‘greener’ products and services, could also result in structural economic shifts. When happening abruptly, the transition towards a greener and carbon neutral economy can lead to rapid revaluations of underlying financial assets.

A first step to assess the exposure of financial institutions to climate and natural disaster related risks is to look at the sectoral composition of their loan portfolio.¹⁹ Given the dominance of banks in Caribbean financial sectors (see Box 1) and limited data availability on the sectoral asset composition of non-banks we focus on the banking sector for the remainder of this chapter. Figure A4 in the Appendix shows that the largest share of bank loans in the Caribbean are classified as personal loans, i.e. loans to individuals. These account on average for almost 50 percent of total loans and for up to 85 percent in countries such as Montserrat. The high share of personal loans highlights the importance of the financial health of the household sector for banks’ asset quality. If a natural disaster would, for example, result in widespread job losses and reduced income the related deterioration in debt service ability for households would have large impact on banks’ health. Among loans extended to economic sectors, the largest share goes to the *wholesale and retail trade sector, public administration* and the *service sector*. The *hotels & restaurant sector* receives on average 6.2 percent of total loans extended by domestic banks, with the share being almost twice as high in Grenada and Anguilla. It is important to notice that many large international hotels are part of multinational corporations and do not rely on Caribbean financial institutions for financing.

In order to assess the exposure of banks’ loan portfolios to physical risks stemming from natural disasters, we combine the sectoral loan exposure with the vulnerability of a certain sector to a natural disaster as estimated in Section 1.2.1. We therefore combine the importance of a sector for total lending in a country with the vulnerability of this sector to tropical storms, the most frequent type of natural disaster in the region. The β_i^j coefficients from Equation (1) serve as the measures of vulnerability of a given sector to tropical storms. In particular, we multiply the sum of all significant coefficients for t and t-1 with the ratio of loans to the respective sector to total loans²⁰ and take the sum over all ten main sectors as described in Equation (3)

$$Financial\ Sector\ Vulnerability_i = \sum_{j=1}^{10} (|\beta_0^j + \beta_1^j|) \frac{Loans_t^j}{Loans_t} \quad (3)$$

if β_0^j, β_1^j are statistically significant at the 10 percent level in Equation 1.

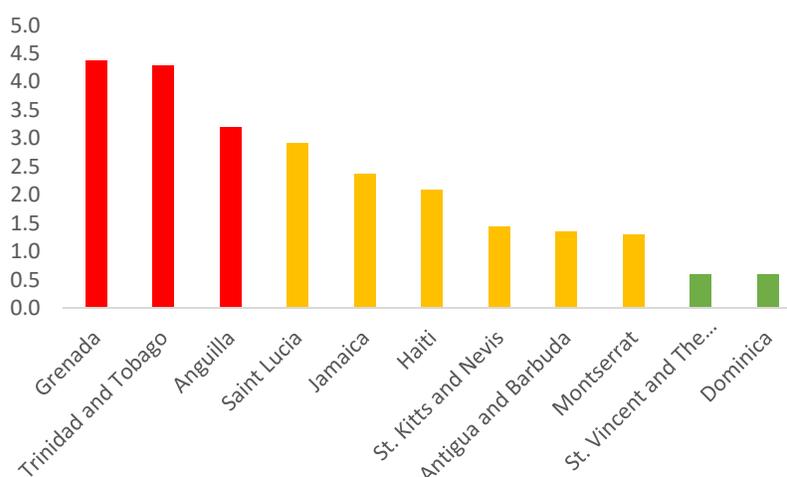
The index is based on the assumption that loans to sectors that experience a more negative growth impact following a storm are more likely to turn non-performing and thus negatively impact the health of banks. It is structured so that higher values indicate higher vulnerabilities to storms. However, the index only covers the direct exposures of banks to a certain sector and does not account for the fact that problems in a certain sector can also spill over to other categories, such as personal loans due to job losses stemming

¹⁹ Geographic breakdowns of bank loans are not available for the Caribbean countries and would be of less relevance given the small size of the respective countries.

²⁰ The latest available values for sectoral lending are taken. For most countries this is 2018.

from a disaster disruption in that sector. Importantly, this index also does not consider the historic occurrence or frequency of storm events or the likelihood of future storms. It only relates a country's financial sector loan portfolio with the average vulnerability of a given sector to storms in the Caribbean. Applying this methodology results in the financial sector vulnerabilities as indicated in Figure 7. The countries with the highest structural financial sector vulnerability are Grenada and Trinidad and Tobago. While in the case of Grenada the high vulnerability index is primarily due to a large loan share of the *hotel & restaurant sector* (12.5 percent of total loans), in Trinidad and Tobago the index is pushed up by lending exposure to the *mining & quarrying sector*.

Figure 7: Financial sector vulnerability to storms



Notes: Red bars indicate a financial sector vulnerability to storms index ≥ 3 , orange bars indicate an economic structure vulnerability index < 3 and ≥ 1 , green bars indicate an economic structure vulnerability index ≤ 1 .

1.5.2 Health and shock absorbing capacity of the financial sector

Whether financial sectors in the Caribbean are resilient to natural disasters does not only depend on their exposure to shocks, but also on their shock absorbing capacity. When the financial sector is well capitalized and liquid it is more likely to withstand the impact of climate related shocks. It is thus important to consider the health and soundness of the financial sector as a pre-condition for resilience. Figure 8 displays the key financial soundness indicators for the Caribbean countries. Importantly these data pre-date the COVID-19 pandemic and do not yet account for the impact of the pandemic on the financial sector. The results paint a mixed picture of the health of the Caribbean's financial sector at the eve of the pandemic. While most financial sectors in the region were well capitalized and had regulatory capital to risk-weighted asset ratios of more than 15 percent, asset quality was often already weak. The non-performing loans (NPL) ratio exceeded 8 percent for five of the 13 countries for which data are available. NPLs even stood at around 25 percent of total loans in Anguilla and St. Kitts and Nevis. The high level of NPLs in the Caribbean is not a new phenomenon and often NPLs originate from past crises and have not been resolved or written-off, due to shortcomings in the regulatory and oversight framework as well as deficiencies in the insolvency frameworks in the region. The risks from high levels of NPLs are amplified in many countries by low provisions. In Anguilla and St. Kitts and Nevis banks build provisions for less than

25 percent of the NPL stock, meaning that the realization of losses on those loans would directly affect banks' income and capital. The liquidity situation of banks in the Caribbean was more encouraging at the onset of the Covid-19 pandemic, with most banking systems being very liquid.

The economic impact of the COVID-19 pandemic is very likely to put severe pressure on the Caribbean's financial sector. As regional central banks adopted a set of countermeasures, including credit moratoria and relaxations of loan classification and provisioning rules, it will take some time until the impact on banks' balance sheet becomes fully visible, but it is broadly expected that financial soundness indicators will deteriorate. This means that the shock absorbing capacity of the financial sector will decrease further and its ability to withstand an additional climate related shock is lower than it was before the pandemic.

Figure 8: Financial Soundness Indicators

Country	Solvency			Liquidity	
	Regulatory Capital to RWA (%)	NPL to Total Loans (%)	Provisions to NPLs (%)	Liquid Asset to Total Assets (%)	Liquid Assets to ST Liabilities (%)
Anguilla	8.6	25.8	18.2	48.3	57.3
Antigua and Barbuda	39.4	5.3	55.3	46.4	52.0
Barbados	14.6	6.9	58.0	19.3	
Belize	22.8	5.1	71.9		
Dominica		12.2	84.7	46.2	53.2
Grenada	11.9	2.2	85.0	43.5	47.7
Guyana	30.7	11.6	35.3	35.3	
Jamaica	14.8	3.1		22.4	
Montserrat		5.5	114.5	71.3	82.7
St. Kitts and Nevis	20.2	24.0	23.2	55.7	62.2
St. Lucia	25.6	8.2	62.2	40.4	43.2
St. Vincent and the Grenadines	22.2	6.4	64.7	41.4	45.5
Trinidad and Tobago	21.2	2.9	61.5	21.8	27.1
Thresholds	13 - 15	7-4	50-80	18 - 25	25 - 50
High Risk					
Medium Risk					
Low Risk					

Data as of end-2019
Source: CBs, IFS and FSI (IMF)

1.5.3 Financial sector safety net and crisis management frameworks

The combination of elevated exposure to climate related shocks and depleted shock absorbing capacity of the Caribbean's financial sectors mean that attention needs to be paid to the financial safety nets and crisis management frameworks. While proper safety nets can reduce the probability of a financial crisis by increasing trust in the system and thus reduce for example the likelihood that a savers 'run' on banks in response to a shock, they also play an important role to minimize the economic costs of a financial crisis.

One important part of the financial sector safety net is the deposit insurance system. Deposit insurance systems aim to protect small and unsophisticated savers in the event of a banking crisis by guaranteeing

a certain share of their savings. Deposit insurance systems are usually funded through a regular contribution of member financial institutions, usually all banks in a market, to a fund that can only be used to compensate and repay depositors. This shifts the financial burden of protecting depositors to banks and away from governments, which in the absence of a proper deposit insurance system often have to assume the cost and bail-out banks.

Despite these benefits, deposit insurance systems are not universally in place in the Caribbean. The first deposit insurance system was established in the regional financial center Trinidad and Tobago in 1986 followed by Jamaica and the Bahamas in the late 1990s. Barbados followed in the first decade of the new millennium and recently Guyana and Belize established deposit insurance system. A deposit insurance system is also currently under consideration in the Eastern Caribbean Currency Union and envisioned to become operational in 2021. The other Caribbean countries currently lack a formalized deposit insurance. Deposit insurance systems often receive only a moderate amount of seed capital and grow through the accumulation and investment income of annual contributions from banks (premia) the volume of funds usually grows over time. In that sense it is not surprising that while the deposit insurance funds in Trinidad and Tobago and Jamaica are well capitalized at US\$ 500 million and US\$ 160 million, respectively, the funds of the newly established deposit insurance systems in Belize and Guyana are small and might not yet be able to repay all borrowers in case of a banking crisis without the need of emergency financing.

Figure 9: Deposit Insurance Systems in the Caribbean

	Establishment and legal foundations	Fund Size (US\$)	Premiums	Member Institutions	Coverage (US\$)
<u>Trinidad & Tobago</u>	Established 1986 CB Act	\$500.0 million	Annual premium 0.2%	Twenty-four (24)	\$17,900
<u>Jamaica</u>	Established by Deposit Insurance Act of 1998	\$166.3 million	0.15%	Eleven (11)	\$4,275
<u>Bahamas</u>	Established under the Protection of Depositors Act 1999 and the Protection of Depositors Bye Laws 1999	\$58.0 million	One-twentieth of one percent (.0005)	Eleven (11)	\$50,000
<u>Barbados</u>	Established on June 8, 2007 by– Deposit Insurance Act 2006	\$53.0 million	0.05%	Eleven (11)	\$12,500
<u>Guyana</u>	Established under Section 5 of the Deposit Insurance Act 2018.	\$3.6 million. Fund aims for a target size of 5% of the total industry’s value of insured deposits within 10 years of its establishment.	Initial contribution to the Fund at a rate of 0.5%	Eight (8)	\$9,585
<u>Belize</u>	Passed by Parliament in December 2019 and signed into law in January 2020.	A minimum Fund coverage ratio of 4 percent within 10 years thereafter the minimum target size of the Fund set by the Board	0.10%	Fund members (domestic banks and credit unions)	\$9,980
<u>ECCU</u>	Draft legislation currently developed; Planned to start in 2021.				

Source: CBTT

Another important aspect of the financial safety net and crisis management infrastructure are efficient resolution regimes that ensure that failed financial institutions are resolved in a least cost way, which imposes losses on the creditors of failed financial entities rather than the general public while preserving financial stability. Given the interconnectedness of financial sectors and banks operating across multiple

jurisdictions in the Caribbean, regional coordination and information sharing among supervisors and resolution entities are paramount. To facilitate this coordination supervisors in the region are working within the Caribbean Group of Banking Supervisors (CGBS) on developing a Regional Financial Crisis Management Plan. Regional supervisors also cooperate in the insurance sector through regional and bilateral MOUs on coordination and data exchange under the aegis of the Caribbean Association of Insurance Supervisors (CAIR).

Box 2: Resilience of payment systems

A key component of overall financial sector resilience is the continuity of payment systems in the aftermath of a disaster. Payment systems consist of different systems and platforms that allow firms, individuals, government and other economic agents to transfer money on a daily basis without having to use cash.²¹ Natural disasters (of all types) can have impacts on all types of payment and settlement systems, including Systemically Important Payment Systems (SIPS), Financial Market Infrastructures (FMIs), as well as Retail Payment Systems (RPS). Operational disruptions from natural disasters threaten all types of payment and settlement systems alike and could take the following forms:

- Electricity, mobile network and internet network disruptions resulting from natural disasters could directly impact the operation of payment systems and the connections of participants (banks and non-bank payment service providers) to them. If one or more of the systemically important participants in a payment system becomes impaired and stops participating in the system, other participants could also be impacted.
- Operational disruptions causing the unavailability or limited availability of a SIPS for an extended period of time (e.g. 1 hour) can have impacts on broader financial stability due to linkages with functioning of money and capital markets and liquidity in the system.
- There is an increased risk of potential insufficiency of staff to carry out normal operations of all the components of a system (i.e. hardware, software, network, participant interfaces, etc.) for reasons like staff not being able to physically reach operations centers.
- Increased cyber risks could be borne from potential relaxations of risk management measures in the absence of resources. An increase in cyber risk among others impact customer confidence posing further challenges for authorities and relevant stakeholders.
- Unavailability of a retail payment systems would impair the payment services offered to individuals and firms (e.g. interbank credit transfers, card payments online and at point of sale, mobile money transfers between different operators, etc.). In turn, this would have an impact in the real sector of the economy (i.e. commerce, industry, etc.), the activity of the Government (disbursement of social protection program-related payments) as well as in the daily personal lives of citizens, including recipients and senders of remittances.
- Cash availability could also be disrupted in cases where ATM operations are being impacted, and bank and agent branches might not be fully operational. Agents include mobile money agents, agents servicing government-to-person (G2P) payment programs, agents providing cashback services to cardholders, etc. In many developing countries, agents are, due to their proximity and

²¹ <https://www.bis.org/ifc/publ/ifcb471.pdf>

other features, the preferred option for accessing cash by a significant share of the population and majority of payments are still made in cash.

- The resilience of payments systems is also crucial to quickly and efficiently distribute government assistance programs in the aftermath of a disaster. This has been evident by the COVID-19 pandemic, where countries with modern and resilient payment systems have been more successful in supporting citizens during the crisis.

2. Traffic-light System for Private and Financial Sector Resilience

In order to comprehensively summarize the main dimensions of private and financial sector resilience we use the key indicators and variables derived in the previous sections to develop a ‘traffic-light system’. Red cells indicate that a country is in the highest risk category, orange indicate medium risk, while green signals the lowest risk. The country-specific values used to color the cells accordingly are derived from the quantitative analyses conducted in this paper and the cut-off points are indicator specific as discussed in the notes below.

Figure 10: Traffic-light System for Private and Financial Sector Resilience

	Private Sector Resilience			Financial Sector Resilience			
	Economic structure vulnerability to storms	Insurance penetration	Business environment	Solvency Risk	Liquidity Risk	Financial sector vulnerability to storms	Safety Nets
Antigua and Barbuda	Orange	Green	Orange	Orange	Green	Orange	Red
Anguilla	Red	White	White	Red	Green	Red	Red
Bahamas, The	Orange	Green	Orange	White	White	White	Green
Barbados	White	Green	White	White	Red	White	Green
Belize	White	Orange	Orange	Orange	White	White	Orange
Dominica	Red	Orange	Orange	White	Green	Green	Red
Dominican Republic	White	Red	Orange	White	White	White	Red
Grenada	Red	Green	White	Orange	Orange	Red	Red
Guyana	White	Red	Orange	Red	White	White	Orange
Haiti	Orange	Red	Red	White	White	Orange	Red
Jamaica	Orange	Green	Green	Green	Orange	White	Green
Montserrat	Green	White	White	Green	Green	Orange	Red
Suriname	White	Red	Red	White	White	White	Red
St. Kitts and Nevis	Green	White	Red	Red	Green	Orange	Red
St. Lucia	Red	Orange	Green	Orange	Orange	Orange	Red
St. Vincent and the Grenadines	Orange	White	Orange	Orange	Orange	Green	Red
Trinidad and Tobago	Orange	Green	Orange	Green	Orange	Red	Green

Notes: i) Economic structure vulnerability to storm: red indicates an economic structure vulnerability index ≥ 4 , orange indicates an economic structure vulnerability index < 4 and ≥ 2 , green indicate an economic structure vulnerability index < 2 ; ii) Insurance penetration: green indicates insurance penetration ≥ 5 percent of GDP, orange indicates insurance penetration < 5 and ≥ 2 percent of GDP, red indicates insurance penetration ≤ 2 percent of GDP; iii) Business environment: green indicates an overall Ease of Doing Business (2020) score of ≥ 63 , orange a score ≥ 55 and < 63 and red a score ≤ 55 ; iv) Solvency risk is the weighted average of the individual risk categories shown in Figure 8, with each subcategory of solvency risk in Figure 8 receiving a value of 3 if it is in the high risk category, 2 if it is in the medium risk category and 1 if it is in the low risk category. The traffic light system for this indicator is red and indicates high solvency risk when the weighted average > 2 , orange indicates medium risk (weighted average > 1.5 and < 2) and green indicates low risks (weighted average < 1.5); v) Liquidity risk is the weighted average of the individual liquidity risk categories shown in Figure 8, with each subcategory of liquidity risk in Figure 8 receiving a value of 3 if it is in the high risk category, 2 if it is in the medium risk category and 1 if it is in the low risk category. The traffic light system for this indicator is red and indicates high liquidity risk when the weighted average > 2 , orange indicates medium risk (weighted average > 1.5 and < 2) and green indicates low risks (weighted average < 1.5); vi) Financial Sector vulnerability to storms: red indicates a financial sector vulnerability to storms index ≥ 3 , orange indicates an economic structure vulnerability index < 3 and ≥ 1 , green indicate an economic structure vulnerability index ≤ 1 ; vii) Safety net: Green indicates the existence of an established and funded deposit insurance system, orange indicates the existence of a deposit insurance system that is not yet fully funded, red indicates countries that do not have a deposit insurance system.

3. Solutions

Based on the vulnerabilities identified in the previous section, the following six action points are recommended to enhance private and financial sector resilience in the Caribbean:

➤ *Economic diversification and efficiency through digitization*

Digitization of the Caribbean's economy and private sector presents an opportunity to significantly strengthen the region's resilience and ability to adapt to climate change and recover more quickly from climate-related natural disasters and shocks such as the ongoing COVID-19 pandemic. Digitization could pave the way for an economic diversification and transition toward a knowledge-based economy, less dependent on the natural resources, and in-person transactions for economic growth and employment. In the Caribbean, digitization can also enable business models that connect local workers with global employment opportunities through online working platforms and thus enable the region's educated workforce to find employment outside small domestic markets (without causing a "brain-drain") and less affected by regional shocks. New technologies can also increase the efficiency of key economic sectors, such as tourism by opening new ways for customer acquisition, improving online brand visibility and expanding international reach, as well as improving the quality of service delivery and client satisfaction (Dredge et al. 2018). This would require upgrades to physical ICT infrastructure and legal and regulatory reforms in the telecommunication sector to increase the scope and reduce the costs of connectivity. Reforms need to be accompanied by support for technology adoption by businesses and empowering individuals with digital skills.

One important area of digitization relates to the financial sector where access to innovative, low cost digital financial services (transaction accounts, savings, credit, insurance, remittances) could support vulnerable households, MSMEs, and farmers to invest, smooth consumption over time, and mitigate the impact from climate and other shocks to their livelihoods. Modernized regulation and infrastructure for payments systems would also support efficient transmission of social cash transfer funds to vulnerable households throughout the sub-region.

➤ *Expand insurance coverage and instrument range for the private sector*

Increased insurance penetration and a wider range of instruments would allow the private sector to better hedge against the economic and financial costs of a natural disaster. Increasing insurance uptake require initiatives at the demand and supply side. At the demand side authorities need to better understand the reasons behind the reluctance to insure and consider public information and financial education campaigns to increase understanding about the benefits and functioning of insurance. At the supply side an assessment of the market structure and eventual impediments to product development should be considered. Improved insurance coverage also requires stronger supervision and competition mechanisms. Strengthening the supervisory functions of the insurance supervisor would improve the collection, management, and analysis of insurance-industry data while strengthening the ability to undertake risk-based regulation. Addressing information asymmetry and other market failures is expected to facilitate the development of the insurance industry, enabling it to provide a wider range of instruments on more favorable terms. Robust and standardized information on insurance coverage and incurred claims would allow the authorities to strengthen oversight of the insurance market in key areas such as pricing, reserve definitions, capital requirements, and reinsurance. All these would help to reduce the Government's role as insurer of last resort of the whole economy, promoting that the private sector and families in risk take their own steps to prepare financially for a disaster event or any other relevant

contingency. Insurance coverage can also be boosted through Government-led initiatives, such as the COAST (*Caribbean Ocean and Aquaculture Sustainability Facility*) project, that provides parametric insurance coverage to fishers in Grenada and St. Lucia against adverse weather and tropical cyclones.

➤ *Improvements in the business environment and access to finance*

Like the increased adaptation of the digital economy, addressing key shortcomings in the business environment could facilitate private sector led growth and resilience through economic diversification. As outlined in Section 1.4, key gaps relate to land registries as well as credit information. While the former could be addressed through modernized registries, the latter would benefit greatly from the establishment of credit registries or bureaus. These, which could be done either by the private sector if the appropriate legal framework is in place, or offered as a public good by central banks, would help to mitigate information asymmetries and enhance access to credit for underserved segments, such as MSMEs. Access to credit would also benefit from improvements in the secured transaction and moveable collateral framework. Consideration should also be given to specifically promote access to credit for up-front investments in private sector resilience building.

➤ *Reduce financial sector vulnerabilities*

A key factor for private sector resilience in the Caribbean is the health of the region's large financial sector. In fact, one of the crises with the strongest impact on regional GDP over the last two decades was not caused by a natural disaster but by the failure of a regional financial conglomerate (CL Financial including CLICO) in 2009. As the Global Financial Crisis in 2008/09, the COVID-19 pandemic presents a massive challenge to the region's financial sector and it is thus paramount to ensure that financial sector regulation and supervision are aligned with international good practices and proactively used to safeguard financial stability. This does not only apply to the banking sector but should also include parts of the financial sector that are under less scrutiny such as credit unions or investment funds. Given the interconnectedness of the Caribbean's financial sector, resilience can only be achieved through close cooperation and timely information sharing across jurisdictions.

Supervisors should also pay more attention to building financial sector resilience to climate and environmental risks. This includes both the direct physical risks stemming from natural disasters as well as the transition risks stemming from a global transition towards a greener, low carbon economy that could affect the value of financial assets, for example, in countries with a large hydro-carbon sector such as Guyana or Trinidad and Tobago. As initial steps it might be useful to perform in-depth environmental risk assessments of the impact of climate and environmental risks on financial institutions, to improve information collection and monitoring of relevant risk metrics, and to build internal capacity on the topic. Supervisors should also increase climate stress capacity particularly to assess the potential impact of catastrophic weather-related events that lend themselves well for these more forward-looking assessment tools. For modeling such events, regulators could make use of existing "natcat" (Natural Catastrophe) model capacity if available in a country. Informed by the assessments, authorities might consider explicit guidelines for financial institutions on climate and environmental risk management, governance and disclosure. To get further information and share experiences, central banks and supervisors could also consider joining the *Network for Greening the Financial Sector*.

➤ *Strengthen financial sector safety nets*

While crisis prevention is crucial for financial sector resilience, authorities should also put in place measures to mitigate the costs of a crisis, if prevention measures fail. Financial sector safety nets in the region should be strengthened and expanded to protect the most vulnerable, such as unsophisticated savers, while avoiding moral hazard and large fiscal liabilities. Given the small size of many countries and relatively high fixed costs in running a deposit insurance system, where possible such as in the ECCU, regional approaches should be preferred.

➤ *Ensure payment systems continuity*

The continuity of payments systems in the aftermath of a natural disaster is crucial for financial stability and the recovery of the real economy. Financial authorities must thus identify critical payment systems infrastructure that need to continue operating normally. The criteria to do so should be based on the relevance of the services and access points they provide to the public and vulnerable groups, as well as in interdependencies between different systems and payment systems providers. Risk management frameworks and business continuity plans can help to avoid disruptions to crucial payment system infrastructure. It is also important to evaluate the specific needs of critical payment service providers in terms of access to sources of liquidity and financial assets. Further, crisis decision-making and communication protocols are essential under current circumstances and authorities should ensure their availability and efficacy. It is important that governance arrangements are in place to ensure that responsibilities are clearly assigned, and timely decision can be taken.

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Appendix

Table A1: GDP decomposition by sector

	Agriculture, livestock, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale, retail trade	Hotels and restaurants	Transport, storage and communications	Financial intermediation	Real estate, renting and business activities	Public administration and defense; compulsory social security	Education; health and other social and personal services
The Bahamas**	1%	1%	3%	3%	6%	14%	9%	11%	10%	23%	6%	14%
Barbados*	1%	0%	6%	3%	6%	11%	14%	12%	10%	20%	6%	11%
Belize*	13%	0%	8%	4%	4%	17%	6%	13%	9%	7%	14%	9%
Dominican Republic	6%	2%	14%	2%	12%	9%	8%	10%	5%	8%	5%	18%
Guyana	15%	22%	6%	3%	9%	13%			4%	1%	9%	9%
Haiti	19%	0%	8%	1%	22%	29%	0%	13%	2%	4%	2%	0%
Jamaica*	8%	3%	9%	3%	8%	18%	4%	8%	10%	11%	8%	10%
Suriname*	13%	7%	16%	3%	9%	13%	4%	13%	5%	6%	11%	1%
Trinidad and Tobago*	0%	11%	18%	4%	6%	20%	1%	8%	8%	9%	10%	4%
Anguilla	1%	0%	2%	2%	17%	12%	13%	9%	11%	12%	9%	11%
Antigua and Barbuda	2%	1%	3%	4%	16%	12%	12%	11%	7%	13%	9%	10%
Dominica	14%	2%	3%	3%	12%	14%	1%	18%	5%	7%	11%	10%
Grenada	6%	0%	4%	3%	9%	8%	8%	12%	6%	11%	7%	27%
Montserrat	1%	3%	3%	3%	5%	8%	2%	8%	9%	15%	30%	14%
St. Kitts and Nevis	1%	0%	6%	1%	20%	7%	9%	11%	8%	10%	10%	16%
St. Lucia	2%	0%	3%	4%	4%	4%	26%	13%	7%	22%	5%	10%
St. Vincent and the Grenadines	9%	0%	6%	4%	8%	13%	2%	13%	7%	15%	12%	11%
Average	7%	3%	7%	3%	10%	13%	8%	11%	7%	11%	10%	11%
Median	6%	1%	6%	3%	9%	13%	7%	12%	7%	11%	9%	10%

Notes: Data as of 2018. * indicates data as of 2017

Source: Own compilation based on data from ECCB, UNdata (Table 2.4 Value added by industries at current prices (ISIC Rev. 4))

Table A2: Regression results Equation 1

VARIABLES	(1) Agriculture, livestock, forestry and fishing	(2) Construction	(3) Education	(4) Electricity, gas and water supply	(5) Financial intermediation	(6) Health and social work	(7) Hotels and restaurants
f	-0.142** [-2.09]	-0.064 [-0.84]	-0.072 [-1.26]	-0.047 [-0.86]	0.024 [0.50]	-0.040 [-0.64]	-0.123* [-1.95]
L.f	-0.159** [-2.33]	0.137* [1.80]	-0.115** [-2.00]	-0.017 [-0.31]	0.030 [0.62]	-0.027 [-0.43]	-0.160** [-2.49]
L2.f	-0.099 [-1.12]	-0.039 [-0.40]	-0.045 [-0.61]	-0.034 [-0.48]	-0.009 [-0.15]	-0.004 [-0.05]	0.006 [0.08]
trend	0.001 [0.82]	0.001 [0.36]	-0.003** [-2.30]	-0.002* [-1.84]	-0.003*** [-3.29]	0.000 [0.05]	-0.000 [-0.39]
GFC	0.022 [0.44]	-0.198*** [-3.38]	0.029 [0.66]	0.072* [1.77]	-0.021 [-0.56]	-0.001 [-0.02]	-0.127*** [-2.60]
Constant	-0.256 [-0.80]	-0.101 [-0.29]	0.707** [2.44]	0.507* [1.95]	0.829*** [3.41]	-0.003 [-0.01]	0.149 [0.50]
Observations	305	301	273	305	279	269	295
R-squared	0.036	0.052	0.043	0.024	0.043	0.002	0.055
Number of Countries	12	12	11	12	12	11	12

Table A3: Regression results Equation 1 (cont.)

VARIABLES	(8) Manufacturing	(9) Mining and quarrying	(10) Other Service activities	(11) Public admin, defense	(12) Real estate, renting and business activities	(13) Transport, storage and communication	(14) Wholesale, retail trade	(16) Total GVA
f	-0.109 [-1.57]	-0.276** [-1.99]	0.016 [0.19]	0.003 [0.10]	-0.030 [-0.87]	-0.045 [-1.14]	-0.071* [-1.84]	-0.050** [-2.04]
L.f	0.083 [1.19]	0.049 [0.35]	-0.016 [-0.19]	-0.020 [-0.61]	-0.020 [-0.56]	0.003 [0.08]	0.086** [2.22]	-0.001 [-0.04]
L2.f	-0.185** [-2.05]	-0.098 [-0.55]	0.003 [0.03]	0.029 [0.70]	-0.008 [-0.18]	-0.066 [-1.29]	-0.119** [-2.37]	-0.017 [-0.55]
trend	-0.001 [-0.38]	0.001 [0.43]	-0.002 [-1.30]	-0.000 [-0.08]	0.001 [0.90]	-0.001 [-1.08]	0.000 [0.31]	-0.000 [-0.37]
GFC	-0.042 [-0.81]	-0.212** [-2.06]	-0.007 [-0.12]	0.059** [2.48]	-0.023 [-0.83]	-0.062** [-2.11]	-0.101*** [-3.40]	-0.065*** [-3.30]
Constant	0.139 [0.42]	-0.254 [-0.39]	0.586 [1.38]	0.026 [0.17]	-0.138 [-0.80]	0.231 [1.23]	-0.033 [-0.18]	0.064 [0.54]
Observations	305	305	273	305	271	305	295	258
R-squared	0.029	0.027	0.007	0.024	0.009	0.029	0.084	0.058
Number of Countries	12	12	11	12	12	12	12	11

t-statistics in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A4: Sectoral lending distribution of banks

	Agriculture, livestock, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade	Hotels and restaurants	Transport, storage and communications	Financial intermediation	Public administration and defense; compulsory social security	Professional services and Others	Personal Loans
Anguilla	0.1%	1.0%	0.2%	0.3%	8.7%	9.0%	12.0%	3.3%	0.4%	2.3%	7.1%	55.6%
Antigua and Barbuda	0.0%	0.0%	0.5%	2.4%	7.4%	9.7%	6.8%	2.7%	1.2%	16.6%	4.9%	47.7%
Dominica	0.1%	1.4%	0.8%	8.7%	9.5%	8.1%	4.4%	0.3%	6.2%	13.1%	2.8%	44.6%
Grenada	1.5%	0.0%	1.5%	2.3%	2.1%	5.4%	12.5%	0.9%	0.3%	3.2%	6.6%	63.8%
Montserrat	0.0%	0.5%	0.9%	0.0%	4.0%	2.1%	5.9%	0.1%	0.0%	0.0%	0.6%	85.9%
St. Kitts and Nevis	0.1%	0.0%	0.7%	3.4%	12.7%	5.6%	9.1%	0.3%	0.7%	11.7%	5.8%	50.0%
Saint Lucia	0.3%	0.1%	2.0%	1.2%	5.8%	7.3%	9.2%	1.7%	1.0%	7.7%	9.4%	54.2%
St. Vincent and The Grenadines	0.2%	0.0%	1.1%	0.0%	1.1%	6.6%	1.7%	0.5%	1.2%	8.9%	2.7%	75.8%
Belize	10.4%	0.2%	3.3%	2.1%	28.4%	8.2%	6.3%	2.8%	0.0%	0.3%	16.5%	21.4%
Dominican Republic	3.5%	0.2%	6.1%	1.5%	6.7%	17.5%	4.9%	1.7%	0.0%	0.0%	30.6%	27.3%
Trinidad and Tobago	0.3%	5.1%	5.0%	2.0%	3.8%		6.8%	3.0%	15.7%		12.0%	46.2%
Haiti	0.4%		13.5%	4.1%	7.1%	27.9%	1.8%	4.5%	6.5%		24.6%	9.7%
Guyana	9.4%	3.5%	17.3%				3.5%	3.6%			14.5%	21.6%
Bahamas	0.1%	0.0%	0.6%	0.0%	4.5%	4.1%	1.0%	0.6%	0.4%	13.2%	2.3%	73.1%
Jamaica	1.9%	0.1%	4.2%	5.0%	6.3%	1.7%	6.6%	3.9%	1.6%	9.6%	7.0%	52.2%
Average	1.9%	0.9%	3.8%	2.4%	7.7%	8.7%	6.2%	2.0%	2.5%	7.2%	9.8%	48.6%
Median	0.3%	0.2%	1.5%	2.1%	6.5%	7.3%	6.3%	1.7%	0.9%	8.3%	7.0%	50.0%