KCL Astute Capital Research Team

<u>Value at Risk:</u> VAR is one of the popular measure to quantitatively quantify the investment risk present in the underlying securities, particularly the banking scripts. It provides the probable loss in a security or portfolio value over a specified time period.

The table below shows the <u>Market VAR</u> of 27 Commercial Banks under different methods of computation:

Method 1: Parametric / Variance – Covariance Method

S. N.	Ticker	Daily Return	Daily Std. Dev.	1 Day VAR			1 Week VAR			1 Month VAR		
				10%	5%	1%	10%	5%	1%	10%	5%	1%
1	NMB	0.09%	2.35%	-2.91%	-3.77%	-5.37%	-6.51%	-8.42%	-12.00%	-13.35%	-17.26%	-24.59%
2	BOKL	0.03%	2.16%	-2.75%	-3.53%	-5.00%	-6.14%	-7.90%	-11.19%	-12.58%	-16.18%	-22.93%
4	SCB	0.03%	2.11%	-2.68%	-3.44%	-4.88%	-5.98%	-7.70%	-10.92%	-12.26%	-15.78%	-22.37%
3	GBIME	0.09%	2.14%	-2.65%	-3.43%	-4.88%	-5.93%	-7.66%	-10.92%	-12.15%	-15.70%	-22.37%
5	PCBL	0.09%	2.07%	-2.56%	-3.32%	-4.73%	-5.73%	-7.42%	-10.57%	-11.75%	-15.20%	-21.67%
6	NIB	0.09%	2.06%	-2.55%	-3.30%	-4.71%	-5.71%	-7.39%	-10.53%	-11.70%	-15.14%	-21.57%
7	NBL	0.07%	2.05%	-2.56%	-3.31%	-4.71%	-5.73%	-7.40%	-10.52%	-11.75%	-15.16%	-21.57%
10	HBL	0.08%	2.05%	-2.54%	-3.28%	-4.68%	-5.68%	-7.35%	-10.46%	-11.65%	-15.05%	-21.44%
8	JBNL	0.05%	2.03%	-2.56%	-3.29%	-4.68%	-5.71%	-7.36%	-10.46%	-11.71%	-15.09%	-21.43%
9	NICA	0.08%	2.04%	-2.54%	-3.28%	-4.66%	-5.67%	-7.33%	-10.43%	-11.62%	-15.01%	-21.38%
11	ADBL	0.10%	2.04%	-2.51%	-3.26%	-4.65%	-5.62%	-7.28%	-10.39%	-11.52%	-14.92%	-21.30%
12	SBI	0.06%	2.00%	-2.50%	-3.22%	-4.58%	-5.58%	-7.20%	-10.24%	-11.43%	-14.76%	-21.00%
13	NABIL	0.06%	1.99%	-2.49%	-3.22%	-4.57%	-5.57%	-7.19%	-10.23%	-11.42%	-14.74%	-20.96%
15	MEGA	0.10%	2.00%	-2.46%	-3.19%	-4.55%	-5.51%	-7.13%	-10.18%	-11.29%	-14.62%	-20.87%
14	NCCB	0.07%	1.98%	-2.48%	-3.20%	-4.55%	-5.54%	-7.15%	-10.18%	-11.35%	-14.66%	-20.85%
18	EBL	0.07%	1.96%	-2.44%	-3.15%	-4.48%	-5.45%	-7.04%	-10.02%	-11.16%	-14.42%	-20.54%
16	PRVU	0.07%	1.96%	-2.44%	-3.15%	-4.48%	-5.45%	-7.04%	-10.02%	-11.17%	-14.42%	-20.53%
17	MBL	0.10%	1.96%	-2.41%	-3.12%	-4.45%	-5.39%	-6.98%	-9.96%	-11.04%	-14.30%	-20.40%
19	KBL	0.05%	1.91%	-2.39%	-3.09%	-4.39%	-5.35%	-6.90%	-9.81%	-10.97%	-14.15%	-20.11%
21	SRBL	0.07%	1.90%	-2.37%	-3.06%	-4.35%	-5.29%	-6.84%	-9.73%	-10.85%	-14.01%	-19.95%
20	CBL	0.02%	1.87%	-2.37%	-3.05%	-4.33%	-5.31%	-6.83%	-9.68%	-10.88%	-14.00%	-19.84%
23	NBB	0.06%	1.84%	-2.30%	-2.96%	-4.22%	-5.13%	-6.63%	-9.44%	-10.52%	-13.59%	-19.34%
22	LBL	0.05%	1.83%	-2.30%	-2.96%	-4.21%	-5.14%	-6.63%	-9.42%	-10.53%	-13.58%	-19.30%
25	SBL	0.08%	1.81%	-2.24%	-2.89%	-4.13%	-5.00%	-6.47%	-9.23%	-10.26%	-13.27%	-18.91%
24	CCBL	0.02%	1.76%	-2.24%	-2.87%	-4.07%	-5.00%	-6.43%	-9.10%	-10.25%	-13.17%	-18.66%
26	SANIMA	0.08%	1.72%	-2.12%	-2.75%	-3.92%	-4.75%	-6.15%	-8.76%	-9.74%	-12.59%	-17.96%
27	CZBIL	0.05%	1.69%	-2.11%	-2.73%	-3.88%	-4.73%	-6.10%	-8.67%	-9.69%	-12.50%	-17.77%

<u>Limitation:</u>

✓ Assumes normal distribution

<u>Interpretation:</u> NMB - 1 Day 10% VAR can be interpreted in two ways as below:

I. There is 90% probability that the loss on investment in NMB will be less than 2.91% in any 1 normal trading day. OR

II. There is 10% chances that the loss on investment in NMB will be 2.91% or more in any 1 normal trading day.

Highest VAR: NMB   **Lowest VAR: CZBIL**

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Method 2: Non-Parametric Method / Historical Simulation Method

S.N.	Ticker	1 Day VAR			1 Week VAR			1 Month VAR		
		10%	**5%**	**1%**	**10%**	**5%**	**1%**	**10%**	**5%**	**1%**
1	NMB	-2.26%	-3.35%	-5.75%	-5.06%	-7.49%	-12.86%	-10.37%	-15.36%	-26.35%
2	NCCB	-2.18%	-2.80%	-5.37%	-4.87%	-6.26%	-12.01%	-9.97%	-12.83%	-24.60%
3	JBNL	-2.14%	-2.81%	-5.38%	-4.79%	-6.29%	-12.04%	-9.82%	-12.90%	-24.67%
4	NBL	-2.05%	-2.92%	-5.24%	-4.59%	-6.54%	-11.72%	-9.40%	-13.40%	-24.03%
5	KBL	-2.02%	-2.63%	-4.76%	-4.51%	-5.88%	-10.64%	-9.24%	-12.06%	-21.81%
7	HBL	-2.01%	-2.87%	-4.91%	-4.49%	-6.42%	-10.98%	-9.21%	-13.16%	-22.51%
6	GBIME	-2.00%	-2.78%	-4.71%	-4.46%	-6.21%	-10.54%	-9.15%	-12.72%	-21.60%
8	SCB	-1.98%	-2.78%	-6.24%	-4.43%	-6.21%	-13.96%	-9.08%	-12.73%	-28.60%
10	ADBL	-1.97%	-2.75%	-4.94%	-4.40%	-6.14%	-11.05%	-9.02%	-12.59%	-22.66%
9	BOKL	-1.97%	-2.78%	-4.83%	-4.40%	-6.22%	-10.80%	-9.02%	-12.74%	-22.12%
11	NBB	-1.96%	-2.19%	-4.34%	-4.38%	-4.90%	-9.71%	-8.99%	-10.05%	-19.91%
12	CBL	-1.95%	-2.55%	-4.64%	-4.37%	-5.71%	-10.37%	-8.96%	-11.69%	-21.25%
13	MBL	-1.95%	-2.58%	-4.21%	-4.36%	-5.78%	-9.42%	-8.94%	-11.84%	-19.32%
14	NICA	-1.94%	-2.75%	-4.94%	-4.33%	-6.14%	-11.06%	-8.87%	-12.59%	-22.66%
15	SRBL	-1.92%	-2.71%	-4.71%	-4.30%	-6.07%	-8.81%	-8.81%	-12.43%	-21.59%
17	PCBL	-1.88%	-2.58%	-4.88%	-4.20%	-5.76%	-10.92%	-8.60%	-11.81%	-22.38%
16	LBL	-1.87%	-2.64%	-4.67%	-4.19%	-5.90%	-10.44%	-8.59%	-12.09%	-21.39%
18	SBI	-1.86%	-2.81%	-4.94%	-4.15%	-6.27%	-11.04%	-8.51%	-12.86%	-22.62%
19	MEGA	-1.82%	-2.29%	-4.40%	-4.06%	-5.12%	-9.83%	-8.33%	-10.49%	-20.14%
20	NABIL	-1.80%	-2.60%	-5.68%	-4.04%	-5.81%	-12.69%	-8.27%	-11.90%	-26.01%
22	PRVU	-1.80%	-2.42%	-4.52%	-4.02%	-5.41%	-10.10%	-8.23%	-11.08%	-20.70%
23	NIB	-1.79%	-2.51%	-4.98%	-4.01%	-5.62%	-11.13%	-8.21%	-11.51%	-22.81%
21	SBL	-1.78%	-2.40%	-4.30%	-3.99%	-5.37%	-9.61%	-8.17%	-11.01%	-19.69%
24	CCBL	-1.78%	-2.42%	-4.21%	-3.99%	-5.42%	-9.42%	-8.17%	-11.11%	-19.31%
25	EBL	-1.77%	-2.51%	-5.66%	-3.96%	-5.61%	-12.66%	-8.11%	-11.50%	-25.95%
26	CZBIL	-1.74%	-2.34%	-3.83%	-3.89%	-5.24%	-8.57%	-7.97%	-10.73%	-17.56%
27	SANIMA	-1.62%	-2.43%	-3.33%	-3.62%	-5.42%	-7.44%	-7.42%	-11.11%	-15.26%

Advantages:

✓ No assumption of normal distribution

Limitation:

✓ Solely based on historical prices which may not be reflective for futures.

Interpretation: Same as Method 1.

1 Day/ Week/ Month		
VaR	*Highest*	*Lowest*
10%	NMB	SANIMA
5%	NMB	NBB
1%	SCB	SANIMA

Expected Shortfall: One limitation of Market VAR is that it does not specify or hint the magnitude of losses in the security or portfolio. For example, 1 Day 10% VAR of NMB does not tell the magnitude of losses exceeding 2.91% in any 1 normal trading day. Expected shortfall provides an estimate of average tail losses likely on a portfolio / investments when VaR limit is exceeded on a given significance level. It is also referred as Conditional VaR.

Expected Shortfall (ES) / Conditional VAR (CVAR)

| S.N.	Ticker	1 Day ES			1 Week ES			1 Month ES		
		10%	5%	1%	10%	5%	1%	10%	5%	1%
1	NMB	-3.82%	-4.81%	-7.27%	-8.54%	-10.75%	-16.26%	-17.50%	-22.03%	-33.32%
2	SCB	-3.50%	-4.69%	-8.29%	-7.83%	-10.49%	-18.54%	-16.05%	-21.50%	-38.00%
3	NBL	-3.40%	-4.30%	-6.96%	-7.59%	-9.61%	-15.55%	-15.56%	-19.69%	-31.88%
5	HBL	-3.33%	-4.31%	-7.09%	-7.45%	-9.63%	-15.85%	-15.28%	-19.73%	-32.49%
6	JBNL	-3.33%	-4.22%	-7.17%	-7.44%	-9.43%	-16.04%	-15.25%	-19.33%	-32.87%
7	NCCB	-3.31%	-4.14%	-6.30%	-7.41%	-9.26%	-14.09%	-15.19%	-18.98%	-28.87%
8	BOKL	-3.29%	-4.28%	-7.86%	-7.36%	-9.57%	-17.57%	-15.09%	-19.61%	-36.00%
9	NABIL	-3.28%	-4.43%	-7.81%	-7.34%	-9.91%	-17.45%	-15.04%	-20.31%	-35.77%
4	SBI	-3.26%	-4.24%	-6.88%	-7.29%	-9.49%	-15.38%	-14.94%	-19.45%	-31.51%
10	NICA	-3.21%	-4.14%	-6.59%	-7.18%	-9.26%	-14.73%	-14.72%	-18.98%	-30.18%
11	EBL	-3.20%	-4.32%	-8.22%	-7.16%	-9.66%	-18.39%	-14.68%	-19.80%	-37.68%
12	ADBL	-3.19%	-4.05%	-6.09%	-7.13%	-9.06%	-13.63%	-14.61%	-18.57%	-27.93%
13	NIB	-3.18%	-4.28%	-7.60%	-7.11%	-9.58%	-16.99%	-14.58%	-19.63%	-34.83%
14	GBIME	-3.16%	-4.01%	-6.03%	-7.08%	-8.97%	-13.49%	-14.50%	-18.38%	-27.65%
15	PCBL	-3.16%	-4.11%	-6.72%	-7.06%	-9.20%	-15.02%	-14.47%	-18.85%	-30.78%
16	SRBL	-3.08%	-3.89%	-5.65%	-6.89%	-8.70%	-12.63%	-14.12%	-17.84%	-25.88%
17	MEGA	-3.05%	-4.06%	-8.00%	-6.83%	-9.09%	-17.90%	-14.00%	-18.63%	-36.68%
18	KBL	-3.05%	-3.85%	-6.29%	-6.81%	-8.61%	-14.06%	-13.96%	-17.64%	-28.82%
19	CBL	-2.98%	-3.73%	-5.88%	-6.65%	-8.34%	-13.15%	-13.64%	-17.10%	-26.95%
20	PRVU	-2.96%	-3.89%	-6.89%	-6.62%	-8.69%	-15.41%	-13.57%	-17.81%	-31.59%
21	NBB	-2.95%	-3.64%	-5.34%	-6.59%	-8.14%	-11.93%	-13.51%	-16.68%	-24.45%
22	LBL	-2.95%	-3.72%	-5.92%	-6.59%	-8.32%	-13.23%	-13.50%	-17.06%	-27.12%
23	MBL	-2.89%	-3.53%	-5.22%	-6.47%	-7.90%	-11.67%	-13.26%	-16.18%	-23.91%
24	CCBL	-2.83%	-3.56%	-5.72%	-6.34%	-7.97%	-12.79%	-12.99%	-16.33%	-26.21%
25	SBL	-2.78%	-3.50%	-5.51%	-6.21%	-7.84%	-12.33%	-12.73%	-16.06%	-25.26%
26	SANIMA	-2.76%	-3.59%	-5.67%	-6.18%	-8.02%	-12.69%	-12.66%	-16.44%	-26.00%
27	CZBIL	-2.64%	-3.24%	-5.03%	-5.91%	-7.25%	-11.25%	-12.11%	-14.85%	-23.06%

Interpretation: NMB - 1 Day 10% ES can be interpreted as below:

I. There is 10% probability that the average losses on investment in NMB will be 3.82% on any single trading day, if loss exceeds 2.91% (VaR).

1 Day/ Week/ Month		
VaR	*Highest*	*Lowest*
10%	NMB	CZBIL
5%	NMB	CZBIL
1%	SCB	CZBIL

NEPSE VaR				Commercial Bank VaR		
Daily mean	0.05%			0.05%		
Daily Std. Dev.	1.19%			1.57%		
Parametric Approach				**Parametric Approach**		
	10%	**5%**	**1%**	**10%**	**5%**	**1%**
1 Day	-1.47%	-1.90%	-2.71%	-1.97%	-2.54%	-3.61%
1 Week	-3.29%	-4.25%	-6.06%	-4.40%	-5.67%	-8.07%
1 Month	-6.74%	-8.71%	-12.42%	-9.01%	-11.63%	-16.53%
Non Parametric Approach				**Non Parametric Approach**		
1 Day	-1.14%	-1.76%	-3.33%	-1.43%	-2.16%	-4.66%
1 Week	-2.55%	-3.93%	-7.45%	-3.21%	-4.84%	-10.42%
1 Month	-5.22%	-8.05%	-15.26%	-6.57%	-9.91%	-21.36%
Expected Shortfall				**Expected Shortfall**		
1 Day	-2.05%	-2.71%	-4.38%	-2.68%	-3.61%	-6.09%
1 Week	-4.59%	-6.07%	-9.79%	-5.99%	-8.07%	-13.63%
1 Month	-9.40%	-12.44%	-20.06%	-12.27%	-16.54%	-27.93%

NEPSE 1 DAY VAR - PARAMETRIC
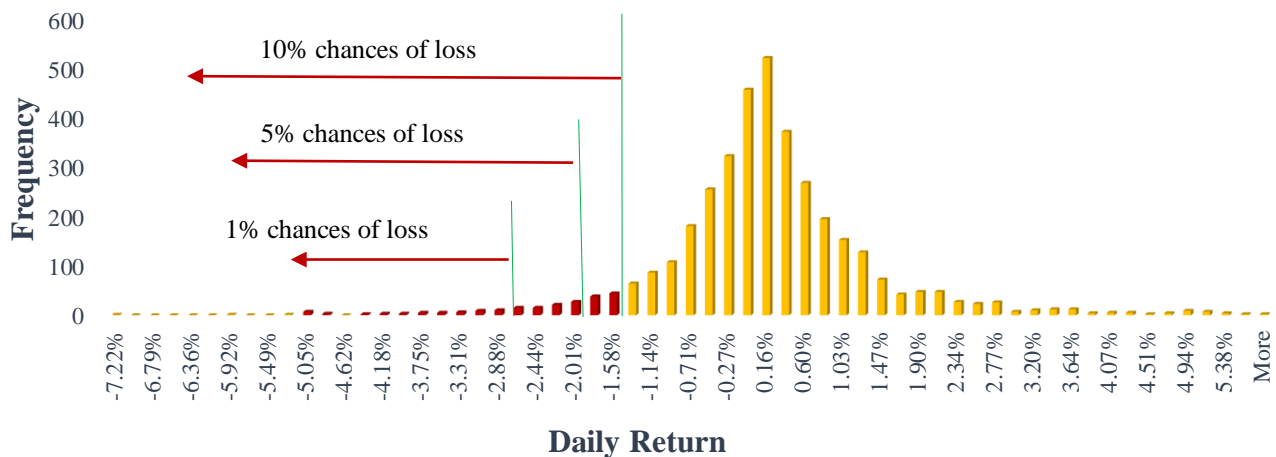
COMMERCIAL BANK - 1 DAY VAR - PARAMETRIC
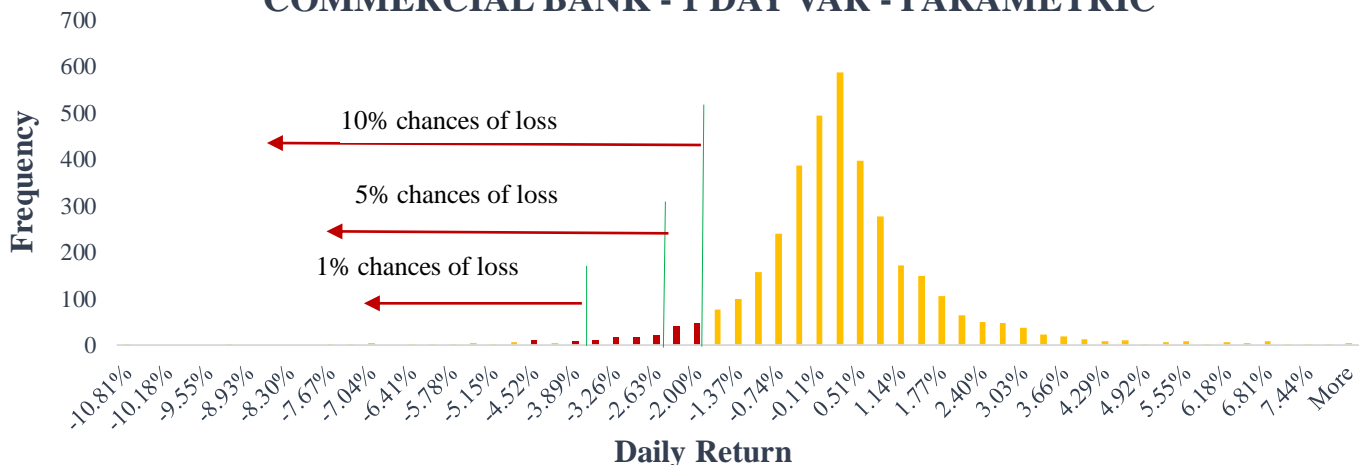
Assumption:
a. *Daily adjusted prices of stocks till 13th June 2019.*
b. *5 trading days assumed for 1 Week calculation.*
c. *21 trading days assumed for 1 Month calculation.*