

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 banking sector remains stable and well above the domestic regulatory benchmark over 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 flood and droughts and any assumed disruptions to the IMF program. In terms of size, the large banks with a potential to cause systemic disruptions carry sufficiently higher capital buffers and are expected to sustain the impact of the shocks over the assessment horizon. Similarly, the medium and small sized banks are also expected to remain resilient to the shocks. Under baseline, the credit is projected to grow at a decent average rate of 14 percent. However, under stress scenario, the credit growth decelerates but remains positive, averaging 12 percent but falling to 7 percent in third year. Therefore, the banking sector, with adequate capital buffers, is expected to continue catering to the credit needs of the economy in both the baseline and stressed conditions. That said, the exact severity, duration and path of the current and assumed global commodity market upheavals due to adverse geopolitical tensions remain highly uncertain. As a result, the stress-test results are also subject to a significant uncertainty. SBP, on its part, continues to closely watch the evolving situation and shall remain ready to take whatever actions necessary to safeguard financial stability.

4.1 Background

The banking sector provides the needed grease in the form of credit to run the engines of economy. However, during stressed periods when the sector suffers losses and the capital buffers shrink, the lending is also curtailed, which further amplifies the adverse economic impacts.⁸³ The feedbacks between the real and financial sectors have been most prominently highlighted by the **GFC** of 2007-08. Since then, supervisors have enhanced the level of oversight of the financial sector and have taken measures to strengthen the resilience of the sector to withstand shocks

transmitting from the economy. At the same time, stress-testing frameworks are also being extensively used by supervisory authorities as well as multilateral agencies to assess the resilience of the banking sector to certain 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 the different *assumed* scenarios.

SBP has been conducting this exercise internally on a quarterly basis since 2005. For external stakeholders, detailed stress-testing results and

⁸³ See e.g., (1) Aizenman, J., Pinto, B., & Sushko, V. (2013). Financial sector ups and downs and the real sector in the open economy: Up by the stairs, down by the parachute. *Emerging Markets Review*, 16, 1-30.

(2) Peek, J., Rosengren, E. S., & Tootell, G. M. (2003). Identifying the macroeconomic effect of loan supply shocks. *Journal of Money, Credit and Banking*, 931-946.

(3) Jokipii, T., & Monnin, P. (2013). The impact of banking sector stability on the real economy. *Journal of International Money and Finance*, 32, 1-16.

assessments are being published annually in the FSRs since 2007-08 and quarterly results are also shared via Quarterly Compendium: Statistics of Banking System. The stress-testing framework at SBP is being continuously revamped and strengthened. Besides, for the institutions falling under its supervisory ambit, SBP has also issued a comprehensive set of stress testing guideline for conventional bank, Islamic banks, Islamic branches of conventional banks, DFIs and MFBs. The guidelines require these institutions to assess their resilience on regular basis.⁸⁴ Importantly, the sample of **D-SIBs** are now required to conduct macro-stress testing under various scenarios to gauge their level of resilience to shocks.

4.2 Overview of Scenario Design

The current year's stress testing exercise consists of assessment of resilience of the sector under *baseline* and *hypothetical stressed* scenarios. Both scenarios are built on the basis of key internal and external risk factors including domestic future waves of pandemic, extreme weather conditions, evolving political dynamics, intensified geopolitical tensions leading to higher commodity prices, risks to possible continuation of IMF program, rising debt levels and tightening global financial conditions. The two scenarios differ in terms of assumptions regarding materialization and intensity of risk factors.

The *baseline scenario* traces the path of macro-financial variables under the current dynamics of the global and domestic economy.⁸⁵ On the other hand, the *hypothetical stress* scenario assumes

recession on the back of vaccine-resistant variants, extreme weather conditions causing floods and droughts, elevated international commodity prices led by intensified geopolitical tensions (Russia-Ukraine war) and domestic political uncertainty.⁸⁶

Against the backdrop of economic challenges, the impact of both scenarios for the domestic macro-financial stability is investigated over the projection horizon of next three years: Q1CY22 to Q4CY24.

The implications of assumed changes in macroeconomic indicators such as output, inflation, interest rate, current account balance and exchange rate on the health of the banking sector have been captured via non-performing loans, profitability and capital adequacy. Specifically, 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.

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.

⁸⁴ Recent review and enhancement in the stress testing guidelines has been made in September 2020 ([FSD Circular No 01 of 2020](#)).

⁸⁵ For a detailed discussion of key issues relevant to global and domestic economic environment, please see Chapter 01.

⁸⁶ 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 to be L-shaped with slight recovery towards the end of projected period. Owing to high level of severity in the stressed scenario, recovery takes a longer time compared with the baseline scenario.

Given the interaction between real and financial sectors, a suite of vector autoregressive (**VAR**) and Bayesian VAR models has been employed.^{87,88}

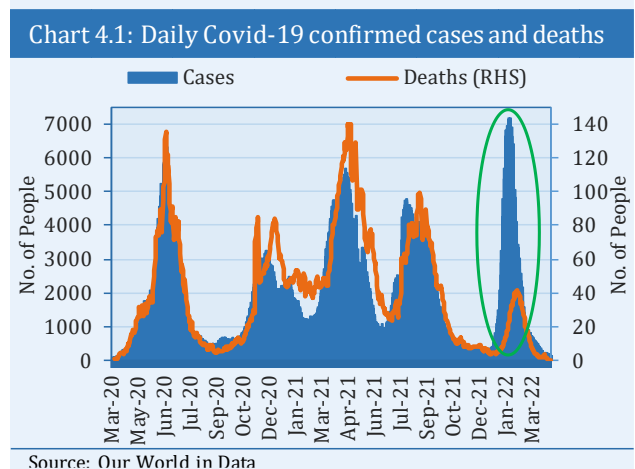
In terms of risk coverage, the resilience of the banking sector has been assessed against credit, market (interest rate and exchange rate) and operational risks. In addition to the aggregate assessment, cross-sectional heterogeneity has also been captured for the different segments of the banking industry in terms of size, i.e., small, medium and large banks.

4.3 Baseline Scenario

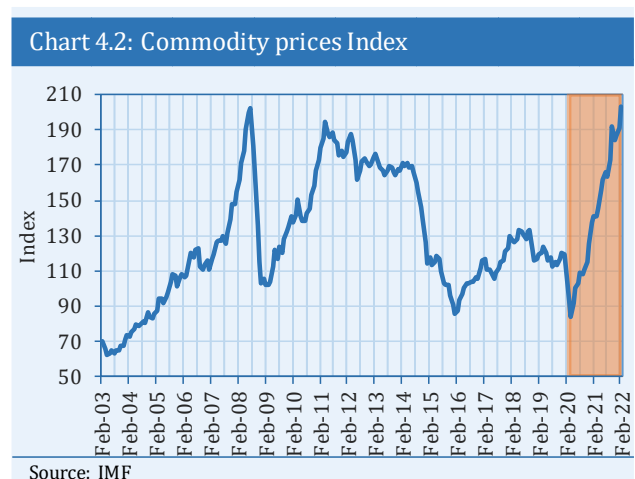
The baseline scenario, *Scenario 0 - S0*, is built around three assumptions regarding global and domestic risk factors.

COVID-19 is likely to remain contained in terms of transmission and economic impact

First, assuming a low probability of new vaccine-resistant variants, COVID-19 is likely to remain contained in global and domestic setting. Moreover, enhancement in the testing capacity and increased vaccination rate (**Chart 1.11**) over the last two years have already brought down death rate in the country. During the recent wave that started in Jan-22, the death rate remained much lower relative to previous waves (**Chart 4.1**).



Global commodity prices are expected to remain elevated in near term before gradually declining by the end of assessment horizon



Second, the global recession caused by the pandemic in early 2020 led to a widespread fall in commodity prices. This fall was followed by a synchronized sharp rebound in prices starting in Apr-20 (**Chart 4.2**). The oil prices increased primarily due to a quick recovery in demand, the disruptions in supply chain due to COVID and, more recently, due to geopolitical tensions in Eastern Europe.⁸⁹ According to the latest forecast

⁸⁷ For details, please see 'Box 4.1 Technical Details' of Chapter 4: Resilience of the Banking Sector, Financial Stability Review 2016, SBP.

⁸⁸ 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).

⁸⁹ [World Economic Forum \(2022\). Why do oil prices matter to the global economy? An expert explains. Cologny.](#)

of U.S Energy Information Administration (EIA), Brent oil prices may average USD102 per barrel in H2CY22 and may fall to USD 93 per barrel in CY23.⁹⁰ Based on oil futures, *S0* therefore assumes a gradual decline to USD 80 per barrel by the end of projection horizon, i.e., Q4CY24.

Domestic political environment is likely to remain stable, allowing successful implementation of reforms under IMF's EFF program

Third, after recent change of government in Apr-22, domestic political situation is likely to stabilize, allowing successful implementation of needed reforms under IMF's EFF. Against this backdrop, fiscal policy measures to contain energy sector subsidies may, however, push inflation up. On the other hand, recent monetary authority's measures are likely to moderate growth momentum as well. On positive side, successful implementation of reforms is likely to keep twin deficits and public debt under check while boosting investors' confidence.

Apart from the three major assumptions mentioned above, *S0* also incorporates impacts of reversal of monetary policy in advanced economies, but assumes availability of external financing avenues.

In this perspective, *S0* assumes GDP to grow by around six percent in FY22. However, growth is expected to slowdown in FY23 on account of assumed stabilization measures before regaining upward trajectory in FY24. Further, CPI inflation may stay at elevated levels during FY22 and FY23 before moderating during FY24.

[Switzerland, February](#). Weforum.org. Accessed on May 1, 2022

⁹⁰ Energy Information Administration (2022). [Short-Term Energy Outlook, United States, April](#). Accessed on May 27, 2022

4.4 Hypothetical Stressed Scenario

The stress scenario, *Scenario 1 - S1*, is built around following assumptions regarding global and domestic risk factors.

With a rise in geopolitical tensions, global commodity prices may soar up further

While *S0* assumes a gradual decline in global commodity prices, *S1* assumes the opposite. The ongoing Russia-Ukraine war and the resulting sanctions on Russia – the third largest oil exporter— may lead to disruptions in supply in world oil markets. Resultantly, *S1* assumes that the oil prices may rise to USD 130 per barrel by the end of CY22 before gradually declining to USD 110 per barrel by end of CY24. Additionally, Russia and Ukraine being major wheat suppliers, the supply disruptions may result in a rise in global wheat prices, which may also affect the domestic economy negatively.

A rise in domestic political uncertainty may also involve adverse economic impacts...

S1 incorporates the impact of a rise in domestic political uncertainty that can negatively affect domestic economy in several ways. First, it may dampen investor and consumer sentiments, thereby deteriorating aggregate demand, output and employment. Second, it may push up Pakistan's risk premium, making access to external financing costlier and more difficult. Finally, it may lead to a compromise on reform agenda agreed under IMF's EFF program.

Global financial conditions may tighten

Despite rising inflation in advanced economies and emerging markets (**Chart 1.4**), the global

financial conditions remained accommodative until Dec-21. However, driven by persistently rising inflationary pressures and Ukraine-Russia conflict, Global Financial Conditions Index have lately been showing a tightening trend since Mar-22 (**Chart 4.3**). Additionally, the Federal Reserve increased policy rate by 25 bps and signaled multiple rate hikes during 2022 at its meeting in Mar-22.⁹¹ *S1*, thus, also assumes that financial conditions will continue to tighten in the near term, making external financing for emerging markets more expensive.

Chart 4.3: Goldman Sachs Global Financial Conditions



Source: Bloomberg

Extreme weather conditions pose a risk to macro-financial stability

Global warming and the consequent climate change have been postulated to lead to extreme weather conditions causing droughts, floods, famine and cyclones. Historically, Pakistan has been a victim of a series of extreme weather related catastrophes such as, severe droughts (1998-2002), massive flooding (2010, 2020), extreme heat waves (2015), heavy rainfalls (2020), 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 has remained 8th most affected country by climate changes in terms of human and output losses. According to Long-Term Climate Risk Index (**CRI**) 2021, during last two decades (2000-2019), Pakistan experienced 173 climate related extreme events. It has thus been included in the category of countries that are recurrently affected by the catastrophes and continues to be ranked among the most affected countries both in the long-term index and in the index for each respective year. On production side, around one-fifth of the domestic production is directly contributed by agriculture sector. Further, the sector's interlinkages with industry and services sectors make it a key driver of the overall economic growth. However, agriculture sector is highly prone to global warming and natural calamities such as periodic floods, droughts, extreme temperatures and untimely heavy rainfalls.

Amid this backdrop, the adverse scenario (*S1*) assumes occurrence 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 growth is assumed to fall to around one percent in FY23 from around six percent in FY22. Growth is assumed to show a mild recovery in FY24. Under *S1* the supply shocks are assumed to push inflation higher to around 12 percent in FY22 and 17.5 percent in FY23 before expected moderation to 13.9 percent in FY24.

4.5 Stress Testing Results: System Level

a) Impact on Credit Riskiness

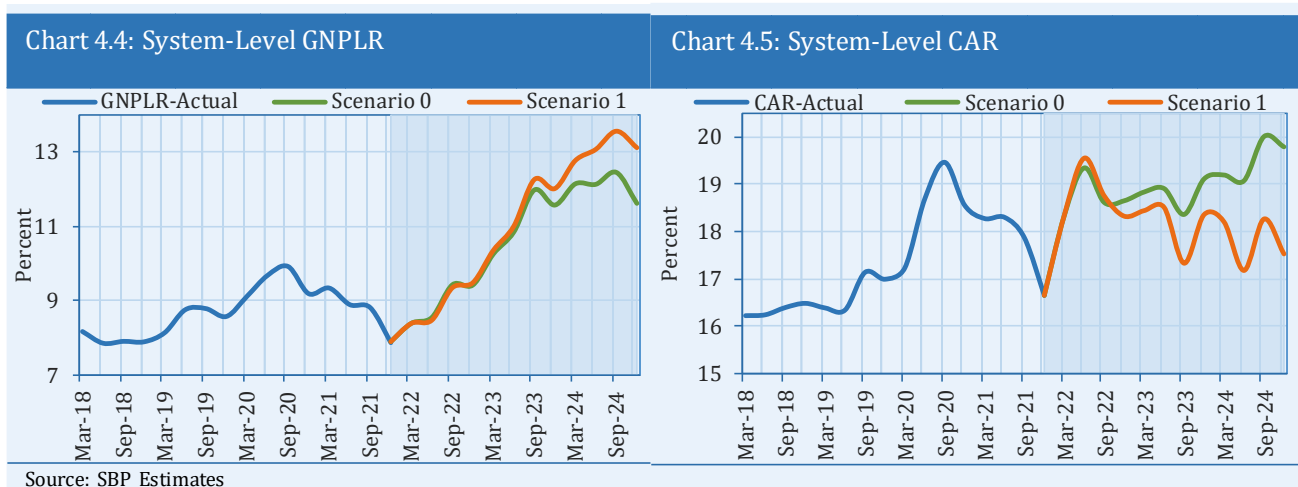
The results of the stress test exercise indicate that the **GNPLR**, under *S0* is likely to remain on

⁹¹ World Bank Global Monthly Newsletter – March 2022 issue

higher side over the three-year projection horizon, given slow recovery in domestic demand, reconciled supply conditions and fiscal consolidation under IMF-EFF stabilization program (Chart 4.4). The lending portfolio of banking sector may expand, on average, by around 14.37 percent over the projection period.

The GNPLR attains the peak of 12.43 percent and settles at 11.60 percent by the end of projection

period CY24. This projection is 371 bps above than the recorded level of 7.89 percent as of end CY21. This is mainly in line with our assessment of the domestic economy, where gradual recovery in identified macroeconomic indicators may imply the slight buildup of the credit risk in the banking sector. A reasonable but decelerating growth in its denominator i.e. advances, also explains relatively higher GNPLR.



The asset quality indicator, under hypothetical scenario, *S1*, 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*, growth of lending portfolio is projected to decelerate to an average of 11.8 percent over the projection period, while the delinquency rate peaks at 13.56 percent before settling at 13.12 percent by the end of projection horizon (**Chart 4.4**).

b) Impact on Solvency

The impact on solvency is measured via the **CAR** of the banking system. As explained in the scenario design, besides credit risk, two other risks are likely to have an impact on solvency: market risk, realized via movements in interest and exchange rates, as well as operational risk. These three risks, therefore, have also been factored in while analyzing the impact of each scenario on capital as well as risk-weighted assets. Under the baseline scenario, the CAR of the banking system increases by 313 bps by Q4CY24 from the prevailing level of 16.7 percent. The major impact comes from the favorable gaps in risk sensitive assets and liabilities, which result in plough back of profits in the capital (**Chart 4.5**). However, in stress scenario the CAR remains higher than the current level, but 226 bps below the baseline.

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 percent during the entire period of projection horizon.

The resilience of the banking sector, despite substantial level of assumed slowdown in real economy, can be justified based on following facts. First, the banking sector is maintaining sufficiently higher capital buffers than 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 policy rate movements provide further cushion during the times of stress as the sector aggressively re-balances portfolio from riskier private sector loans to risk-free treasury investments. Finally, reasonably high credit growth even during stress period also supports the profitability and hence the capital. Moreover, the banks in general follow a conservative lending strategy and prefer to lend to borrowers with better credit worthiness as well as the capacity to withstand macroeconomic shocks.

4.6 Stress Testing Results – Banking Segments

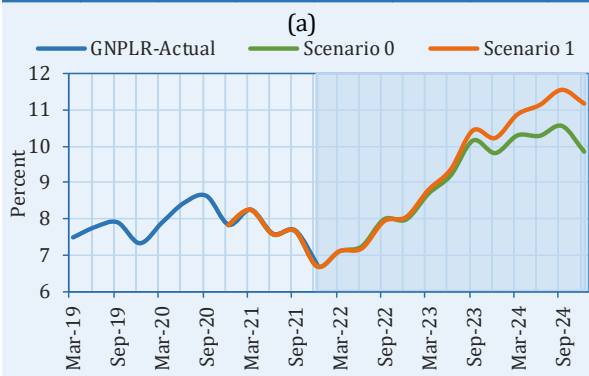
In line with the system-level credit risk analysis, infection ratios of banking segments (small, medium and large sized banks)⁹² have also been projected. This aspect of the banking industry is included to assess how cross-sectional heterogeneity affects the resilience of banks against various macroeconomic risks.

For GNPLR, system-level projections of non-performing loans and gross advances are distributed proportionately based on the contribution of each segment to the loan portfolio of the entire banking system as of Dec-21. Similarly, capital is also distributed proportionately to compute segment level CARs.

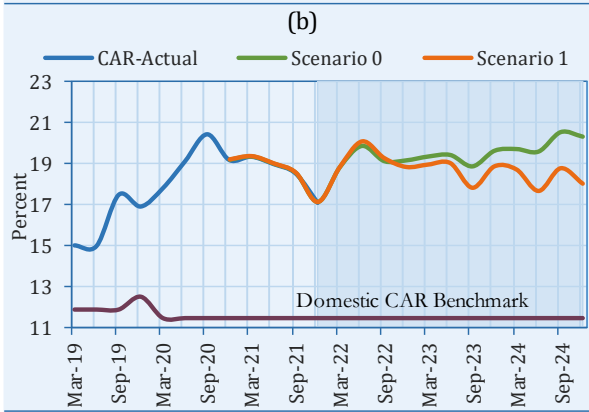
⁹² The categorization has been done based on balance sheet footing. The banks with assets above 70th percentile of the entire banking sector are termed as 'Large' while

below 30th percentile are categorized as 'Small'. The banks falling in between these two thresholds are categorized as 'Medium' sized banks.

Chart 4.6: GNPLR and CAR: Large Banks



Source: SBP Estimates



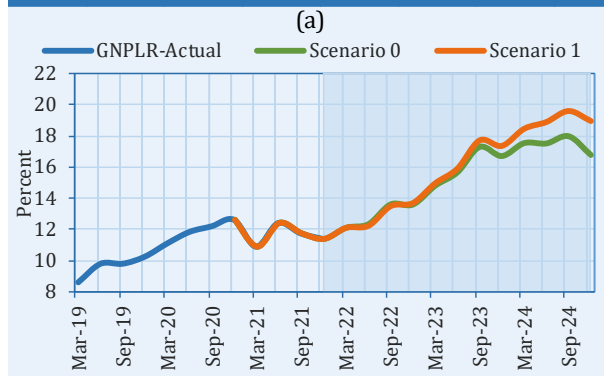
Source: SBP Estimates

(a) Large Banks

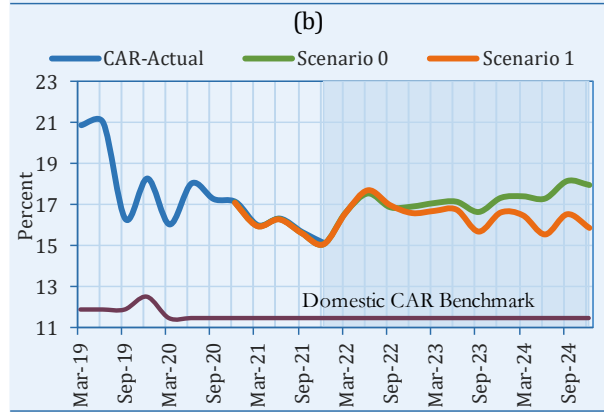
The large banks segment - comprising 78.65 percent of the banking system – under *S0* witnesses an increase of 316 bps in GNPLR by the end of CY24 from its current level of 6.71 percent. Under stress (*S1*), however, the infection ratio rises by 445 bps by the end of projection horizon. The CAR also increases by 322 bps and 89 bps in the baseline and stress scenarios from the prevailing level of 17.11 percent over similar horizon (**Chart 4.6**), respectively. The CAR remains a hefty 883 bps higher than the local benchmark in *S0* while staying 650 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)**). Sufficiently higher capital buffers available with larger banks are a likely factor behind this resilience. More importantly, the systemically important banks are also likely to remain well-capitalized and resilient to the shocks assumed in stress scenario.

Chart 4.7: GNPLR and CAR: Medium-sized Banks



Source: SBP Estimates



Source: SBP Estimates

(b) Medium-sized Banks

By the end of the projection period, the GNPLR of medium-sized banks (asset share 17.33 percent) increases by 535 bps and 754 bps in *S0* and *S1*, respectively, from existing 11.37 percent. The CAR, correspondingly, attains 284 bps and 79 bps higher levels under the two scenarios compared with prevailing reading of 15.10 percent. The medium-sized banks are, therefore, also expected to remain compliant to the regulatory CAR standards, even under the stress scenario (**Chart 4.7**).

Their level of CAR remains 644 bps and 439 bps percentage points above the minimum regulatory requirement (11.5 percent) in *S0* and *S1*, respectively (**Chart 4.7 (b)**). Though their delinquency ratios are higher and pre-shock capital buffers are lower than the large banks segment, this segment carry sufficient capital buffers and have the ability to withstand the assumed shocks under stress scenario.

(c) Small Banks

Small banks – constituting 4.02 percent of the banking system – are also found to be resilient against both scenarios. From its existing level of 16.22 percent, the loan delinquency rate of small banks increases by 764 bps in *S0*, whereas it rises by 1076 bps under *S1*, by the end of three-year horizon (**Chart 4.8 (a)**). This is the highest level of infections in any segment of banks under stress scenario.

Since small banks have comparatively lower lending exposure, the assumed increase in delinquencies does not have significant impact on their CAR, which rises by 282 bps in *S0* and 78 bps under *S1* from the prevailing 15.01 percent (**Chart 4.8 (a)**). Over the period of time, this segment has strengthened its resilience by substantially building the capital adequacy levels.

Overall, under the baseline scenario, the solvency of the banking sector portrays an encouraging picture with the delinquency ratio mostly hovering between 8-10 percent (current level 7.9 percent) 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 (small, medium and large) can withstand the stress conditions as well. Reassuringly, the large size banks whose stability has particular significance for economy and financial system, carry sufficiently higher capital buffers and are thus able to sustain the impact of hypothesized shocks for projection period of three years. Also, other two segments of banks never breach the solvency criteria during the projection horizon. If history is any guide, the domestic banking sector has generally performed quite well even during the severe downturns, e.g., 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 remains highly uncertain. As a result, the stress-test results are also subject to a significant uncertainty. SBP, on its part, continues to closely watch the evolving situation and remains ready to take necessary actions for safeguarding the financial stability.

