



KINGDOM OF THE NETHERLANDS - ARUBA

TECHNICAL ASSISTANCE REPORT-FINANCIAL STABILITY DIAGNOSTIC AND SCOPING MISSION

May 2023

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TECHNICAL ASSISTANCE REPORT

ARUBA

Financial Stability Diagnostic and Scoping Mission

APRIL 2022

PREPARED BY

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GLOSSARY

CAR	Capital Adequacy Ratio
CBA	Central Bank of Aruba
CCyB	Counter-Cyclical Capital Buffer
D-SIB	Domestic Systemically Important Bank
DSTI	Debt Service to Income
DTFI	Deposit-taking Financial Institution
DTI	Debt to Income
FI	Financial Institution
FSC	Financial Stability Committee
FSD	Financial Stability Department
FSI	Financial Soundness Indicators
FTE	Full-Time Equivalent
FX	Foreign Exchange
GFC	Global Financial Crisis
LTI	Loan to Income
LTV	Loan to Value
MCM	Monetary and Capital Markets Department
MaP	Macroprudential Policy
NPL	Non-Performing Loan
RPPI	Residential Property price Index
PF	Pension Fund
ST	Stress Testing
T-bill	Treasury Bill

PREFACE

At the request of the Central Bank of Aruba, a CARTAC mission conducted virtual meetings from 4 April 2022 to 11 April 2022 to assist the authority in developing their financial stability framework.

The mission met with Jeanette R. Semeleer, President, CBA; Miriam M. Gonzalez, Executive Director, CBA; Prakash Mungra, Executive Director, CBA; Ryan R. Peterson, Division Manager, Economic Policy and Financial Stability, Giantcarlo G. Croes, Deputy Manager, Research, CBA; Stephanie Werleman, Economist, Research, CBA; Sherina Arends, Manager, Statistics, CBA; Ghislaine Paalman, Senior Policy Officer, Statistics, CBA; Amalin L.A.C. Flanegin, Division Manager, Supervision & Enforcement, CBA; Kathy Scholliers, Manager, Prudential Supervision Banks, CBA; Jonathan Zichem, Deputy Manager Prudential Supervision Banks, CBA; and Laïndhra Garcia, Manager, Prudential Supervision Insurance Companies, Pension Funds & Investment Institutions, CBA. The mission also met with representatives from commercial banks of Aruba, the Aruban Bankers' Association, the Insurance Association of Aruba, and the Association of Aruban Realtors.

The mission wishes to thank participants of the meetings for their cooperation and productive discussions. We are especially grateful to Ryan Peterson, who helped to guide us through the mission, always available for our follow-up questions.

EXECUTIVE SUMMARY

Aruba has a sizeable financial sector, dominated by commercial banks that are generally well capitalized and hold ample liquidity buffers. Within the context of a conservative business model, capital adequacy and liquid assets to total assets ratios have been around double the regulatory minima. Banks are profitable and before the pandemic the NPL ratio was at a moderate level. Due to the Covid-19 pandemic, the NPL risks increased, but have remained within acceptable ranges.

The economy of Aruba is tourist dependent, which is an important source of vulnerability. The tourism-related industries' total contribution to GDP is above 90 percent, which is exceptionally high even in the Caribbean context. This constrains financial institutions' efforts to diversify, and makes them vulnerable to common, external shocks. Concentration risks (large institutions and large exposures) are also structural vulnerabilities, related to the small size of the economy.

The major source of risk comes from lending. Given banks reliance on deposits, few investment alternatives to government bonds, the stable peg and the huge liquidity in the financial system, market and liquidity risks are limited. Although interest rates are considered stable, the dominance of fixed term mortgage lending and the government bond holdings make banks potentially vulnerable to a rise in interest rate.

Banks are increasingly exposed to the real estate market and compete with non-regulated lenders. The share of mortgage loans rose from 60 to 75 percent in the household portfolio during the last decade. Mortgages are also offered by pension funds (14 percent), mortgage banks (10 percent) and life insurance companies (4 percent). Strict prudential supervisory policy and adequate monitoring by the mortgage lending institutions have kept the share of non-performing housing mortgage loans relatively stable, and there are no signs of increasing leverage in the household sector either. Pre-pandemic credit growth was also moderate. Commercial lending has also shifted away from trade to real estate lending. Moreover, in light of the relatively sizeable informal economy – estimated at about 15 percent of GDP in 2019 – it is likely that consumer loans are also offered by non-financial corporations, including retailers. The fact that the lending activity of non-financial corporations is not subject to bank-like regulation, may lead to excessive risk-taking. Monitoring these activities is critical.

Residential house prices have increased significantly in some regions since the start of the pandemic driven by strong demand from non-residential buyers as well as higher construction costs due to covid-related supply constraints. The rise in house prices seems not to have been associated with a significant increase in the stock of banks' mortgages to residents and non-resident households due to the fact, that a large part of the non-resident investors settles their purchase with cash. The recent increase can become a source of risk should the rise in house

prices be sustained or accompanied by increasing lending, rise in leverage and LTV, or falling price of risk.

Both banks and local authorities seem to manage the pandemic well due to swift measures.

As the pandemic started, the CBA introduced a temporary lowering of the minimum for reserve requirement (from 12 to 7 percent), capital adequacy ratio (from 16 to 14 percent) and prudential liquidity ratio (from 18 to 15 percent)¹. The government has also implemented a generous package to support households and business during the pandemic. In dialogue with the CBA, banks introduced moratorium for lenders to alleviate debt payments during the pandemic.

The CBA has formulated a comprehensive strategy for financial stability with a clear vision and understanding of the future path in this area. While internal prioritizations and resource constraints have delayed the implementation of the strategy, the CBA is cognisant of the current financial stability risks and steps needed to mitigate these risks. A working group has been set up, which will help prepare upcoming first meetings of a new Financial Stability Committee.

While changing the state ordinance of the CBA can take time, the CBA should continue with its plans to build on the proposed financial stability framework. Instead of waiting for the state ordinance to be changed, the CBA is wise to continue to build up the functions that do not require a changed ordinance. It will be important for the Financial Stability Committee (FSC) to have an appropriate preparatory body. While the working group will be an interim solution, the CBA should form a dedicated Financial Stability Department (FSD) consisting of at least 3 FTEs as be a more permanent function as preparatory body for the FSC.

The future FSD is advised to develop a strategy on Macroprudential Policy (MaP). To be able to prioritize which MaP tools to introduce and in which order, the new FSD should develop a plan that takes into account the vulnerabilities and data constraints and sets out a road map for the introduction of tools. Such plan should also consider the need to prioritize between micro and macroprudential tools.

Based on the macroprudential strategy, the FSD should prepare the methodology for the introduction of the MaP instruments chosen as well as ensure the necessary preparations in terms of data collection for this purpose. Depending on the tools chosen, a methodology for the introduction and calibration of the Counter-Cyclical Capital Buffer (CCyB) and, the identification of systemically important domestic banks (D-SIB) in order to set separate capital or liquidity surcharges for D-SIBs could be created. Apart from broad-based and structural tools, borrower-based tools such as LTV and LTI should also be considered in order to broaden the MaP toolkit.

¹ By the end of 2021, the CBA removed these measures, increasing the reserve requirement, capital adequacy ratio, and prudential liquidity ratio back to 12, 16, and 18 percent, respectively.

The main output of the FSD should be an annual Financial Stability Report (FSR). The annual FSR should include an overview of the recent development in the financial sector in Aruba, in addition to the recent developments with respect to financial institutions and lenders. The FSR should also discuss the main risks and vulnerabilities facing financial stability in Aruba as well as issue policy recommendations.

The data available to the CBA is sufficient for starting systemic risk monitoring, but some data gaps should be addressed. The monitoring of systemic risk and the development of macroprudential tools requires more granular, frequent, and timely data. The success of macroprudential policy rests on the authority's ability to recognize the build-up of vulnerabilities in time, and to calibrate tools that are effective but minimize cost. Climate risk monitoring will also require climate and loan data by firm and location. Implementation of the credit register would lower monitoring cost, increase access to credit, and also provide granular data for the CBA.

Table 1. Key Recommendations

Recommendations	Priority	Timeframe²
Macroprudential Framework		
Create a Financial Stability Committee (the proposed designated macroprudential authority) and initiate quarterly meetings in the second half of 2022. Par 32-34	High	Near term
Create a dedicated Financial Stability Department with at least 3 FTEs. Par 35	High	Medium term
Seek approval of a change to the ordinance of the CBA to include a specific financial stability mandate. Par 27, 32	High	Medium term
Start producing an annual Financial Stability Report. Par 36	High	Medium term
Develop a strategy on MaP Policy: prioritize, based on the vulnerabilities and data constraints, which MaP tools and in which order to develop. Decide on the combination of Micro and Macro-prudential tools. Par 37	Medium	Long term
Develop the methodology for the future introduction of macroprudential tools (CCyB, surcharge on D-SIBS, LTV and DTI/DSTI depending on the choice of the strategy), including the calibration of such tools as well as ensuring the collection of necessary data. Par 38	Medium	Long term
Data		
Collect granular household data on income, loan, value of collateral etc. which facilitate the calculation of LTV and DSTI or DTI. Par 42	High	Medium term
Implement a credit register. Par 19	Medium	Long term
Revise regulatory data template to capture vintage information, recent developments (LTV by time of loan origination, loan flows etc.). Par 44	Medium	Medium term
Calculate Quarterly GDP. Par 40	Medium	Medium term
Start collecting climate-related information to assess the materiality of risk. Par 45	Medium	Medium term
Stress testing		
Extend the coverage of ST (add interest rate risk, sovereign spread shock). Run multi-factor shocks. Par 54, 57	High	Near term
Use historical data on NPLs to choose an extreme but realistic scenario. Use it together with reverse stress testing, if you are uncertain about the size of shock. Depending on the relevant risk, use combination of industry specific shocks in addition or instead of general credit shock. Par 50 - 53,	High	Near term
Once Basle II is implemented, revise the current ST template, which considers only private sector credit risk and liquidity risk	Medium	Medium Term

²Near term: < 12 months; Medium term: 12 to 24 months, Long term:>24 months

Recommendations	Priority	Timeframe²
Map linkages between FIs. Run contagion simulation (including banks and non-bank FIs). Par 55	Medium	Medium term
Use ST in the future FSR, linking the considered scenarios to the assessment of risks and vulnerabilities (choice of risk scenario and calibration of shock). Par 57	High	Long term
Once granular household and firm data become available, use those for stress testing purposes. Par 56	Medium	Long term
Develop satellite models which link credit losses and other items of the Income statement to macro-financial variables. Par 58	Medium	Long term
Implement a multi-period framework for ST. Par 58	Low	Long term

I. INTRODUCTION

1. **At the request of the Central Bank of Aruba (CBA), CARTAC conducted a virtual diagnostic and scoping mission on systemic risk analysis and financial stability framework on April 4 – 11.** The aim of the mission was twofold: to gather a view on the main potential risks and vulnerabilities the banking sector faces in Aruba as well as assess the ongoing work related to the financial stability framework, initiated in 2018. The mission also discussed the CBA’s stress-testing framework. The structure of this report is as follows. First, the report discusses the structure of the Aruban Financial Sector and the main vulnerabilities and risks facing the banking sector. The second part discusses the macroprudential framework and offers a few recommendations. Finally, the report discusses data issues and the stress-testing framework and adds a few recommendations.

2. **Aruba has a sizeable financial sector, dominated by commercial banks, which accounted for 49 percent of total assets at end of 2021.** The total assets of the financial sector account around 2.5 times the country’s GDP. Five commercial banks³ operated in Aruba at the end of 2021, 3 of which owned 92 percent of total commercial bank assets. The only branch was acquired by another commercial bank during 2022, which decreased the number of institutions to four. The largest of the commercial banks is local, the rest are foreign subsidiaries of banks in Canada (2) and Curacao (1). Five nonmonetary institutions operate in the country, two mortgage lenders, one development finance company, and two credit unions. None of the local commercial banks have branches or subsidiaries outside of Aruba.

Table 2. The structure of the financial sector, 2021

	Number	Total assets/GDP
Deposit-Taking FI		
Commercial banks	5	130.5%
Credit unions	2	0.4%
Mortgage bank	1	7.3%
Other DTFI*	2	8.2%
Insurance companies		
Life	6	31.1%
Non-life	10	6.7%
Captive	4	3.7%
Pension funds		
Company PF	7	12.6%
Civil Servants PF	1	64.4%

Source: Central Bank of Aruba

3. **The insurance companies’ total assets make up 41.5 percent of GDP.** The Insurance sector is dominated by life insurers based on asset size. All insurers are foreign

³ International banks ceased their operation in Aruba, the last one exited in 2018.

subsidiaries or branches. The market, especially the non-life segment is overpopulated.⁴ Parents are primarily from the region, but Dutch, US and Indian insurers are also present. There is a group consisting of one bank and three insurance companies belonging to the same foreign holding. There is also another group consisting of one bank and one insurance company that belong to another foreign holding. But otherwise, banks and other non-bank FIs are not linked via ownership.

II. THE BANKING SECTOR IN ARUBA

4. **Banks are generally well capitalized and hold ample liquidity buffers.** Within the context of a conservative business model, capital adequacy and liquid assets to total assets ratios have been around double the regulatory minima.

5. **Banks are profitable and before the pandemic the NPL ratio was at a moderate level** (3.2 percent). The conservative business model is also reflected in the 40-60 rule - corresponding to the LTI and LTV limit (with respect to resident customers)- followed by insurance companies and pension funds.

6. **Both banks and local authorities seem to manage the pandemic well.** Banks have thus far been able to weather the covid-19 pandemic due to swift measures from the Aruban authorities and banks themselves. As the pandemic started, the CBA introduced a temporary lowering of the minimum reserve requirement (from 12 to 7 percent), capital adequacy ratio (from 16 to 14 percent) and prudential liquidity ratio (from 18 to 15 percent). The government also implemented a financial package to support households and business during the pandemic. Banks provided moratoria, which were already lifted by the end of 2021, intensified communication with clients and restructured loan facilities on an individual basis and clients' needs. Even though the covid-19 pandemic brought about a fall in GDP of around 25 percent in 2020, NPLs have only increased marginally up to around 6 percent (end 2021). Banks have remained well- capitalized and with ample liquid buffers.

Table 3. Commercial banks - Financial Soundness Indicators, 2016-2020

	2016	2017	2018	2019	2020
Capital Adequacy Ratio (min 16%)	28.1	30.3	32.1	31	33.2
Return on Assets	2.1	1.7	1.7	1.3	0.3
Return on Equity	15.1	11.5	10.5	8.1	2.2
Loan to Deposit (max 80%)	66.2	68.2	68.1	68.4	66.8
Liquid assets to total assets (min 18%)	30.6	28.6	29.8	29.3	33.7
NPL ratio	4.4	4	3.9	3.2	5
Large loans to regulatory capital	51.4	40.6	41.4	45.3	50.2

Source: Central Bank of Aruba

⁴ Despite the competition and the relatively low premiums, institutions are profitable. This can be partly attributed to the low claim rate.

7. **Commercial banks have limited exposure to funding liquidity risk.** They run traditional banking business, collecting deposits and providing loans to residents. External or wholesale funds are not relied upon, the Loan to Deposit Ratio is below 70 percent (a regulatory limit of 80 percent is in place). Deposit insurance has not been implemented though (a draft has already been submitted to the Parliament), which imply that the size of deposit run can be substantial, should that occur.

8. **Exposure to market risk is low.** Aruba doesn't have a stock exchange; investments opportunities are limited. Banks hold their excess liquidity in local government securities or keep as deposits at the foreign parent bank. Banks compete for government securities with institutional investors, who are obliged to invest a large share of their assets (60 percent in the case of life insurers) on the domestic market. Regarding foreign currency (FX) risk, the country has maintained a successful peg; exchange rate shocks are not likely. There is a net open position limit in effect, and banks do not provide FX loans.

9. **Sizable government bond holdings and the dominance of fixed term mortgage contracts subject banks to interest rate moves, but a significant rise of interest rate is considered unlikely.** Over the last 10-15 years lending rates have been declining, partly because of the increasing competition between lenders, the relatively weak loan demand and the excess liquidity in the system. Although a large part of this excess liquidity is structural (e.g. due to limited investment opportunities), should that change, the interest rate may become more volatile.⁵

10. **The major source of loss for banks comes from credit risk, which tends to be systemic and subject to external shocks, given the heavy dependence of the Aruban economy on tourism.** The tourism-related industries' (including direct and indirect) contribution to GDP is above 90 percent, which is exceptionally high even in the Caribbean context. The US accounts for 85 percent of the tourist flow.⁶ The lack of diversification also limits banks' ability to diversify and makes the economy subject to large volatility. This volatility is likely to play an important role in banks effort to build buffers.

11. **The largest group of borrowers is that of households.** About 55-60 percent of total private sector lending is placed at households, and this share was rather stable since 2006 (data used by the mission covered the period between 2006 - 2020). Although some variation can be observed among banks, they all have substantial exposure to households. Given the

⁵ A potential scenario can be households moving their savings abroad, investing online following e.g. a jump in inflation or widening yield differential between domestic and foreign investments.

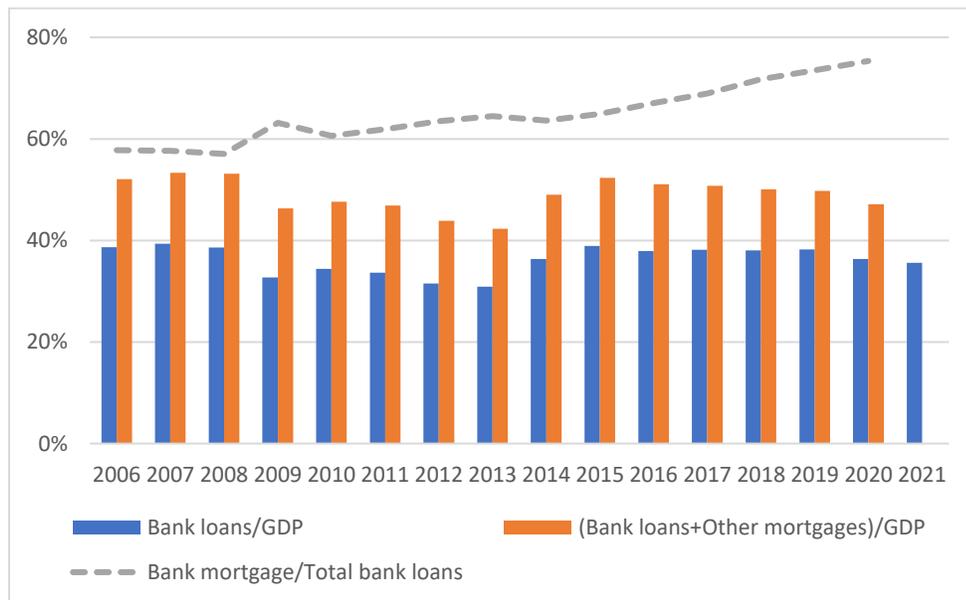
⁶ Dependence on US tourists was gradually increasing prior to the pandemic. This is related to the crisis in Venezuela and the consequent fall of tourist form the South American country, which used to be the second most important tourist partner for Aruba.

large exposure to households, monitoring vulnerabilities in the household sector is key from a macroprudential point of view.

12. **Based on the available data no signs of increasing leverage can be observed in the household sector over the last 10-15 years.** The aggregate leverage indicator (household loans provided by commercial banks/GDP) moved between 30 and 40 percent in the period 2006-2020 – fell following the GFC and then recovered to the pre-GFC level. If we add the mortgages granted by other FIs, the leverage show very similar dynamics (see Figure 1). For the proper assessment of trends in household leverage one would need data on lending outside the financial sector (consumer lending provided by retailers or pawn shops), which has likely been picking up according to the CBA. Also, granular data by households or income groups could provide more information on risks. The aggregate data may conceal the buildup of vulnerabilities in certain segments, typically low-income households.

13. **Banks have large and increasing exposure to the housing market via increasing mortgage lending to households.** During the last decade the share of mortgage loans in the household portfolio increased from 60 percent to 75 percent, mortgage lending picking up especially after 2015. While the CBA has yet to introduce borrower-based macroprudential measures, banks apply conservative standards, allowing a LTV of 60 percent for non-residents purchasing a property on the island and an LTV of 70 to 80 percent of execution value for local mortgage buyers.

Figure 1. Household leverage and share of mortgage loans, 2006-2020

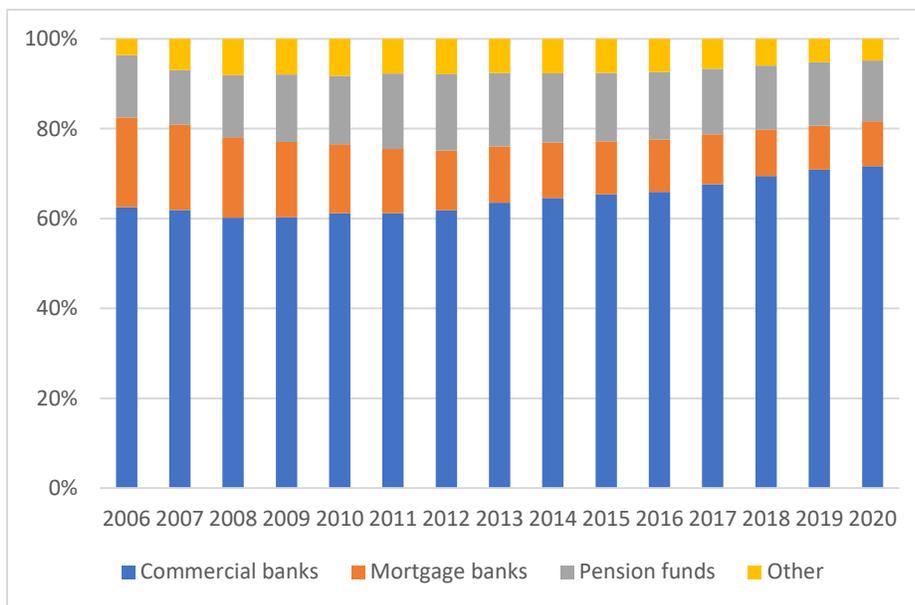


Source: Central Bank of Aruba. Note: calculations by the mission.

14. **Non-bank lending activity to households is material and increasing in some segments.** Non-bank FIs compete with the commercial banks on the mortgage market. Both

insurance companies and pension funds offer mortgages, their share moved between 16-24 percent, in the period of 2006 - 2020. Commercial banks managed to increase slightly their share, while mortgage banks lost the most. Competition comes from outside the financial sector in consumer lending as well. Retailers and, pawn shops are increasingly offering consumer loans. Their share on this subsegment is estimated around 10 percent. To curtail predatory lending the CBA has already drafted a consumer protection state ordinance, which aims to limit excessive interest rates and leverage, and uninformed borrowing. Shadow banking also challenges banks' credit risk monitoring – which is curtailed even in the absence of shadow banking, given that no credit register exists in Aruba. As some lending activities in the area of consumer financing are not subject to bank-like regulation or supervision, this may lead to increased risk-taking.

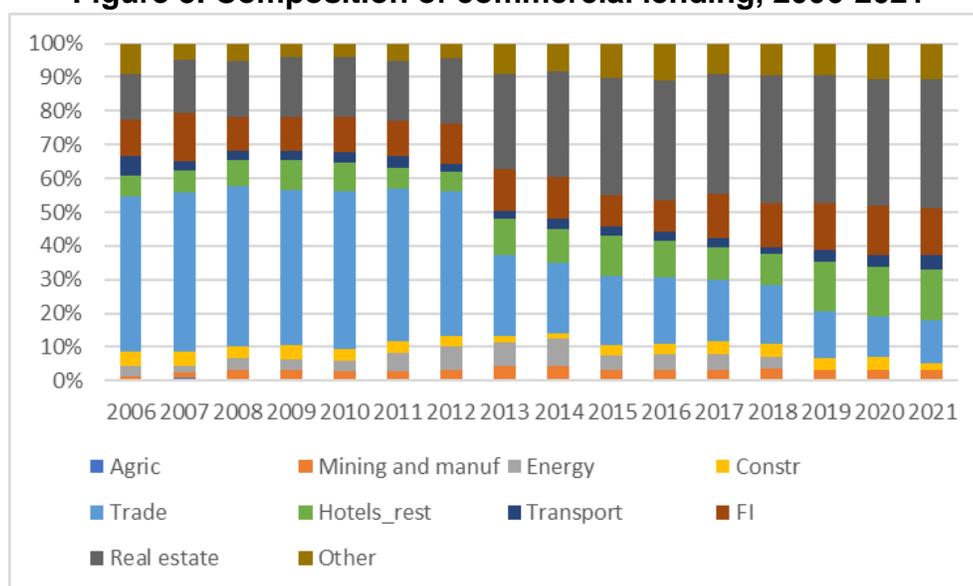
Figure 2. Housing Mortgages by type of lender, 2006-2020



Source: Central Bank of Aruba. Note: calculations by the mission.

15. **Regarding commercial lending, banks are increasingly exposed to real estate and tourism related industries.** Following the GFC, a clear shift in commercial lending can be observed. Up to 2012 almost half of lending went to the trade sector. By 2021 its share fell to 13 percent; not just the share, but even the outstanding stock fell significantly. Two sectors gained: the “real estate and renting” sector tripled its share in the portfolio, reaching 38 percent by 2021; and the “hotels and restaurants” industry more than doubled its share.

Figure 3. Composition of commercial lending, 2006-2021



Source: Central Bank of Aruba. Note: calculations by the mission.

16. **Given the size of the country, banks' lending portfolio is subject to single name concentration risk; but the huge capital buffers make banks resilient to the potential default of their largest borrowers.** In small countries banks tend to be subject to single name risk. The CBA has a prudent regulation in place which limits individual exposures and the sum of large exposures to a group of connected clients, as well as the total sum of large loans. According to the stress tests run by the Supervision department, banks have enough capital buffer to withstand the failure of the (3-4) largest borrowers, but the impact of the shock is large.

17. **The lack of a diversified financial market makes banks vulnerable to a deteriorated sovereign situation.** The government debt/GDP ratio has increased from 73 percent prior to the pandemic to 111 percent due to need to take credit from the Dutch government. Financial institutions in Aruba are the main buyers of government debt. Weak sovereign position is a concern for at least two reasons: (i) the weakened ability of the government to provide protection during stress, and (ii) the risks coming from banks' direct exposure via their investments (or lending). Regarding direct exposure, banks in Aruba do not provide loans to the government. The magnitude of their sovereign investments is rather limited at the banking sector level (6.5 percent of total asset at the end of 2021). But banks are different: the Canadian banks have very small or no investment in government securities (end of 2021), the others keep 10-15 percent of their assets in government bonds, which can be considered as sizable exposure⁷ and worth monitoring.

⁷ In the current regulatory framework sovereign exposure enjoys preferential treatment: zero risk weight and no provisioning requirement, but that may change with the introduction of Basel II Pillar 1.

18. **Direct interlinkages between financial institutions can be a source of contagion and systemic risk, but for proper assessment more data and deep analysis of available returns are needed.** Direct linkages can be of two types: direct exposure coming from lending/funding and linkages via ownership. The former entails solvency and funding risk, the latter, reputational risk (the parent may provide liquidity or capital to the distressed subsidiary because of reputational reasons). In Aruba:

- a. Banks do not have majority interest in other financial institutions; they are not facing reputational risk.
- b. Foreign subsidiaries in Aruba hold assets at the parent, but they don't rely on group funding. The potential solvency risk, the spillover from foreign parents is limited by the fact that parents are highly rated institutions. In addition, existing regulatory rules limit the deposits placed at parent banks⁸.
- c. Given the large liquidity buffers at banks, the interbank market is thin.
- d. The exposure between banks and other resident FIs should be further explored. Non-life insurance companies (although small by asset size) keep 65 percent of their assets in banks deposits. Life insurance companies also keep deposits at local banks (10 percent of their total assets). The CBA have a regulatory return asking banks to report all their exposure with other financial institutions⁹. This report can be harnessed to map the institution level exposure of all banks with other FIs.

19. **No credit register exists in Aruba, which increases information asymmetry.** The Aruban Bankers Association had a discussion with a private register provider, but the offer was not deemed sufficient as the company did not offer full coverage. The implementation of a credit register would lower monitoring costs, increase access to finance and provide useful data for CBA as well for monitoring risk and conducting MaP.

20. **The lack of financial deepening can also be a source of vulnerability.** While 50 percent of surveyed households have access to basic financial services, and almost 60 percent of surveyed households indicate that they have a savings account, only 1 in 3 households makes savings on a regular basis. Less than 6 percent of surveyed households hold stocks and bonds according to the 2021 household survey.

21. **Residential house prices have increased significantly since the start of the pandemic driven by strong demand from non-residential buyers as well as higher construction costs due to covid-related supply constraints.** While the rise in house prices seems not to have been associated with a significant increase in the stock of banks' mortgages to resident and non-resident households due to the fact, that a large part of the

⁸ Exposure above 10 percent of the regulatory capital should be deducted from both liquidity and capital.

⁹ The only missing element is the claims from resident non-bank FIs.

non-resident investors settles their purchase with cash, the recent increase can be a source of risk should the rise in house prices be sustained. The rise in house prices has thus far mainly been concentrated in the more affluent areas of the Island and has yet to make an impact in the general house price index.

Box 1. Housing Market in Aruba

The housing market in Aruba consists of around 48,000 houses¹⁰. With 75 percent, commercial banks have the largest market share in mortgages followed by pension funds (14 percent), mortgage banks (10 percent) and life insurance companies (4 percent). The trend has been a gradual increase in the share of commercial banks at the expense of mortgage banks. The share of total mortgage loans to GDP increased from 27 percent in 2006 to 44 percent in 2021. Strict prudential supervisory policy and adequate monitoring by the mortgage lending institutions have kept the share of non-performing housing mortgage loans relatively stable. In dialogue with the CBA, mortgage lenders introduced moratoria during 2020 and 2021 in order to alleviate debt payments during the covid-19 pandemic.

While the CBA has yet to introduce borrower-based MaP measures, banks apply conservative standards, allowing an LTV of 60 percent for non-residents purchasing a property on the island and an LTV of around 70 percent for local mortgage buyers, taking into account that many non-resident investors settle their housing purchases in cash. Life insurance companies offer more generous LTV requirements with the condition that mortgage holders also purchase life insurance; the latter is a general requirement by all commercial banks. While the CBA has been in contact with mortgage providers, the CBA has so far not started to collect data on LTV and DTI.

House price developments is normally closely related to consumer spending. Lower house prices can lead to reduced consumption since when faced with economic shocks; highly indebted households reduce consumption to stay current with debt payments. This could further worsen the economic environment and can lead to problems in corporations, eventually leading to credit losses at the banks. Over leveraged households can also pose a credit risk for banks if house prices fall and households become unemployed and are not able to continue paying their mortgages. Credit losses could be exacerbated if mortgages are held as non-recourse loans.

In Aruba, the outstanding stock of mortgages is held at fixed interest rates. This means that a possible interest rate shock would not immediately affect the household expenditures as it would only affect new borrowers, most likely having a small effect on household consumption. Moreover, mortgage equity withdrawal seems not to be very prevalent in Aruba. LTVs are also generally low in view of the rather tight LTV restrictions imposed by mortgage lenders. Therefore, the main risk from a financial stability perspective is likely more linked to possible credit losses arising from mortgage household defaults following a real economic shock with falling house prices, rather than indirect effects from the consumption channel. In Aruba, mortgages are held as full-recourse loans, which means that in the event a mortgage would end up with negative equity, the household is still liable for the remaining part of the loan, mitigating the situation for the lenders.

The lack of financial investment opportunities can be a source of vulnerability, making households less able to handle a situation with less income due to unemployment. While 50 percent of surveyed households have access to basic financial services, and almost 60 percent of surveyed households indicate that they have a savings account, only 1 in 3 households makes savings on a regular basis. Less than 6 percent of surveyed households hold stocks and bonds according to the 2021 household survey.

¹⁰ Based on the number of utilities connections. "A hedonic regression analysis of house asking-prices in Aruba" Leo de Haanab and Stephanie Werleman (Central Bank of Aruba and De Nederlandsche bank), 2020.

22. **Physical and transition climate related risks can lead to financial stability risks and needs to be monitored.** Being an island economy heavily dependent on tourism and in a region that could be prone to extreme weather, the CBA has done some research on over tourism and climate risks¹¹. Much of the research and work conducted to date on climate change relates to the physical risks of climate change. While the CBA has organized initial discussions on the transition-related risks (both energy-transition and financial-transition risks), these have not crystallized in any quantifiable output. Hence, it is too soon to draw any conclusions about the relative importance of physical vs. transition risks in Aruba.

III. THE MACROPRUDENTIAL FRAMEWORK

A. CURRENT FRAMEWORK AND PLANS

23. **The CBA is responsible for microprudential supervision and issues guidelines through directives and policy papers.** The existing Central Bank Ordinance does not include a mandate for macroprudential policy.

24. **Although lacking a formal mandate for financial stability, four departments are involved in work related to financial stability.** Two departments in the division for supervision and enforcement, one prudential department focusing on banks and one that focuses on insurance companies, pension funds, and investment institutions, as well as two other departments under the economic policy and financial stability division, the research department and the statistics department, are involved in the internal work related to financial stability issues.

25. **The CBA has elaborated a comprehensive framework for financial stability that is not fully implemented due to prioritizations and resource constraints.** A working group on financial stability presented plans for a financial stability framework in 2018. A central component of the plan is a revision of the Ordinance of the CBA to give it a financial stability mandate. This revision has still not been implemented since it needs to be passed by the Parliament. The CBA strategic plan 2021-2025, “Dilanti Biento”, specifies the goal of having a solid financial stability policy framework in place, based on a legal mandate, by 2025.

26. **The proposed framework provides the CBA a clear view of main objectives of macroprudential policy.** While noting that there is no single widely accepted and used definition of financial stability and taking into account international best practices, the

¹¹ “Whence the twain shall meet: Weathering overtourism and climate change in small island tourism economies”, Working Paper, Central Bank of Aruba, 2020.

objectives for macroprudential policy have been proposed by the CBA to include the following: To strengthen the resilience of the financial system to aggregate systemic shock; and, to limit the build-up of financial risks over time and within the financial system.

27. **A change to the ordinance of the CBA would ensure that the central bank has an explicit mandate for financial stability.** The current ordinance of the CBA only incorporates a mandate for microprudential supervision. According to the proposed framework, the ordinance of the CBA would include a provision that sets out a mandate which would be defined as follows: to promote the stability of the financial system. Since changes to the Ordinance of the CBA needs parliamentary approval, which is lengthy, it is still not clear when this amendment could be made.

28. **A Financial Stability Committee (FSC) within the CBA is proposed to be designated as macroprudential authority.** The FSC would include the President and the two Executive Directors as voting members. A dedicated Working Group has been formed, led by the Division Manager of Economic Policy and Financial Stability, consisting of representatives from the Statistics Department, the Research Department and the Prudential Supervision Department. This working group will prepare the quarterly meetings of the FSC, which is expected to have its first meeting in the second half of 2022.

29. **A dedicated Financial Stability Department is planned in order to execute operational activities with regard to financial stability in an effective manner.** The new department, to be placed in the Economic Policy and Financial Stability Division, will replace the Working Group once resources for the proposed department has been confirmed. The CBA plans to start with 1 FTEs (one manager) in the department, gradually increasing the number of staff to 3-4 FTEs if resources permit.

30. **The proposed framework includes a toolkit of financial soundness indicators for systemic risk.** The CBA already is able to collect the bulk of the data but will need to collect LTV and DTI data.

31. **While building on already prudent capital and liquidity measures as well as the commercial banks internally applied requirements, the framework is proposed to be expanded with liquidity measures as well as borrower-based measures.** In addition, the CBA's toolkit includes several instruments that it actively used to mitigate the effects of the covid-19 pandemic:

- a. The minimum reserve requirement refers to the minimum amount of reserves that commercial banks must hold at the CBA and is (currently) equal to 18.0 percent of their liabilities with a maturity less than 2 years¹². The minimum reserve

¹² The CBA decided to raise the Reserve Requirement from 14 percent to 16 percent as of 1 March 2022 and further to 18 percent from 1 April 2022 in order to reduce commercial banks excess liquidity.

requirement is used to mop up liquidity from, or inject liquidity into the banking sector.

- b. The minimum prudential liquidity ratio is defined as the ratio of liquid assets to total assets and is set at 18 percent¹³.
- c. The minimum risk-weighted capital adequacy ratio (CAR) sets the minimum of Tier I and Tier II capital. When introduced, it was set at 16 percent of risk weighted assets, well above the Basle framework¹⁴.
- d. The large-exposure rule sets the maximum exposure to one client or a group of connected clients at 25 percent of the sum of Tier I and Tier II capital. This limit can be raised to 35 percent under exceptional circumstances and only for well-collateralized loans to clients with an excellent financial position. Exposures to the local Government, as well as short-term (< 1 year) investments with financial institutions are exempted from this rule, under the conditions that subject financial institutions have a solid financial position and fall under effective supervision. The banks are required to periodically evaluate the financial position of these institutions.

B. RECOMMENDATIONS

32. **While changing the state ordinance of the CBA can take time, the CBA should continue to build on the proposed financial stability framework.** Instead of waiting for the law to be changed, the CBA is wise to continue to build up the functions that do not require a changed ordinance.

33. **It will be important for the Financial Stability Committee to have an appropriate preparatory body.** The working group, together with a dedicated secretary from the statistics department will initially prepare the quarterly report to the FSC. While this set-up will help ensure the production of material to the initial set of meetings, it is likely not an optimal, long-run solution since the responsibilities are spread out across departments and divisions.

34. **A dedicated Financial Stability Department would be a more permanent function as preparatory body for the Financial Stability Committee.** The CBA is cognizant of the need to establish a dedicated Financial Stability Department. However, creating a payment system department was considered a priority immediately following the conclusion of the strategy in 2018, crowding out resources for a new Financial Stability Department. Moreover, the need to cut back on expenditures during the covid-19 pandemic has further delayed the process.

¹³ The CBA decided to reduce this requirement to 15 percent in response to covid.

¹⁴ The CBA decided to reduce this requirement to 14 percent in response to covid but has since end 2021 returned the requirement to 16 percent.

35. **The new Financial Stability Department should include at least 3 FTEs.** While the new Financial Stability Department will cooperate with other departments, and receive input from other divisions within the CBA, in order for it to be effective, at least 3 FTEs should be devoted to the department. While the exact composition of staff is for the CBA to decide, it could include one function dedicated to financial stability policy issues, and one function responsible for data issues, modelling and systemic tools. The manager of the department could function as the editor of the reports produced in the department.

36. **The main output of the Financial Stability Department should be an annual Financial Stability Report (FSR).** The annual FSR should include an overview of the recent development in the financial sector in Aruba, the recent developments with respect to financial institutions and lenders. The FSR should also discuss the main risks and vulnerabilities facing financial stability in Aruba as well as issue policy recommendations. Periodicity could be increased when more experience gained.

37. **The Financial Stability Department should also develop a strategy on Macroprudential Policy.** In order to be able to prioritize which MaP tools to introduce and in what order, the new Financial Stability Department should develop a plan which takes into account the vulnerabilities and data constraints and sets out a road map for the introduction of tools. A cost-benefit analysis could be made in order to identify the appropriate tools and sequencing of tools. For example, in order for the CBA to introduce a Counter-Cyclical Capital Buffer, it would need to collect more data. To date, the CBA does not collect data on quarterly GDP. As GDP development has historically been volatile, it will need more granular and timely data. Without such data, there could be risks associated with the signaling of the collected data. The data could signal the need to increase the buffer while this is not needed. The plan developed by the CBA should also take into account the need to prioritize between micro and macroprudential tools.

38. **Based on the macroprudential strategy, the Financial Stability Department should prepare the methodology for the introduction of the chosen macroprudential instruments as well as ensure the necessary preparations in terms of data collection for this purpose.** Depending on the tools chosen, a methodology for the introduction and calibration of the Counter-Cyclical Capital Buffer, the identification of systemically important domestic banks (D-SIB) in order to set separate capital or liquidity surcharges for D-SIBs could be created. Moreover, the CBA could start collecting quarterly data on GDP in order to be able to provide the basis for the eventual introduction of the Counter-Cyclical Capital Buffer. Apart from broad-based and structural tools, borrower-based tools such as LTV and LTI should also be considered in order to broaden the MaP toolkit.

IV. ASSESSING DATA AVAILABILITY FOR SYSTEMIC RISK ANALYSIS

39. **Systemic risk monitoring in the case of Aruba requires data collection such as:**
- a. Macro and financial data
 - b. FSI for banks and other FIs
 - c. Credit development, interest rates, lending standards
 - d. Sectoral data on household, non-financial companies, sovereign
 - e. Housing market (residential, potentially also commercial)
 - f. Interconnectedness between financial institutions¹⁵
 - g. Climate data

40. **The available data at CBA is sufficient for starting systemic risk monitoring.** The coverage of macro data is sufficient, though GDP and unemployment data are available at an annual frequency only¹⁶. Bank regulatory reports provide an extensive coverage of FSIs, interest rates, repricing gap, bilateral exposure between FIs, large exposure, the decomposition of changes in NPL stock. Sectoral data is scarce, but the CBA regularly conducts a household survey which it can utilize¹⁷. Granular data for NFC would be available from the tax authority, but the tax authority is not allowed to share those data. The staff also calculates a residential property price index since 2012.

41. **In parallel with the implementations of Basle II standards, a new reporting system is under development¹⁸.** Currently banks report data in pdf format, which are then manually input into excel sheets. Work is ongoing to implement a new digitalized reporting system, which will save time, increase accessibility and reliability of data.

42. **To develop systemic risk monitoring and macroprudential tools, increasing the granularity and frequency of certain data is advised.**
- a. That is fairly obvious in case of household data. Based on the experiences, households in the lower income groups tend to be the most vulnerable to loss of their income or increase in the debt burden. Thus, information by income categories (or by households) is crucial for monitoring risks.
 - b. Also, the calibration of MaP tools requires detailed data – for example on the distribution of LTV and DSTI. MaP should choose the limits to ensure that the tools will be effective but not too costly, excessively inhibiting lending. Staff at

¹⁵ Mapping bilateral exposure between banks, and banks and other FIs: report 9A and 9B provide almost full coverage, except the category of “due from resident non-bank FI”.

¹⁶ The CBA does now-casting for GDP.

¹⁷The CBA regularly conducts household survey since 2010, which include useful information on the income position, use of financial services, investments and debt. The frequency of the survey (every four years) doesn't facilitate the timely monitoring of the vulnerabilities in the household sector though.

¹⁸ As the mission gained access only to the old templates, some of our recommendations might have already been met.

the CBA is aware of the problem and has already started internal discussions on gathering household level data from banks. Since surveys tend to be expensive, approaching banks for data is a first best solution.

- c. CBA is advised to ask for more detailed NPL data. The report should consider the evidences being gathered on the heterogeneity of credit risk – default probabilities and their sensitivity to macro-financial moves (GDP or interest rate) are found to vary by type of products (consider mortgages and consumer loans) and by industries (construction being more cyclical than services).
43. **The CBA has the necessary data to perform interest rate risk and market risk analysis.** The CBA is collecting monthly data on interest rate risk. For example, data on the interest rates on new loans (resident only), on new deposits (in time buckets of maturity), maturity gap including all assets and liabilities, as well as interest rate risk exposures is collected. The data to perform market analysis on the bond portfolio is not readily available, but will be once the new data reporting is implemented.
44. **Data should ensure that recent developments and the buildup of vulnerabilities are detected in time.** The distribution of LTV over the entire stock may not signal in time the increase of LTV for new loan flows. Also, the level of NPL, especially following crisis episodes tend to be tainted by legacy loans, which may remain on the balance sheet for many years. Thus, the level or the change of NPL ratio may provide misleading signals about the development of credit risk – which is better proxied by the share of new NPLs.
45. **Climate risk monitoring reinforces the need for detailed exposure by industry and location.** The first step in climate risk analysis is to assess the materiality of climate risk. For that, one needs to collect climate, greenhouse gas emission and lending data by firms and by location.
46. **Length of available data series will be key to develop certain analytical tools and macro-financial models.** Most of the (FSI) bank data are available since 2006. That may not be sufficient for macro-financial modelling – e.g. credit risk model often link credit risk measures (NPL) to GDP growth rate. As GDP data has annual frequency, and the NPL data doesn't seem to cover a full "NPL cycle", more data points may be needed for robust estimation. Later, generating composite indicators or heat maps, the distributional properties of long time series will be exploited, which also requires relatively large number of observations.
47. **Given the exposure of banks, analysis of the housing market is key.** The CBA has already compiled an RPPI. Staff also follows the price developments by region, given the recent discrepancy of market developments. In addition to prices, other information can also be collected (transactions, house permits etc.).

48. **Interconnectedness.** Linkages via ownership is limited. Mapping bilateral exposure between banks, and banks and other FIs is facilitated by existing regulatory reports (9A and 9B), which provide almost full coverage (due from resident non-bank FI is not covered, but that is likely to be negligible).

V. STRESS TESTING AT THE CBA

49. **The Supervision department run ST annually for banks.** General credit shock (increase of NPL by 5, 15 and 25 percentage points), default on the largest exposures and liquidity run scenarios are considered. The staff uses a simplified version of the IMF Stress Tester 3. Interest rate and FX shocks are not considered, neither scenarios nor contagion. The ST results are submitted to the Executive Committee, and discussed with the banks as well. The department is developing a guide for banks to run bottom-up ST. During covid, semiannual STs were conducted with a different methodology – with assumptions on shrinking loan portfolio, loss of interest payments etc.

50. **The mission recommends choosing one or max 2 severe but realistic credit shocks.** Instead of running a large number (3-4) of ad hoc scenarios with increasing severity of NPL rise. Historical data helps calibrating the likely scenario. The Global Financial Crisis can be one example. The scenario can be hypothetical as well, if warranted. If the staff believes that historical episodes are not appropriate, or the uncertainty is huge (like in case of the pandemic), then reverse stress test should be run.

51. **The scenarios should be expressed in terms of shock on new NPLs instead of the level or change of NPL ratio.** The CBA has a very useful report on the source of change of NPL stock (upgrade, movement between classification groups, new NPL, write offs). Staff is advised to check the reliability of this data report. It may provide a better measure of true credit risk¹⁹ (Probability of Default) than the observed NPL ratio, which is tainted by the legacy loans of previous shocks²⁰.

52. **It is advised to collect and observe data (long time series) by banks, and by industries and type of loan products to learn about the heterogeneity of credit risk.** Banks may differ in risk appetite, ability to monitor risk or their lending portfolio composition. Credit risk (its level and volatility, sensitivity to macro-financial shocks) vary by industry. Type of product also matters - mortgages and consumer loans are also very different. Later, the CBA may decide to use bank or industry specific scenarios and assumptions if deemed necessary.

¹⁹ That data may become also useful in credit risk model estimation.

²⁰ Banks are and have been advised by the CBA (on an individual basis and when applicable) to write off legacy loans to prevent that the NPL loans stay in the books for years.

53. **Under some circumstances the combination of sector specific shocks may be well exploited.** This feature of the template is not used at the moment. Originally this part aims to test sectoral concentration risk, but can be also used to examine shocks which hit some industries more than others. One example could be a shock originating from the housing market. Another is the Covid-19 pandemic, the impact of which was sector specific.
54. **Given the large exposure to interest rate, the CBA should consider using the interest rate shock as well.** Even if currently a rise in interest rates is considered unlikely (see paragraph 9), given the large exposure – large repricing gap, government bond holdings – the mission suggests adding this to the ST.
55. **Once the direct linkages between FIs are mapped, the data can be used to run contagion simulation.** The interbank market is thin, but depending on the result of the mapping exercise, contagion between various types of FIs should be considered. For reference on the methodology see Cihak (2007), Espinoza-Vega and Sole (2011)²¹.
56. **Later, when granular household (firm) data will become available, the CBA can run stress test separately on the household and corporate sector.** For households even the available survey may be used for this purpose. Unfortunately, the last survey was completed during the pandemic, the income position and the leverage might have improved since. Financial margin and its modified concept²² is one option to run ST on a cross section of data. Should CBA succeed in gaining access to firm financial reports (from the tax authority), that would allow running stress test for non-financial companies as well.
57. **Running ST for Macroprudential purposes will raise its own challenges.** At this point using multifactor shocks, scenarios linked to the assessment of relevant risks and vulnerabilities will be key. Also, the two-way feedback effects between the real economy and the financial sector will need to be considered.
58. **On the long term, moving from the current static, one-period framework to a multi-period ST is advised.** As shocks may last long and the impact on banks may happen with a lag, using a longer horizon is needed. For that, the CBA will need macro forecasting models and developing satellite models which can be used to forecast bank's balance sheet and capital (credit growth, credit losses, net interest income etc.)

²¹Cihak, M. 2007. "Introduction to Applied Stress Testing," International Monetary Fund Working Paper No. 07/59, M.A. Espinoza-Vega and J. Sole (2011): Cross-Border Financial Surveillance: A Network Perspective. IMF WP/10/105

²² Ampuiza et. al (2016): Financial fragility of euro area households. Journal of Financial Stability 26. 2016. See also a recent application of the methodology by Merikkul and Room (2020): Stress test of the Household sector using microdata from survey and administrative sources. International Journal of Central Banking, March 2020.