Chapter 4: Resilience of the Banking Sector under Adverse Conditions

The stress scenario used in this assessment is not a forecast of macroeconomic and financial conditions. It is a hypothetical, coherent, tail-risk setting designed specifically to assess the resilience of the banking sector to hypothesized deterioration in macroeconomic conditions. Under the baseline scenario (business as usual), the solvency level of the banking sector remains stable and well above the domestic regulatory benchmark over the three-year horizon. Under a more adverse scenario as well, the banking sector is expected to comfortably maintain its solvency against a downturn induced by adverse macroeconomic conditions associated with severe pressures in the global commodity prices, recurrence of extreme weather conditions such as floods and droughts and any disruption due to assumed political instability. In terms of size, the large systemically important banks, in particular, carry sufficiently higher capital buffers and are expected to sustain the impact of the shocks over the assessment period. Similarly, the medium and small sized banks are also expected to remain resilient to the shocks. Under the baseline, the credit, however, is projected to grow at a slower pace, which may turn negative in assumed stress conditions. Nonetheless, the banking sector, with sufficient capital buffers, is expected to continue catering to the credit needs of the economy. That said, the exact severity, duration, and path of the current and assumed adverse global commodity market conditions and geopolitical tensions remain highly uncertain. As a result, the stress-test results are also subject to significant uncertainty. The SBP, on its part, continues to closely watch the evolving situation and remains ready to take whatever actions necessary to safeguard financial stability.

4.1 Background

The feedback effects between the real and financial sectors have been most prominently highlighted by the global financial crisis (GFC) of 2007-08. Since then, supervisors have enhanced the level of oversight of the financial sector and taken regulatory measures to strengthen the resilience of the sector to withstand potential shocks. In this connection, stress-testing (ST) exercises are also being extensively used by supervisory authorities as well as multilateral agencies to assess the resilience of the banking sector to some hypothetical adverse yet plausible event(s). The results of these stress tests depict the *projected* behavior of macro-financial variables and health of the banking sector under different *assumed* scenarios.

The SBP has been conducting this exercise internally on a quarterly basis since 2005. For external stakeholders, detailed stress-testing results and assessments are being published annually in the FSRs since 2007-08 and quarterly results are shared via Quarterly Compendium: Statistics of the Banking System.

The ST framework for banking sector in Pakistan is being continuously revamped and strengthened. SBP issued a comprehensive set of ST guidelines for conventional banks, Islamic banks, Islamic branches of conventional banks, DFIs and MFBs in 2020 to regularly assess their resilience and incorporate the same in their risk management processes.[99] Importantly, the sample of domestic systemically important banks (D-SIBs) are now required to conduct macro-stress testing (MST) under various scenarios to gauge their level of resilience against adverse shocks.

[99] FSD Circular No. 01 of 2020.

4.2 Overview of Scenario Design

The current year's ST exercise consists of assessment of resilience of the sector under *baseline* and *hypothetical stressed* scenario. Both scenarios are built on the basis of key internal and external risk factors including extreme weather conditions, evolving political environment, uncertainty associated with completion of the IMF program's review, soaring debt levels, potentially intensified geopolitical tensions leading to higher commodity prices and worsening of global financial conditions. The two scenarios differ in terms of assumptions regarding materialization and intensity of the assumed risk factors.

The *baseline scenario* traces the path of macro-financial variables under the current dynamics of the global and domestic economic conditions.[100] On the other hand, the hypothetical *stressed* scenario assumes recession owing to extreme weather conditions (causing floods and/or droughts), domestic political uncertainty and risks to external financing amid tightened global financial conditions.[101]

Against the backdrop of economic challenges, the impact of both scenarios for the domestic macro-financial stability is investigated over a projection horizon of three years, viz., Q1CY23 to Q4CY25.

The implications of assumed changes in macro-financial indicators such as output, inflation, interest rate, external sector, including current account balance and exchange rate, on the health of the banking sector have been captured in regulatory capital (RC) and risk weighted assets (RWAs). Specifically, the RC and RWAs are impacted by the credit and market risks. The assumed economic downturn can negatively influence the income levels of firms and households, affecting their debt servicing capacity and amplifying the credit risk for the banks. This in turn may put adverse pressures on the profitability of banks and negatively affect their solvency. On the other hand, market risk affects the valuation of assets and liabilities held on banks' balance sheets owing to fluctuations in the interest rate, exchange rate and equity prices.

The feedback effects of weakened solvency of banks could spill over to the real economy, as the banks may be reluctant to provide credit for even potentially profitable investment opportunities, thus amplifying the economic downturn.

In both the scenarios, a similar methodology has been employed to evaluate the resilience of the banking sector and capture the inter-linkages among various sectors of the macro economy. Given the interaction between real and financial sectors, a suite of vector autoregressive (VAR) and Bayesian VAR models has been employed.[102,103]

In addition to the system level assessment, the cross-sectional heterogeneity has also been captured for the different segments of the

[100] For a detailed discussion of key issues relevant to global and domestic economic environment, please see Chapter 01.

[101] Usually three types of shocks are considered in stress testing based on the length of the shock events i.e. V-shaped, L-shaped and U-shaped. The shapes are envisaged in terms of recovery. V-shaped assumes quick recovery; L-shape assumes protracted downturn while U-shaped assumes recovery towards the end of projection horizon. Under this terminology, stressed scenario is assumed V-shaped. However, owing to high level of severity and uncertainty around both scenarios, delayed recovery is assumed making an asymmetrical V with stretched second leg. Although, the recovery in baseline scenario is quicker compared with the stressed scenario.

[102] For details, please see '*Box 4.1 Technical Details*' of Chapter 4: Resilience of the Banking Sector, Financial Stability Review 2016, SBP. In all we use 12 variants of VAR models, and an equal number of Bayesian VAR models. The models contain different combinations of macro-financial variables. Moreover, for calculation of relevant financial soundness indicators, we have assumed a dynamic balance sheet.

[103] One fifth of the authorities use VARs for macro stress testing. Bank for International Settlements (BIS) 2017. *Supervisory and Bank Stress Testing: A Range of Practices*, (December).

banking industry in terms of size, i.e., small, medium, and large banks.

4.3 The Baseline

The domestic economy has been facing quite a challenging macroeconomic environment owing to floods in CY22, pressure on external sector, the after-effects of Covid-19 and political uncertainty. The confluence and cumulative impact of these shocks has culminated into historic levels of currency depreciation and inflationary pressure. Against this challenging backdrop, the baseline, *Scenario 0 (S0)*, is built around four main assumptions regarding global and domestic risk factors.

With general elections assumed to be held in CY23, political uncertainty is likely to abate…

First, *S0* assumes that the general elections will be held in CY23. The scenario assumes that elections will culminate into establishment of a stable government, boosting investor confidence to unlock multilateral and bilateral external financing inflows. On the other hand, ongoing high inflation and the corresponding monetary policy response is likely to moderate growth momentum. On a positive side though, the successful implementation of reforms is likely to keep twin deficits and public debt under check while boosting recovery in the medium term.

Public debt is expected to remain under check owing to fiscal consolidation measures and stable exchange rate…

Second, the scenario assumes that owing to implementation of fiscal consolidation measures, fiscal deficits will be manageable. On the other hand, resumption of multilateral flows is likely to boost confidence, reduce risk premium and stabilize the exchange rate. Based on these two assumptions, the public debt, which increased by 23.4 percent in CY22, is likely to remain in check.

Climate risk events of moderate severity are likely to disrupt real economy…

Third, *S0* assumes that climate risk related events of moderate scale may lead to economic losses during the projection horizon. Historically, Pakistan has been the victim of a series of extreme weather-related catastrophes such as, severe droughts (1998-2002), massive flooding (2010, 2020, and 2022), extreme heat waves (2015), heavy rainfalls (2020, 2022), land sliding and glacier melting. These episodes have resulted in significant supply shocks and output losses.

Even though Pakistan does not rank as a top emitter of greenhouse gases, it is ranked as one of the most affected countries by climate changes in terms of human and output losses.[104] Recently, the total estimated damages attributable to torrential rains of CY22 are estimated at USD 14.9 billion, equivalent to 5.8 percent of GDP.[105] The most affected sectors include agriculture, housing, food, livestock, fisheries, transport and communications.

Global commodity prices are expected to decline gradually…

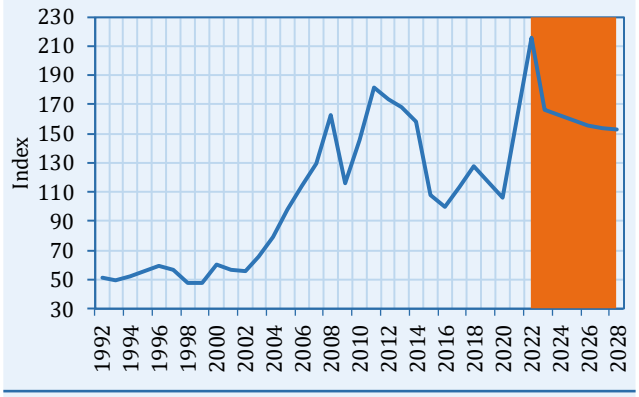
Finally, post-pandemic recovery and Russia's invasion of Ukraine led to a sharp rebound in commodity prices in general and oil prices in particular over the last two years **(Chart 4.1)**. However, as various countries keep evading sanctions on Russian oil amid slowing global demand and phasing out supply disruptions, a gradual declining trend in oil prices is being observed since mid CY22. Oil futures and consensus forecast indicate that this declining trend is likely to continue over our projection

[104] The Germanwatch has included Pakistan in the category of countries that are recurrently affected by the catastrophes and has ranked Pakistan at 8th position in long term climate risk index. *Global Climate Risk Index (CRI) 2021. Germanwatch.*

[105] Pakistan Floods 2022: Post-Disaster Needs Assessment (October 2022).

horizon of next three years.[106] Accordingly, assuming absence of new major shocks to global oil supply, the *S0* assumes that oil prices may gradually decline to USD 74 per barrel by the end of CY25.

Chart 4.1: Commodity prices Index



Source: IMF WEO April 2023

Economic growth is assumed to moderate rapidly in FY23 and then gradually recover over the projected horizon

In this perspective, *S0* assumes GDP to grow by around 0.5 percent in FY23. However, growth is expected to rise to 2.9 percent in FY24 and 3.7 percent in FY25 on account of the assumed favorable global and domestic economic conditions (**Chart 4.2**). Further, YoY average CPI inflation may stay at elevated levels of 28.1 and 17.6 during FY23 and FY24, respectively, before moderating to 7.7 percent during FY25 (**Chart 4.3**).

4.4 The Hypothetical Stressed Scenario

The stressed scenario, *Scenario 1 (S1)*, is built around the following assumptions regarding global and domestic risk factors.

A rise in domestic political uncertainty may lead to adverse economic impacts…

The stressed scenario hypothesizes uncertainty surrounding upcoming general elections, leading to a potential rise in domestic political uncertainty, which may negatively affect domestic economy in several ways. First, it may lead to a compromise on reforms agenda required to ensure economic sustainability and to unlock multilateral financing flows. Second, in the absence of multilateral flows, access to external financing may be difficult and costlier with added risk premium. These two factors are likely to involve an increase in government's domestic financing needs that may push debt levels up and constrain fiscal space. Third, external sector stress may translate into pressures on the exchange rate, leading to a further surge in inflation. Finally, an overall rise in political as well as economic uncertainty may lead to deterioration of investor and consumer confidence, thereby deteriorating aggregate demand and employment.

Climate change related catastrophic events of high severity pose a major risk to macroeconomy…

Considering the recurring history of climate risk related events, as discussed in the previous section, *S1* assumes that climate events of extreme severity may lead to economic losses during the projection horizon. A major climate related event is assumed in the first year of projections horizon – e.g., a recurrence of rains and floods like the previous year; although we avoid framing assumptions regarding exact nature and timing owing to hard-to-predict nature of such events.

A rise in geopolitical tensions may lead to resurgence in global commodity prices …

While *S0* assumes moderation in global commodity prices, *S1* assumes the converse.

[106] U.S Energy Information Administration (EIA), Brent oil prices may average USD 85 per barrel in CY23 and may fall to USD 81 per barrel in CY24. World Economic Outlook by IMF (April 2023) also forecasts downward trend in oil prices.

The intensification of ongoing Russia-Ukraine war and the resulting fresh sanctions on Russia — the second largest crude oil exporter[107] — may lead to severe supply disruptions in the oil market. Resultantly, *S1* assumes that the oil prices may rise to USD 95 per barrel by the end of CY23, before gradually declining to USD 84 per barrel by end of CY25. Additionally, considering the major share of Russia and Ukraine in global wheat supply, the disruptions in these countries may result in a rise in global wheat prices, which, in conjunction with the assumed weather-related shocks, may also affect the domestic economy negatively.

Tightening of global financial conditions may lead to pressure on external sector…

Although headline inflation indicators have started to recede in advanced economics, the indicators of core inflation are yet to plateau. Current situation and inflation outlook, therefore, imply that interest rates in AEs may increase further and may persist at elevated levels for longer than anticipated.[108] Further, the assumed rise in geopolitical tensions may also push up global food and energy prices, necessitating even further monetary tightening as central banks use monetary policy levers to anchor inflation expectations. *S1*, thus, assumes that financial conditions will continue to tighten in the near term, making external financing for emerging markets and developing economies (EMDEs), including Pakistan, more expensive and difficult. This may also build pressure on EMDEs' domestic currencies and may result in flight to safety.[109]

The hypothetical adverse scenario, therefore, assumes recurrence of extreme weather conditions during initial years of projection horizon alongside international commodity price pressures in the wake of intensifying geopolitical tensions. Consequently, the real economy is assumed to contract in FY23 and FY24, before resuming a moderate growth trajectory in FY25 (**Chart 4.2**). Under *S1*, the supply shocks are assumed to push inflation up in FY23 which is expected to moderate in the last two years of projection horizon but will remain at elevated levels (**Chart 4.3**).

4.5 Stress Testing Results: System Level

a) Impact on Credit Riskiness

The results of the ST exercise indicate that the gross non-performing loans ratio (GNPLR),[110] under *S0* is likely to remain on the higher side over the three-year projection horizon, given slow recovery in domestic demand, disrupted supply conditions due to climate related adverse events and fiscal consolidation (**Chart 4.4**). The lending portfolio of the banking sector may decline initially in response to a sharp deceleration of GDP from 6.1 percent in FY22 to 0.29 percent in FY23. However, the credit growth becomes positive in the second half of projection horizon. On average, advances grow by around 3.1 percent over the projection period. This reflects the risk averse behavior of the sector under assumed baseline conditions.

In line with the lagged impact of macroeconomic shocks realized in recent past and assumption of gradual recovery, the GNPLR attains the peak of 14.4 percent and settles at 13.4 percent by the end of projection period CY25.[111] This projection is 607 basis points

[107] Oil Market and Russian Supply, *International Energy Agency*.
[108] International Monetary Fund. (2023). World Economic Outlook: A Rocky Recovery. *Washington, April*. For details, please visit https://www.imf.org/en/Publications/WEO/Issues/2023/04/11/world-economic-outlook-april-2023
[109] World Bank. (2023). Global Monthly Newsletter. *Washington, March*. For details, please visit https://thedocs.worldbank.org/en/doc/abf6fab46b08d9edfcf1187e6a3e108e-0350012023/related/Global-Monthly-Mar23.pdf
[110] GNPLR = Gross Non-Performing Loans ÷ Gross Advances
[111] Please note that the results reflect an assumption of no policy interventions.

(bps) above the recorded level of 7.3 percent as of end CY22. The relatively higher GNPLR is partly explained by the reduced credit supply (gross loans) in response to the contraction of economic growth.

The asset quality indicator, under hypothetical stressed scenario, on the other hand, follows an upward trajectory because of the assumed sharp slowdown amid elevated global commodity prices and domestic supply shocks, which may also significantly affect the credit supply of the banking system. Under *S1*, the lending portfolio is projected to contract, on average, by 2.6 percent over the projection period. The delinquency rate peaks at around 20.1 percent and remains elevated until the end of projection horizon (**Chart 4.4**).

Chart 4.2: Real GDP Growth

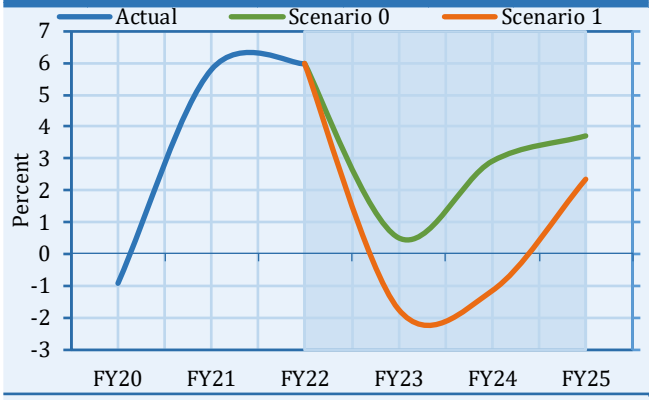


Chart 4.3: Inflation

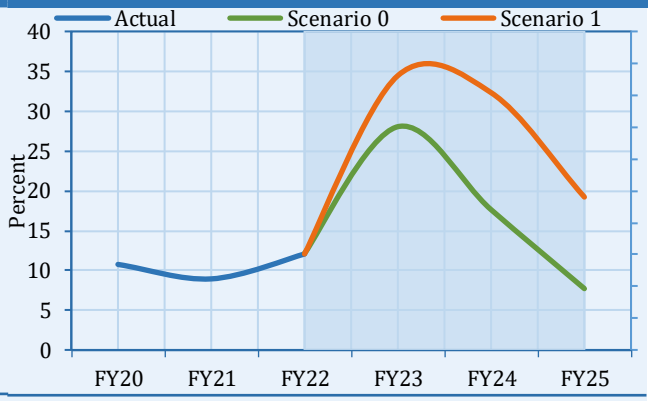


Chart 4.4: System-Level Gross Non-performing Loans Ratio

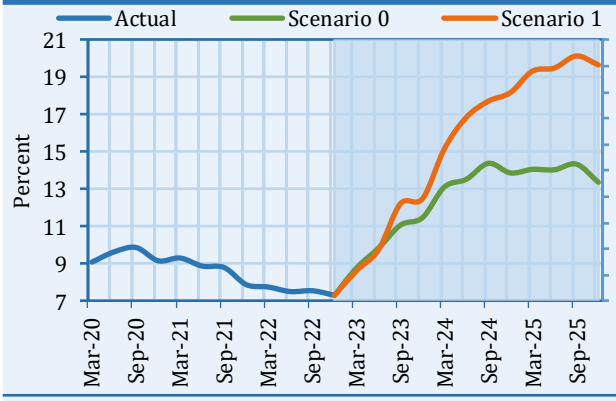
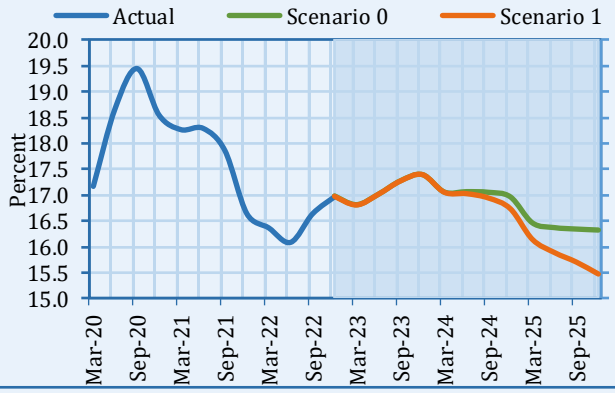


Chart 4.5: System-Level Capital Adequacy Ratio



Source: SBP Calculations

b) Impact on Solvency

The impact on solvency is measured via the Capital Adequacy Ratio (CAR) of the banking system.[112] The CAR of banking system initially increases to 17.4 percent in both scenarios and then declines. The key reason behind an initial rise in CAR is the decline in risk-weighted assets, which in turn may be attributed to an increase in credit risk during uncertain macroeconomic environment and consequent cautious lending behavior of banks. Further, a consistent rise in interest rates and portfolio re-balancing of banks to risk-free investments may bring profits to banks' income statement and

[112] CAR = Eligible Capital ÷ Risk Weighted Assets

may lead to a rise in capital (**Chart 4.5**) without increasing risk-weighted assets.

In the second half of projection horizon, however, losses due to anticipated credit risk may outweigh the impact of declining RWAs as proportionate decline in capital exceeds the decline in RWA, leading to a fall in CAR. Under the baseline, the CAR of the banking system shrinks by 66 bps by the end of CY25 from the prevailing level of 17 percent. However, in stress scenario, the CAR remains 151 bps lower than the current level and 85 bps below the baseline projection.

Positively though, under both the scenarios, the banking industry maintains its CAR above the local minimum regulatory requirement of 11.5 percent and global benchmark of 10.5 percent during the entire period of projection horizon.

The resilience of the banking sector, despite the substantial level of assumed slowdown in real economy, can be justified based on following facts. First, the banking sector is already maintaining higher capital buffers – a hefty 548 bps above the required regulatory benchmark of 11.5 percent. Second, the release of 100 bps capital conservation buffer during COVID-19 has not been reversed yet, which gives banks additional liquidity. Third, favorable overall repricing gaps amidst assumed policy rate movements provide further cushion during times of stress. Finally, the sector's historical behavior has been to re-balance asset portfolio from riskier private sector loans to risk-free treasury investments. Moreover, the banks in general follow a conservative lending strategy and prefer to lend to borrowers with better credit worthiness as well as capacity to withstand macroeconomic shocks.

4.6 Stress Testing Results – Cross Sectional Dynamics of Banking Segments

In line with the system-level credit risk analysis, infection ratios of banking segments (small, medium and large sized banks)[113] have also been projected separately. This aspect of the banking industry is included to assess how cross-sectional heterogeneity affects the resilience of banks against various macroeconomic risks.

For GNPLR, system-level projections of NPLs and gross advances are distributed proportionately based on the contribution of each segment to the aggregate loan portfolio of the banking system as of December 2022. Similarly, capital is also distributed proportionately to compute segment level CARs.

(a) Large Banks

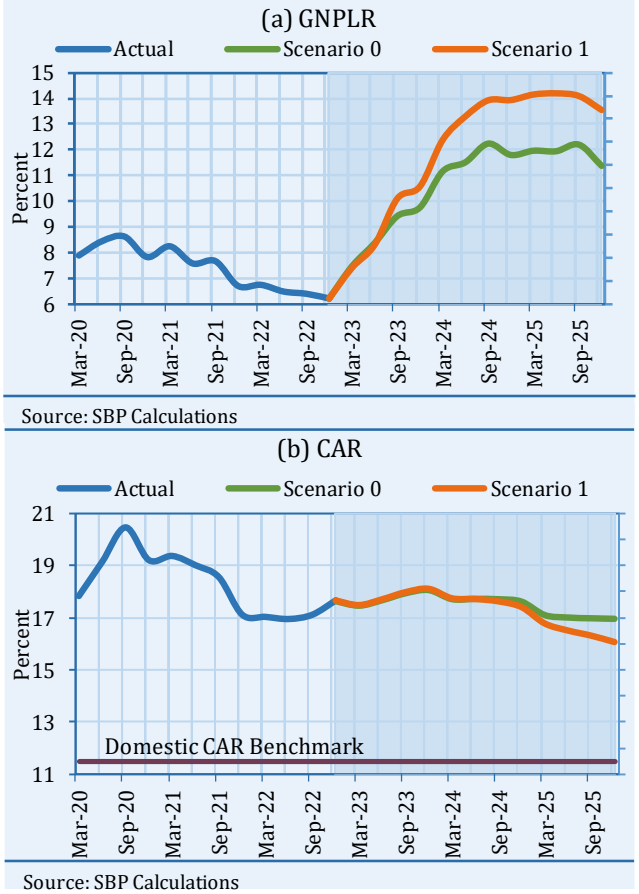
The large banks segment - comprising 70.7 percent of the banking sector's assets – under *S0* witnesses an increase of 516 bps in GNPLR by end-CY25 from its current level of 6.2 percent. Under *S1*, however, the infection ratio rises by 733 bps by the end of projection horizon. The CAR decreases by 68 bps in the baseline scenario and falls by 157 bps in the stressed scenario from prevailing level of 17.7 percent over the projection horizon (**Chart 4.6**). The CAR remains 548 bps higher than the local benchmark in *S0* while staying 459 bps above the minimum requirement under *S1*.

The large banks are generally well-placed to withstand stress over the simulation horizon (**Chart 4.6 (b)**). Higher capital buffers available with larger banks are the likely factor behind this resilience. Incidentally, these banks generally have relatively lower costs of funds due to their wider outreach giving them a

[113] The categorization has been done based on balance sheet footing. The banks with assets above 70th percentile of the entire banking sector are termed as 'Large' while below 30th percentile are categorized as 'Small'. The banks falling in between these two thresholds are categorized as 'Medium' sized banks.

competitive advantage to maintain a loan portfolio of relatively better rated obligors. More importantly, the systemically important banks are also likely to remain well-capitalized and resilient to the shocks assumed in stressed scenario.

Chart 4.6: Large Banks



Source: SBP Calculations

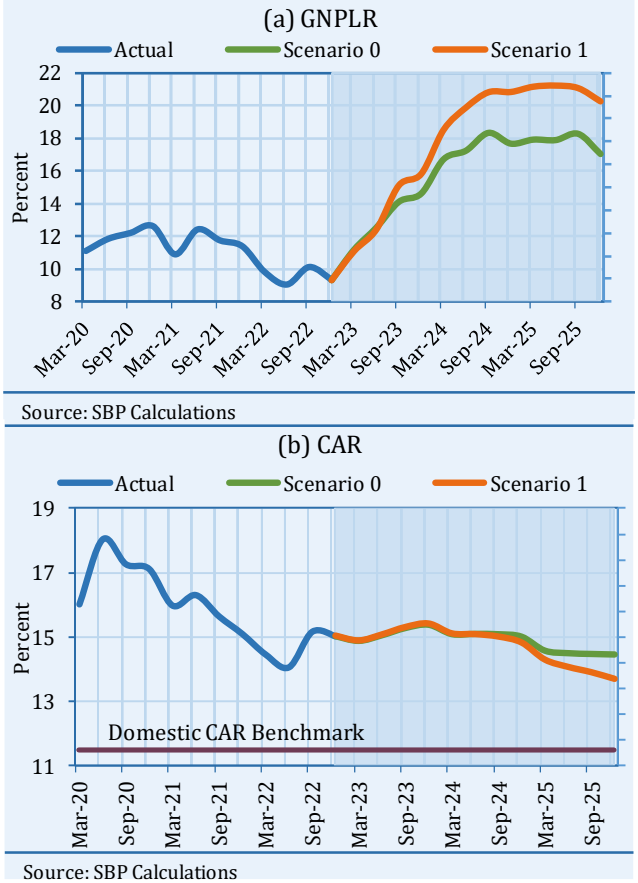
Source: SBP Calculations

(b) Medium-sized Banks

By the end of the projection period, the GNPLR of medium-sized banks (having market share 24.5 percent) increases by 774 bps and 1,098 bps in *S0* and *S1,* respectively, from existing 9.3 percent. The CAR, correspondingly, attains 58 bps and 133 bps lower level compared with the prevailing reading of 15.0 percent, under *S0* and *S1*, respectively. The medium-sized banks are, therefore, also expected to remain compliant with the regulatory CAR standards, even under the stressed scenario (**Chart 4.7**).

Their level of CAR remains 295 bps and 219 bps percentage points above the minimum regulatory requirement (11.5 percent) in *S0* and *S1*, respectively (**Chart 4.7 (b)**). Although their delinquency ratios are higher and pre-shock capital buffers are lower than the large and small banks segments, however, medium-sized banks segment also carries sufficient capital buffers and can withstand assumed shocks under stressed scenario.

Chart 4.7: Medium-sized Banks



Source: SBP Calculations

Source: SBP Calculations

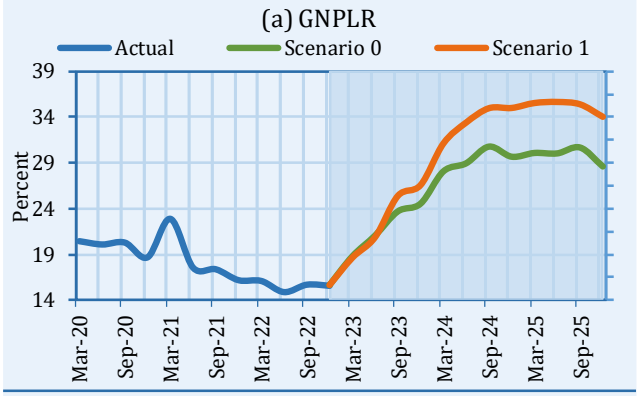
(c) Small Banks

Small banks – contributing 4.8 percent of the banking sector's asset base – are also found to be resilient against both baseline and stressed scenarios. From its existing level of 15.6 percent, the loan delinquency rate of small banks increases by 1,296 bps in *S0*, whereas it rises by 1,839 bps under *S1*, by the end of three-year horizon (**Chart 4.8 (a)**).

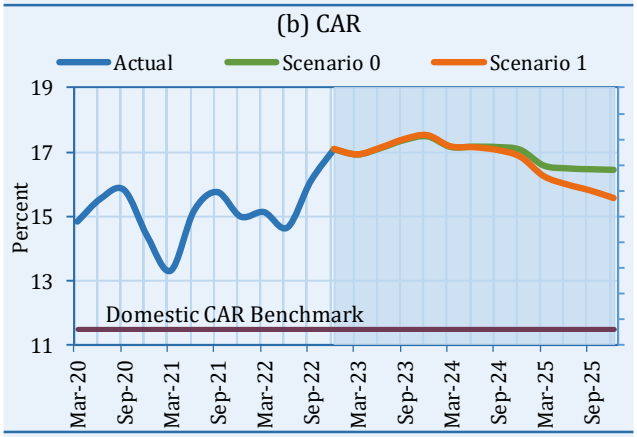
In terms of solvency, the CAR of small banks falls by 66 bps and 152 bps under *S0* and *S1* from the prevailing level of 17.1 percent (**Chart**

4.8 (a)). The CAR, however, remains 494 bps higher than the local benchmark in *S0* while staying 408 bps above the minimum requirement under *S1*. Over the period, this segment has strengthened its resilience by substantially building the capital adequacy levels.

Chart 4.8: Small Banks



Source: SBP Calculations



Source: SBP Calculations

Overall, under the baseline scenario, although the delinquency ratio rises, the solvency of the banking sector portrays an encouraging picture with capital adequacy staying well above the domestic regulatory benchmark. Under the hypothetical stress scenario as well, the banking sector is expected to withstand a severe slowdown induced by adverse global and domestic macroeconomic conditions, including the global commodity market pressures. In terms of size, all the segments of the sector (small, medium, and large) can withstand the stressful conditions as well. Reassuringly, the large size banks whose stability has particular significance for economy and financial system, carry higher capital buffers and are thus able to sustain the impact of hypothesized shocks for the projection period of three years. Also, the other two segments of banks meet the solvency criteria during the projection horizon. Furthermore, if history is any guide, the domestic banking sector has generally performed quite reasonably during severe downturns, such as the external sector crises in 2008 and COVID-19 pandemic. This is clearly visible in the results of the stressed scenario (*S1*), as the sector remains well capitalized and resilient.

That said, the exact severity, duration, and path of the current and assumed global commodity market upheaval due to adverse geopolitical tensions, commodity price shocks and climate related risks remain highly uncertain. As a result, the stress-test results are also subject to a significant uncertainty. The SBP, on its part, continues to closely watch the evolving situation and remains ready to take necessary actions for safeguarding the financial stability so that the sector continues the provision of financial services, especially the credit needs of the economy. The banks are also expected to assess the unfolding economic dynamics, review, and align their business models, and commensurately buttress capital buffers to mitigate potential impacts of any adverse credit and market risk shocks.