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CAN GULF BANKS PASS THE CCAR STRESS TESTS?

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Abstract

The absence of a uniform standard for stress tests is a key challenge today for Central Banks in the Gulf. This paper utilizes the Dodd-Frank 2010 Comprehensive Capital Analysis and Review (CCAR) stress test to assess the balance sheets of 3 of the largest 10 banks in the GCC countries. To our knowledge, this is the first study in the literature that evaluates banks in the region across the (CCAR) stress test scenarios. We follow a top-down approach using a VAR model and measure the impact of macro-economic and financial indicators on the capital ratio, loan loss provision, and a bank's ROA. The results are then used to project these variables using 3 sets of scenarios currently performed by the large banks in the US, mandated by the Federal Reserve System. Our results show that Riyadh Bank and Qatar National Bank pass the most severe scenarios, but the National Bank of Kuwait fails both stress scenarios, potentially falling out of compliance with the Basle II requirements. The implications suggest that while the capital of the Gulf region largest banks is above regulatory requirements during normal conditions, the situation could change dramatically in stressed environments.

JEL Classification: G2; E5

Keywords: Central Banks; Gulf Countries; Comprehensive Capital Analysis and Review (CCAR) stress test

ملخص

عدم وجود معيار موحد لاختبارات الضغط هو التحدي الرئيسي اليوم في البنوك المركزية في الخليج. تستخدم هذه الورقة تحليل رأس المال الشامل لدود-فرانك 2010 واستعراض اختبار الإجهاد لتقييم الميزانيات العمومية لثلاثة من أكبر عشرة بنوك في دول مجلس التعاون الخليجي. على حد علمنا، تعتبر هذه الدراسة هي الأولى في الأدب أن يقيم البنوك في المنطقة عن سيناريوهات اختبار التحمل. نتبع نهج من أعلى إلى أسفل باستخدام نموذج (فار) وقياس تأثير المؤشرات الاقتصادية الكلية والمالية على نسبة رأس المال وتوفير خسائر القروض، والعائد على الأصول للبنك. ثم يتم استخدام النتائج لإبراز هذه المتغيرات باستخدام 3 مجموعات من السيناريوهات التي يؤديها حالياً المصارف الكبيرة في الولايات المتحدة، بتكليف من النظام الاحتياطي الفيدرالي. نتائجا تظهر ان بنك الرياض وبنك قطر الوطني تستطيع ان يمر خلال معظم السيناريوهات، ولكن فشل بنك الكويت الوطني على حد سواء في سيناريوهات الإجهاد، ويحتمل سقوطه من الامتثال لمتطلبات بازل 2. وتشير الآثار أنه في حين أن رأس المال الذي يخص المنطقة لأكبر البنوك الخليجية فوق المتطلبات التنظيمية خلال الظروف العادية، فإن الوضع يمكن أن يتغير بشكل كبير في بيئات أكثر توتر.

1. Background

The financial crisis of 2008 prompted the introduction of laws and regulations aimed at strengthening the capital requirements of financial institutions in general and commercial banks in particular. The Dodd-Frank Wall Street Reform and Consumer Protection Act became law in the United States in July 2010. The law was passed to address systemic weaknesses made apparent by the financial crisis, end the “too big to fail” double standard that gave large banks an unfair advantage, and protect consumers from abusive practices by the financial services industry. Among its myriad provisions, Dodd-Frank compels banks to perform several stress tests. Currently, the annual assessment of a bank’s capital strength is done through 2 programs:

- The Comprehensive Capital Analysis and Review (CCAR) evaluates a bank’s capital adequacy, capital adequacy process, and its planned capital distributions, such as dividend payments and common stock repurchases. As part of CCAR, the Federal Reserve evaluates whether a bank has sufficient capital to continue operations throughout times of economic and financial market stress and whether they have robust, forward-looking capital planning processes that account for their unique risks.
- Dodd-Frank Act supervisory stress testing is a forward-looking quantitative evaluation of the impact of stressful economic and financial market conditions on bank capital. This program serves to inform the Federal Reserve, the financial companies, and the general public, how these institutions’ capital ratios might change during a hypothetical set of adverse economic conditions as designed by the Federal Reserve. In addition to the annual supervisory stress test conducted by the Federal Reserve, each bank is required to conduct annual company-run stress tests under the same three supervisory scenarios and conduct a mid-cycle stress test under company-developed scenarios.

In the US, stress testing is required from all banks that have consolidated assets of \$50 billion or more. The stress testing is done under CCAR where a bank balance sheet is reproduced under a variety of stressed scenarios in order to evaluate the capital adequacy of the institution. From the bank data, the Federal Reserve Bank calculates capital, losses, expenses, and revenues ratios under the stressed environment for each of the large banks. In addition, the stress tests are used to measure if a bank can continue to satisfy the various ratios such as ratio of tier 1 common capital to risk weighted assets of at least 5% under both normal and stressed situations.

2. Motivation

This study is motivated by the absence of a uniform measure which can forecast banks expected value at risk estimation based on different economic conditions in the MENA region, and by the applicability and benefit of using the CCAR stress test across banks under different economic scenarios. In the MENA region, the application of stress testing on banks is currently selective. Banks are encouraged to implement stress tests for good hygiene but there is no regulatory mandate requiring the banks to file any results with their central banks or comply with specific rules other than the capital adequacy rules under Basle II and their transition to Basle III. For example, in Saudi Arabia, the Saudi Arabian Monetary Agency (SAMA) conducted its own stress tests on the country’s largest banks and concluded that they were safe¹. In Kuwait, the Central Bank asked the large banks to conduct their own stress tests as a precaution. The Central Bank detailed its three-pronged approach to stress-testing of the country’s banks and outlined the measures it has taken to upgrade its oversight efforts, including extensive stress-testing. The Kuwaiti Central Bank stated that it has taken the "necessary measures" to strengthen banks' risk management by "assuring and examining the effectiveness of the financial stress tests" they run². A similar stand was adopted by the IMF³.

¹ See Saudi Gazette, 2011.

² Kuwait Central Bank Annual report for the fiscal year ending in March 2013.

³ The National, 2010.

These stress tests however were performed under a vastly different economic landscape and where oil prices were significantly higher than they are today. What impact will the current level of oil prices or further declines will have on the capitalization of the large GCC banks is not clear. What is clear, is that the credit risk at many of these institutions as reported by banks themselves in their latest financial disclosures are significantly higher today than one year ago. For example, in Saudi Arabia, the National Commercial Bank quarterly report for March 2015 shows a decline in Core Capital from 15.6% to 14.7%. At the largest GCC bank in terms of asset, Qatar National Bank, the decline in capital ratio was from 16.2% to 15.1%, and at Abu Dhabi Commercial Bank, the decline was from 17% to 15.7%. While the new capital ratios are still in excess of the 12% typically required by the Central Bank in each country, these changes are only capturing 6 month worth of low oil prices. What capital ratios the GCC banks will achieve should oil prices remain low or slide further is unknown.

In the GCC countries, outside the Central Bank, little is known today about the results of these stress tests. Banks do not reveal the outcome of the tests they performed nor disclose the details of what risks or vulnerabilities they face. Unlike the US or Europe, the stress test results are not disclosed to the public. There is no transparency about which particular stress scenario a bank has been subjected to, or what capital shortfall or buffer a bank will need to survive a major downturn. In addition, the stress tests are not consistent across the GCC countries. What may be considered a “severely adverse” scenario in country A, may actually qualify as only “adverse” in country B. So there is a need to apply a common standard across the Gulf banks particularly because the composition of their economies is closely similar.

In a recent analysis, the Bank of International Settlements (BIS) and the IMF have concluded that following the financial crisis, the stress tests conducted by the individual Central Banks, the banks themselves, even the IMF own staff, were not always able to identify the right risks and exposures⁴. The IMF indicated that the tests frequently failed to provide sufficient early warning of potential vulnerabilities to shocks (Borio and others, 2012). In some cases, the simulated shocks and resulting impact were not sufficiently severe because outside pressures intervened to water down the possible realization of an extreme scenario. In other cases, the IMF found that the stress tests that banks are performing today are not meaningful because they are designed poorly, their techniques is inadequate, or their specification fails to capture complex financial instruments. Unsurprisingly, these factors are similar to those identified in several “lessons learned” articles that blamed prior stress tests for their lack of predictive power to the financial crisis (Alfaro and Drehmann, 2009, Tarullo, 2014).

To address these issues, we propose to apply a single and uniform test design to the largest 3 banks in the GCC. Instead of ad hoc assumptions, the stress tests will be based on the same guidelines of the CCAR in the US, and which were extended to global banks by the Basel Committee (Basel 2011; Basel 2012). The outcome of the stress tests provides an unbiased and independent perspective of the strength or weakness of a particular banking institution in comparison to its peers in the region and enable a reassessment of this institution risk profile in an adverse economic scenario. These results are important for shareholders and central bank policymakers alike.

The stress tests rules we are proposing have been endorsed by the G20 leaders at their November 2011 meeting, in which Saudi Arabia is the only member from the GCC states.

3. The Model

While there are multiple types of stress testing methodologies, fundamentally, there are two broad categories – ‘Parameter Stressing’ and ‘Risk Driver Stressing’. The ‘Parameter

⁴ The IMF has acknowledged that, *after* the financial crisis its own stress tests and those of the Central Banks had major shortcomings (Jobst et al 2013).

Stressing’ approach is intuitive and simple. The default rate is directly stressed without evaluating or worrying about the fundamental default risk drivers. In the ‘Risk Driver Stressing’ approach, the drivers of model parameters (such as the Probability of Default (PD)) are stressed and an estimate of the parameter is computed based on the stressed values of the risk drivers. Figure 1 highlights the different types of techniques available under each of these categories:

Our analysis focuses on the Risk Driver Stressing, consistent with the recommendations endorsed by the G20 countries and the stress testing methodology currently in effect under CCAR for US banks. This methodology is typically used to capture the impact of the movements in macro-economic indicators on default rates in a multivariate setting. This methodology has gained a lot of traction in the recent past when the US Federal Reserve released its CCAR projections on several macro-economic indicators (e.g. GDP, Unemployment Rate, Oil Prices, Bond Yields, and Personal Consumption Index etc.).

We follow the multivariate analysis approach in two stages. In the first stage, the bank provision for loan losses, aggregated at the portfolio level, is modeled against a selected set of internal and macro-economic drivers using a vector auto-regression (VAR) technique. In the second stage, once the time series VAR equations have been established between the portfolio default rate and independent drivers (internal and macro-economic), they are used to project a bank capital asset ratio and return on assets for a set of CCAR scenarios. The CCAR scenarios include projections under Baseline, Stressed, and Severely Stressed environments. The details of the CCAR scenarios are described in the Appendix. From earlier experiences with applications on US and European banks, this approach is perceived to have two key advantages:

- • It captures both specific and systematic risks effectively
- • It tends to have high accuracy in measuring the impact on capital from future credit losses

The tests are applied to three of the 10 largest banks in the Gulf ranked according to their total assets. Each bank is located in a particular Gulf country: Qatar, Kuwait, and Saudi Arabia. The 3 banks are ranked No. 1, 6, and 9 in terms of assets. As required by the CCAR test guidelines, the data is composed of a minimum of 10 years of quarterly observations obtained from Bankscope (2004-2015) as shown in Table 1.

4. Data and Econometric Methodology

The model takes the following form of a structural vector autoregression with exogenous variables as:

$$Y_t = a_0 + A_1 Y_{t-1} + \dots + A_p Y_{t-p} + B_1 X_{t-1} + \dots + B_q X_{t-q} + U_t \quad (1)$$

Where Y_t and X_t are vectors of endogenous and exogenous variables, a_0 is a vector of intercepts, the A_j 's are $k \times k$ coefficient matrices, the B_i 's are $k \times m$ coefficient matrices, and U_t is the vector of errors uncorrelated with the vector X_t . Model (1) is applied to each bank for a total of 3 VARs. The endogenous and exogenous vectors consist of the following:

Endogenous variables in Y_t :

- The capital to asset ratio in quarter t
- The provision for net losses as a percent of total loans in quarter t
- Net income as a percent of total assets (Return on Assets ROA) in quarter t

Exogenous variables in X_t . The Exogenous variables are divided into 2 groups:

Exogenous Economic Variables:

- The annual growth rate in real GDP for the country where the bank is headquartered

- The annual percentage change in the volume of exports with prices held constant. So the changes measure variations in quantities only.

Exogenous Financial Variables:

- The year-on-year percentage change in the price of the future prompt month in crude oil (Brent)
- The year-on-year percentage change in the stock price index of the country where the bank is headquartered

The exogenous variables are available from Bloomberg. Each variable may enter model (1) in the log form to capture any non-linearity. This is the case of the capital to asset ratio. The model uses a multiple number of lags. Our analysis explored 1 through 4 lags and selected the most optimal and stable VAR structure.

5. Constructing CCAR Scenarios for Gulf Banks

As mentioned earlier, the Central Banks in the Gulf do not disclose the details about the scenarios of the stress tests each had performed on the institutions they regulate. They also do not produce a clear set of scenarios to recommend for their local banks. The lack of stress testing guidelines is a key challenge today for the Central Banks in the region. Across the Gulf Central Banks, there is also no consensus on a consistent set of scenarios that a bank can use to compare itself against its peers. This study takes a step in that direction. We provide a set of scenarios based on the stress tests that the Federal Reserve Bank has required from the large institutions operating in the US. The stress tests include 3 scenarios: A baseline, an adverse scenario, and severely adverse scenario. In each scenario, the key economic and financial variables are assumed to deteriorate thereby impacting the capitalization of a bank. The key economic and financial variables are listed in Table 2. The main variables pertinent to Gulf banks are GDP, unemployment, and exports. The baseline projection of each economic variable is based on the IMF forecast for each one of those countries as of January 2015 for the growth in real GDP, and exports. We omit the baseline projection for unemployment because this key variable was not statistically significant for each bank primarily because of the presence of a sizable foreign labor force in each of those countries that the local unemployment rate overlooks. Table 2 also shows the baseline projection for 2 financial variables: the future price of oil, and the stock market index. Consistent with CCAR, the baseline scenario uses the future price of oil as a benchmark. To calculate percentage changes, we measure the year on year change in the price of oil (Brent). As an example, the baseline price of oil for Q3 2016 is calculated as:

5.1 Future price of oil for delivery in sept 2016 / historical price of oil in sept 2015

The baseline for the stock market index assumes no change during the next 13 quarters. The adverse and the severely adverse projections are constructed using the CCAR tests for each of the future 13 quarters. For the growth rate in real GDP and exports, we measure the deviations from baseline and apply them to the IMF forecast for that variable. For example, the Federal Reserve assumes that in the first projected quarter, the growth rate in real GDP will slow from +3% to -0.6% and -3.9% in the adverse, and severely adverse cases. These changes represent -120% and -230% changes from the baseline. We translate these magnitudes to the three countries in our study. Specifically, we reduce the IMF forecast for the next 1st quarter by 120% and 230% to derive the GDP for Qatar, Kuwait, and Saudi Arabia in the Adverse and Severely Adverse cases. Diagrams 2 and 3 illustrate how the scenarios are constructed.

The magnitude of the percentage changes from the baseline are listed for each of the 13 quarters of the projection in Table 3 (shaded columns). A zero percent represents no change from the baseline.

An interesting observation in the severely adverse scenario is the assumption that the economy will fall significantly during the initial 7 quarters, and rebound sharply. By the 13th quarter of a major shock, the economy is expected to exceed the growth rate of the baseline by 150%. In the case of the US, this translates into a jump in real GDP from a baseline of 2.6% to 3.9%. However, in the adverse scenario, the real GDP is expected to stay below the baseline throughout the 13 future quarters. We apply the percentage changes from the baseline on the IMF projections for Qatar, Kuwait and Saudi Arabia. The results allow us to calculate deviations from the baseline and construct an adverse and a severely adverse economic scenario for each Gulf country. Figures 1 through 3 show the annual growth rate in real GDP between Q1 2004 and Q1 2015 for each country. The economic and financial projections are then used to forecast the endogenous variables in Model (1). To simplify the analysis, we only report the results for the capital ratio and the ROA in Table 4.

6. Results

Table 1 presents the key financial metrics of the 3 banks under study over the period of observation (2004 – 2015). In terms of the capital asset ratio, it is clear that all 3 Gulf banks are well capitalized, with an average of 14.82%, 13.5%, and 13.05% for Riyadh Bank, Kuwait National Bank, and Qatar National Bank respectively. The standard deviation in the capital ratio over time is approximately the same across all 3 banks. On average, however, the Qatar National Bank is the most profitable in terms of ROA and with the least loan loss ratio.

Starting with the Qatar National bank (QNB), we notice a steady decline in the capital ratio and ROA over the next 13 quarters. By the 13th quarter, the baseline capital ratio is expected to be 9.09%, substantially down from a ratio of 11.5% today and below the 12% generally recommended by the Central Banks in the region. The adverse scenario will strain the capital ratio starting in the 1st quarter of a major recession. The ratio will dip and stay below 10% for the 12 consecutive quarters. As expected, the largest drop in the capital ratio will occur in the severely adverse scenario. In that case, the capital ratio may dip to 7.90% in the 3rd quarter. While it may recover as the economy bounces back, there is no evidence to suggest that it will break the 5% threshold required by Basle II. The projected ROA figures for the 3 scenarios for QNB are consistent with the capital ratios. The ROA dips the most in the severely adverse case and reaches 36 bp down from 56 bp today. In the adverse scenario, the ROA will remain low because the economy remains in a recession for a prolonged period of time. In the adverse scenario, the recession is not as significant as in the severely adverse scenario, but the economy doesn't bounce back.

The results for NBK are vastly different from QNB. NBK enjoys a healthy capital to asset ratio of 12.95% today, and the baseline outlook suggests a continuation of this trend. However the institution is significantly vulnerable in the two stressed scenarios. If a major recession hits Kuwait, by the 1st quarter the bank capital ratio may fall to 8.9% and 6.6% respectively. By the 5th quarter of an economic shock, NBK capital ratio may fall below the 5% threshold required by Basle II in the adverse case and the 3rd quarter in the severely adverse case. If these scenarios play out, NBK may need a capital infusion after the 8th quarter. Throughout all the adverse scenarios, NBK's ROA may be negative in the adverse scenario. In fact, NBK's capital ratio and ROA perform better in the long term in the severely adverse scenario than in just the adverse scenario. The reason is that the bank recovers quickly as the economy bounces back. However, in the adverse scenario, the recession is not as severe, but it persists longer causing a large deterioration in NBK's financial performance. We looked closer at NBK's historical financial performance in the context of these scenarios. We note that the lowest level of its capital ratio in the past 12 years was registered in March 2006 when it reached 9.9%. During that time, oil prices were at \$65/bl and the real economic growth was 7.5%. It is therefore quite possible that the bank would suffer considerably in a stressed scenario.

We finally turn to Riyadh Bank (RB) of Saudi Arabia. In the baseline case, RB's capital ratio and ROA remain at par with their historical levels (the averages over the 13 projected quarters are 16.2% and 50 bp respectively). These measures deteriorate slightly in the adverse and severely adverse scenarios. The lowest levels occur in the severely adverse case when the capital asset ratio hits 13.97% in the 3rd quarter and the ROA falls to 40 bp in the 10th quarter. The results suggest that RB remains strong and is relatively the least impacted from the stressed scenarios among the three banks we examined. Figures 4 through 6 show the projected capital to asset ratios for each bank over the projected 13 quarters.

7. Discussion, Implications, and Conclusion

A stress test is a simulation based on an examination of a bank's balance sheet. Two decades ago, the Basel Capital Accord began to require banks to conduct stress tests and determine their ability to respond to market events. However these tests were internal to each organization and were never publicized. The stress tests that are implemented today represent a phenomenon spurred by the financial crisis of 2008. In the US, regulators released the stress tests rules and methodologies in 2012 and began to require their largest banks to undergo stress tests twice per year, once internally and once conducted by the regulators. Soon after, European Central Banks adopted this practice, and other developing countries followed suit⁵. In the Gulf, these regulations are still maturing. Stress tests are encouraged but not required for bank compliance. More importantly, the stress scenarios are not disclosed, may not be uniform across banks, and the results of the stress tests remain confidential. Both the public and the shareholders are unable to determine how robust a bank is in a challenging economic or financial condition. In addition, while a bank may know the strength of its own balance sheet in adverse economic scenarios, it is unable to compare itself relative to peers unless the stress tests results and methodologies are made public and applied to all institutions. The absence of a uniform standard for stress tests remains a key challenge for the Central Banks in the Gulf today.

This paper has put to test the balance sheets of 3 of the largest 10 banks in the Gulf. To our knowledge, this is the first study in the literature that compares banks in the MENA region and evaluates them across the CCAR stress scenarios. We follow a top-down approach using a VAR model where we examine the impact of the movements in macro-economic indicators on the capital ratio, loan loss provision, and a bank's ROA. The results are then used to project these variables using 3 sets of CCAR scenarios: Baseline, Stressed, and Severely Stressed. The stressed tests are modeled after the largest banks in the US, and the assumptions of each scenario are consistent with current US regulation.

The results of uniform stress test applied to 3 Gulf banks yield mixed results. Two of these institutions are able to pass the most severe economic and financial shock. We show a steady decline both in capitalization and ROA as the shock persists and accentuates, and where, in the most severe case, oil prices fall by 53.2% and the stock market index drops 62.6%, both on a year to year basis. Nevertheless, QNB and RB are able to maintain a capital to asset ratio at or above 7% in each of the projected 13 quarters. For NBK, the stress tests unveil a hidden weakness in its balance sheet. While the bank is well capitalized today, it is likely to fail both the adverse and severely adverse scenarios, possibly requiring capital infusion in the mid phase of a major recession. We note a sharp deterioration both in capitalization and ROA. To put this result into a larger context, it is important to recognize that while the capital of the region's largest banks is above regulatory requirements during normal conditions, the situation could change dramatically in stressed environments. NBK is possibly one of those cases. Such warnings have been echoed recently about the largest MENA banks, notably by Wyman (2014).

⁵ For stress tests requirements to Indian banks, see M. Y. Khan (2009).

Two takeaways emerge from this analysis. At the regulatory level, as stress tests increasingly become the standard methodological approach used by Western regulators to supervise Bank's safety and soundness, it is important for the Gulf Central banks to adopt the recent best practices on capital adequacy reviews. Regulators may want to gradually move from an ad-hoc, sporadic stress test approach to a mandated and structured exercise conducted on a regular basis. The stress scenarios would examine a wide range of shocks, emanating not just from lower oil or stock prices. Even though the banking sector is generally well capitalized, capital adequacy in a normal environment does not mean safety in a stressed situation. Regulators may use the stress tests results to prevent a bank from failing, define the management actions and triggers, and restore the necessary capital and liquidity for a bank to continue operations. This is primarily intended for small and medium sized banks that fail the stress tests, and where capital infusion or implicit government guarantees are potentially unavailable.

For a bank, the stress tests identify the vulnerability of its balance sheet. An institution should use these results to guide a business strategy intended to maintain required robustness under severe assumptions, and preserve capital adequacy under different scenarios. Examples include increasing portfolio exposures to less cyclical sectors, increasing geographic diversification, and / or use collaterals with less volatile values.

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Diagram 1: Construction of Scenarios

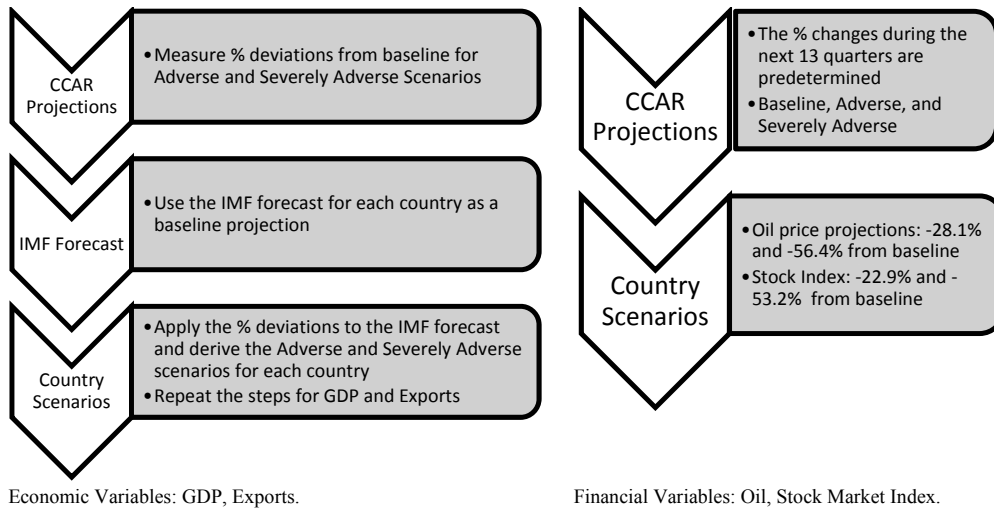
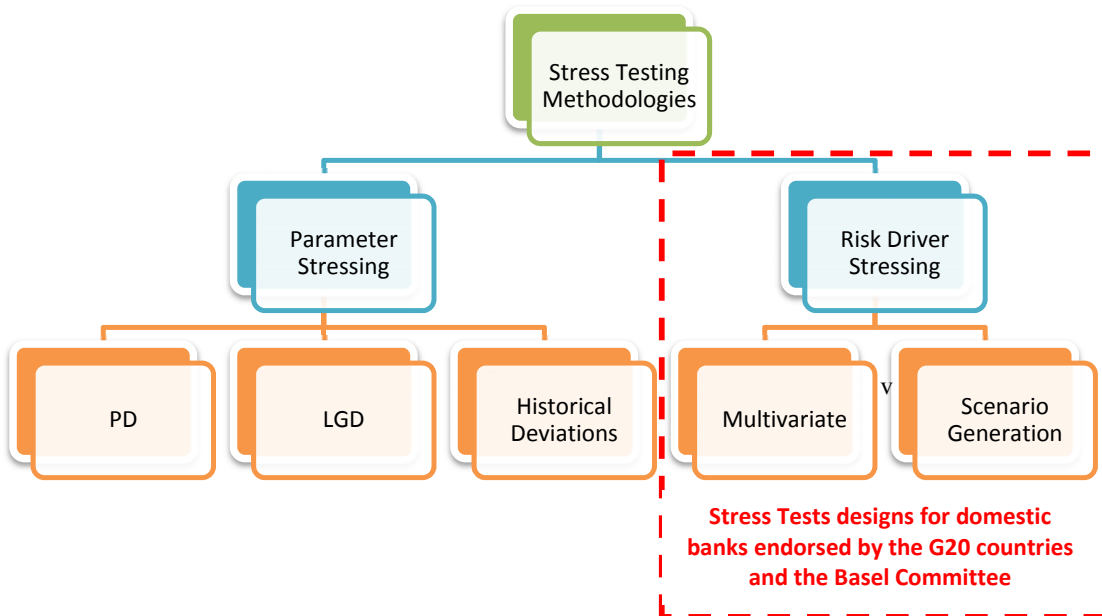


Figure 1: Different Types of Techniques Available



Figures 2: Qatar: Projected Real GDP Growth Rate for the Next 13 Quarters June 2015 – June 2018

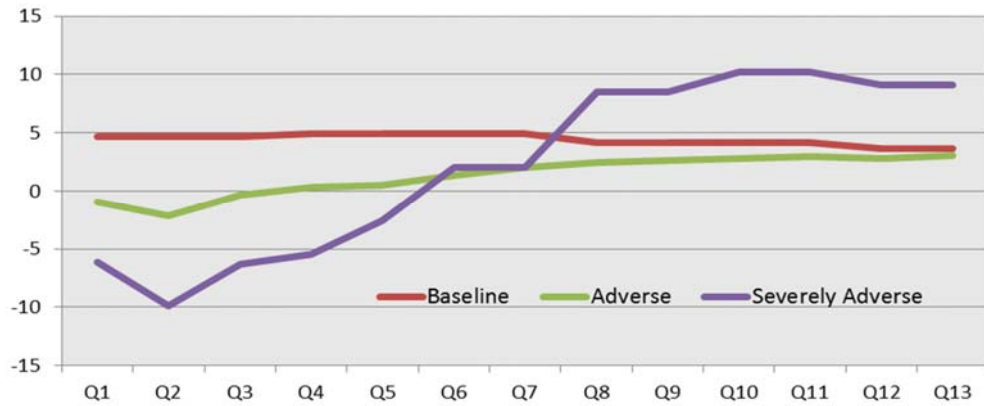


Figure 3: Saudi Arabia: Projected Real GDP Growth Rate for the Next 13 Quarters June 2015 – June 2018

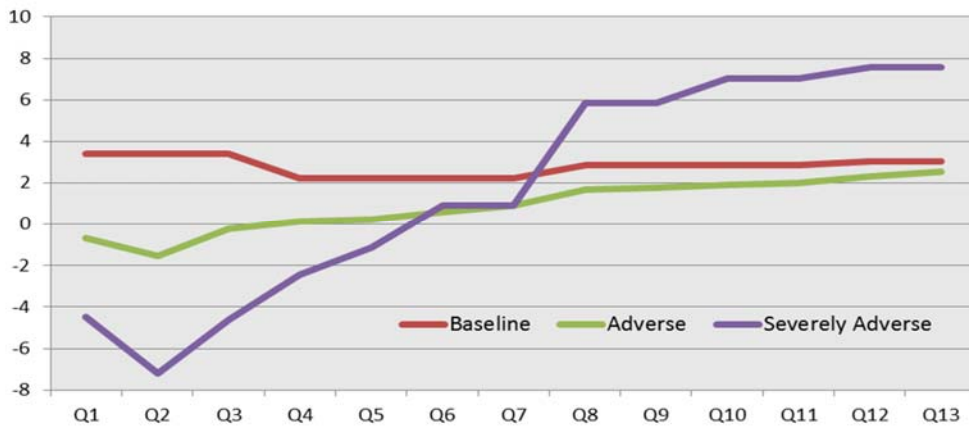


Figure 4: Kuwait: Projected Real GDP Growth Rate for the Next 13 Quarters June 2015 – June 2018

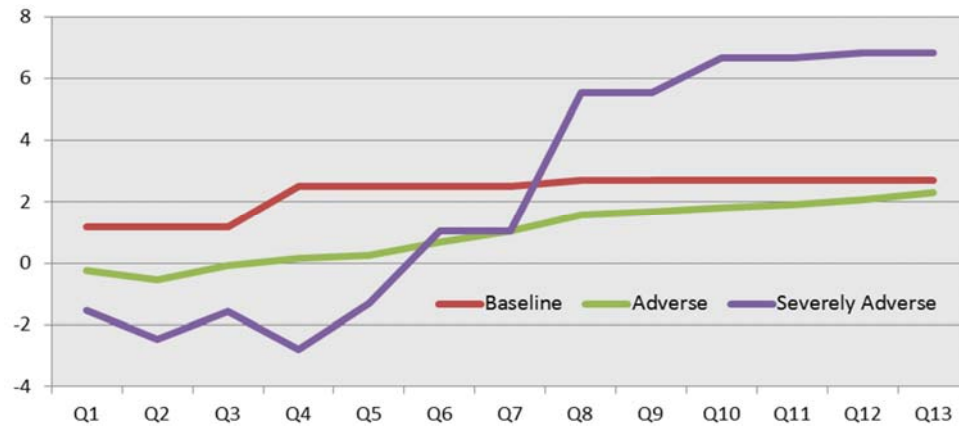


Figure 5: Riyadh Bank: Projected Capital Asset Ratios by CCAR Scenario for the Next 13 Quarters

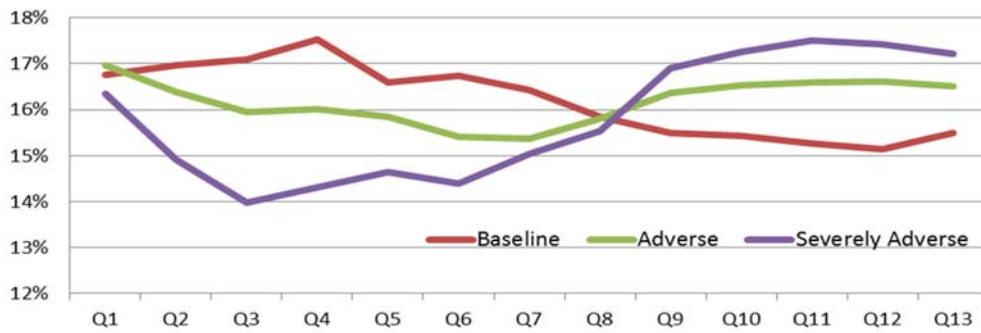


Figure 6: Qatar National Bank: Projected Capital Asset Ratios by CCAR Scenario for the Next 13 Quarters

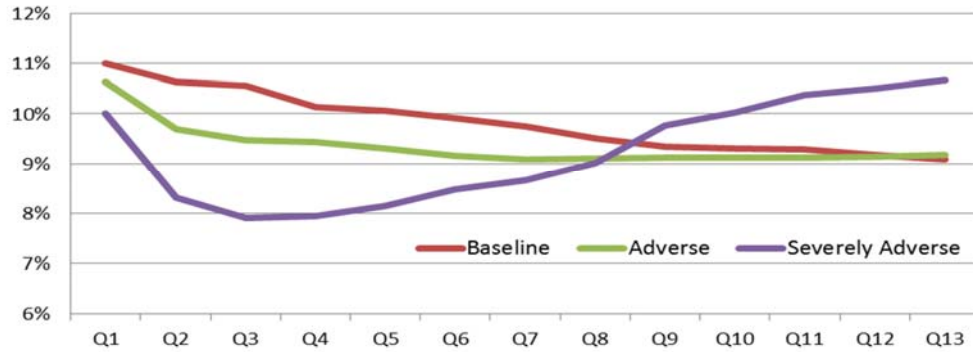


Figure 7: National Bank of Kuwait: Projected Capital Asset Ratios by CCAR Scenario for the Next 13 Quarters

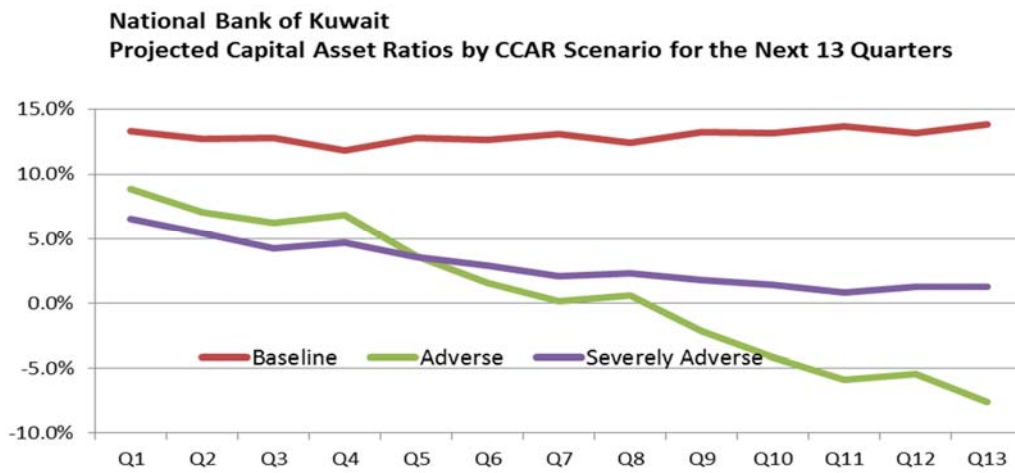


Table 1: Ranking of the Three Banks in Terms of Assets

Rank	Bank	Country	Assets (US\$000)
#1	Qatar National Bank (QNB)	Qatar	100,784,020
#6	National Bank of Kuwait (NBK)	Kuwait	58,418,947
#9	Riyad Bank (RB)	Saudi Arabia	50,714,890

Table 2: Capital Assets, Net Income and Loan Loss Provision for the Three Banks

	Capital / Assets (Capital Ratio) (%)	Net Income / Assets (ROA) (%)	Loan Loss Provision / Total Loans (%)
Riyad Bank			
Mean	14.82	0.58	0.16
Std Dev	2.27	0.19	0.07
Min	9.55	0.26	0.02
Max	17.76	1.21	0.33
Kuwait National Bank			
Mean	13.50	0.59	0.11
Std Dev	2.06	0.23	0.08
Min	9.61	0.10	0.01
Max	17.29	1.10	0.33
Qatar National Bank			
Mean	13.05	0.67	0.03
Std Dev	2.34	0.14	0.08
Min	10.11	0.36	-0.17
Max	19.20	1.07	0.13

Table 3: Projections for Key Economic & Financial Variables in Stress Tests for the Next 13 Quarters

Economic & Financial Variables	Baseline	Adverse**	Severely Adverse**
Rate of Growth in Real GDP	IMF Forecast*	-145% to -15%	-310% to 150%
Rate of Growth in Exports	IMF Forecast*	-145% to -15%	-310% to 150%
% change in the Price of Oil	From NYMEX Oil Futures	-22.90%	Fed: -53.2%
% change in the Stock Mkt.	No Change	-28.10%	-62.60%
Ind.			

Notes: (*)Projections obtained from the IMF World Economic Outlook 2015. (**)Projections obtained from the US Federal Reserve System, Board of Governors, Comprehensive Capital Analysis and Review, 2015

Table 4: CCAR Scenarios: Baseline, Adverse, and Severely Adverse Projections in the Growth of Real US GDP

	Baseline	Adverse	% change from Baseline	Severely Adverse	% change from Baseline
Proj Q1	3	-0.6	-120	-3.9	-230
Proj Q2	2.9	-1.3	-145	-6.1	-310
Proj Q3	2.9	-0.2	-107	-3.9	-234
Proj Q4	2.9	0.2	-93	-3.2	-210
Proj Q5	2.9	0.3	-90	-1.5	-152
Proj Q6	2.9	0.8	-72	1.2	-59
Proj Q7	2.9	1.2	-59	1.2	-59
Proj Q8	2.9	1.7	-41	3	103
Proj Q9	2.9	1.8	-38	3	103
Proj Q10	2.7	1.8	-33	3.9	144
Proj Q11	2.7	1.9	-30	3.9	144
Proj Q12	2.6	2	-23	3.9	150
Proj Q13	2.6	2.2	-15	3.9	150

Notes: CCAR Scenarios Provided by the Federal Reserve Bank

Table 5: Capital Ratio and ROE for the Three Banks

Qatar Natl Bank	Capital Ratio			ROE		
	Base (%)	Adv (%)	Sev Adv (%)	Base (%)	Adv (%)	Sev Adv (%)
Proj Q1	11.00	10.63	10.02	0.54	0.51	0.46
Proj Q2	10.64	9.70	8.31	0.54	0.46	0.39
Proj Q3	10.56	9.47	7.90	0.54	0.49	0.43
Proj Q4	10.15	9.43	7.93	0.52	0.45	0.36
Proj Q5	10.07	9.31	8.15	0.49	0.45	0.37
Proj Q6	9.92	9.16	8.48	0.52	0.45	0.42
Proj Q7	9.74	9.08	8.67	0.50	0.44	0.40
Proj Q8	9.51	9.11	9.02	0.48	0.44	0.46
Proj Q9	9.34	9.12	9.76	0.47	0.45	0.49
Proj Q10	9.31	9.12	10.03	0.48	0.45	0.50
Proj Q11	9.29	9.12	10.39	0.47	0.44	0.52
Proj Q12	9.18	9.13	10.51	0.46	0.44	0.53
Proj Q13	9.09	9.17	10.67	0.46	0.45	0.53
Natl Bk of Kuwait						
Proj Q1	13.40	8.90	6.60	0.26	-0.25	0.38
Proj Q2	12.80	7.00	5.50	0.24	-0.30	0.43
Proj Q3	12.80	6.20	4.20	0.27	-0.45	0.40
Proj Q4	11.80	6.90	4.70	0.42	-0.52	0.48
Proj Q5	12.80	3.60	3.60	0.27	-0.72	0.76
Proj Q6	12.60	1.50	2.90	0.35	-0.74	0.81
Proj Q7	13.10	0.10	2.00	0.42	-0.86	0.85
Proj Q8	12.40	0.60	2.30	0.54	-1.00	0.86
Proj Q9	13.30	-2.10	1.80	0.41	-1.07	1.05
Proj Q10	13.20	-4.20	1.40	0.47	-1.07	1.09
Proj Q11	13.70	-5.90	0.80	0.49	-1.15	1.15
Proj Q12	13.20	-5.50	1.30	0.59	-1.32	1.14
Proj Q13	13.90	-7.60	1.20	0.49	-1.34	1.27
Riyad Bank						
Proj Q1	16.75	16.97	16.35	0.47	0.48	0.50
Proj Q2	16.96	16.39	14.91	0.46	0.47	0.50
Proj Q3	17.10	15.96	13.97	0.45	0.50	0.55
Proj Q4	17.52	16.02	14.32	0.48	0.54	0.59
Proj Q5	16.59	15.85	14.64	0.48	0.53	0.57
Proj Q6	16.74	15.41	14.39	0.52	0.52	0.52
Proj Q7	16.42	15.36	15.03	0.50	0.50	0.48
Proj Q8	15.84	15.81	15.54	0.53	0.50	0.44
Proj Q9	15.50	16.37	16.90	0.54	0.50	0.44
Proj Q10	15.43	16.53	17.25	0.55	0.48	0.40
Proj Q11	15.27	16.60	17.51	0.54	0.48	0.41
Proj Q12	15.14	16.61	17.43	0.52	0.49	0.41
Proj Q13	15.49	16.51	17.22	0.51	0.49	0.43

Appendix

The Federal Reserve Supervisory Stress Test Scenarios⁶

Baseline Scenario

The baseline scenario is very similar to the average projections from surveys of economic forecasters. The baseline scenario for the United States is for a sustained, moderate expansion in economic activity. Real GDP grows at an average rate of just under 3 percent per year over the scenario; the unemployment rate declines modestly, reaching 5-1/4 percent by the end of the scenario in the 8th quarter; and CPI inflation averages just over 2 percent per year.

Accompanying this moderate economic expansion is a gradual normalization in Treasury yields across the maturity spectrum. Short-term Treasury rates begin to increase in the second projected quarter and rise steadily thereafter, reaching just over 3 percent by the 8th projected quarter. Five- and 10-year yields increase from the start of the scenario period and reach 4 percent and 4-1/4 percent, respectively, by the 8th projected quarter. Spreads on investment-grade corporate bonds change little over the scenario period, as do spreads on residential mortgages and other consumer loans. As a result, yields on BBB-rated corporate bonds and mortgage rates both increase roughly in line with long-term Treasury yields, and the prime rate increases roughly in line with short-term Treasury rates.

Consistent with these developments, asset prices are assumed to increase modestly in the baseline scenario. Equity prices, nominal house prices, and commercial property prices all rise steadily throughout the scenario; in addition, equity market volatility is assumed to remain at low levels.

The baseline outlook for the international variables is similar to that reported in the *Blue Chip Economic Indicators* and the International Monetary Fund's *World Economic Outlook*. The baseline scenario for economic activity and inflation outside the United States features an expansion in activity, albeit one that proceeds at different rates across the four countries or country blocks being considered.

Adverse Scenario

The adverse scenario is characterized by a global weakening in economic activity and an increase in U.S. inflationary pressures that, overall, result in a rapid increase in both short- and long-term U.S. Treasury rates. This scenario is not a forecast; rather, it is a hypothetical scenario designed to assess the strength of banking organizations and their resilience to an unfavorable economic environment.

In the adverse scenario, the United States experiences a mild recession. During this period, the level of real GDP falls approximately 1/2 percent relative to its current level and the unemployment rate increases to just over 7 percent. At the same time, the U.S. economy experiences a considerable rise in core inflation that results in a headline CPI inflation rate of 4 percent by the third projected quarter; headline inflation remains elevated thereafter. Short-term interest rates rise quickly as a result, reaching a little over 2-1/2 percent by the end of the 4th projected quarter and 5-1/4 percent by the end of 8th quarter.

Longer-term Treasury yields increase by less, resulting in a yield curve throughout the scenario period that is both higher and flatter relative to the baseline. Corporate financial conditions tighten, reflecting both higher long-term Treasury yields and somewhat wider investment-grade corporate bond spreads. Household financial conditions are assumed to tighten broadly in line with movements in similar-maturity Treasury yields.

⁶ Summarized from the Federal Reserve 2015 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule available at <http://www.federalreserve.gov/>.

The recovery that begins in the 5th quarter is quite sluggish and the unemployment rate continues to increase, and flattens thereafter. Equity prices fall both during and after the recession and by the end of the scenario are about 25 percent lower than their starting level.

Severely Adverse Scenario

The severely adverse scenario features a substantial weakening in global economic activity, accompanied by large reductions in asset prices. In the scenario, the U.S. corporate sector experiences increases in financial distress that are even larger than would be expected in a severe recession, together with a widening in corporate bond spreads and a decline in equity prices. The severely adverse scenario for the United States is characterized by a deep and prolonged recession in which the unemployment rate increases sharply. This shock is of a similar magnitude to those experienced in severe U.S. contractions during the past half-century. Consistent with these developments, asset prices contract sharply in the scenario. Equity prices fall by approximately 60 percent during the first 4 projected quarters, and equity market volatility increases sharply.