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Abstract

In June 2017, four countries in the Middle East led by Saudi Arabia imposed an embargo on Qatar. In response, confidence in Qatari banks was considerably shaken. Our research investigates the evolution in the Probability of Default (PD) of Qatar National Bank (QNB), the largest financial institution in Qatar using Merton's distance to default methodology. We contrast the level of the PD during 5 critical events in the region and observe how these incidents have impacted the credit risk of QNB.

1. Introduction

A key role of bank regulatory policy is the solvency of the banking system. Assessing the risk of default of a bank is important to gauge the amount needed to potentially bail out depositors. Accurate modeling of the probability of default is required for valuing the implicit and explicit guarantees a government provides.

Since the financial crisis, numerous central banks have started publishing financial stability reports. The International Monetary Fund conduct periodic financial sector stability assessments of their member countries[1]. The options embedded in the bank's equity and debt can then be valued using traditional option pricing techniques. Recent examples of bank default risk analysis based on the Merton model include Schweikhard, Tsesmelidakis, and Merton (2014) and Acharya, Anginer, and Warburton (2016), who study the value of implicit (too-big-to-fail) government guarantees.

 Among the quantitative tools used for assessing financial stability is the seminal work of Merton (1974).

We propose to apply this methodology on the largest publicly held bank in Qatar. The goal is to develop an indicator of financial health based on Merton's contingent claims framework known as the distance-to-default (PD).

2. Model and Data

The distant to default (DTD) measure initially proposed by Merton and later commercialized by KMV – now Moody's—begins with the assumption that the total value of a banking firm is assumed to follow geometric Brownian motion:

$$dlogS \ = \ \mu \, dt \ + \ \sigma \, dW \qquad (1)$$

where S is the total value of the bank, μ is the expected continuously compounded return on log V, σ is the volatility of firm value and dW is a standard Weiner process. The second critical assumption of the Merton model is that the bank has issued just one discount bond maturing in T periods. Under these assumptions, the equity of the bank is a call option on the underlying value of the bank with a strike price equal to the face value of the bank's debt and a time-to-maturity of T. The distance to default can be calculated as:

$$PD = \frac{ln(S/F) \ + \ \left(\mu - 0.5\sigma^2 \right)T}{\sigma \ \sqrt{T}} \qquad (2)$$

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[1] For example: In Turkey, there existed a Financial Sector Assessment Program-Detailed Assessment of Observance of the Basel Core Principles for Effective Banking Supervision done by the IMF, Monetary and Capital Markets Department, February 8, 2017.

where F is the face value of the bank's debt, r is the instantaneous risk-free rate, μ is an estimate of the expected annual return of the bank's assets. The corresponding implied probability of default, is given by:

$$P = N(-DTD) \qquad (3)$$

Where N(.) is the cumulative normal distribution. The KMV-Merton model basically translates the value and volatility of a bank equity into an implied probability of default.

We use the information in credit default swap premia to extract a direct measure of default probabilities and compare it with the estimates obtained from our methods.

The data for this study was collected from Bloomberg and the banks' quarterly reports between 02/01/2006 and -04/21/2017. We calculated the DTD for three distinct terms: 3 months, 1 year, and 5 years. The difference in premia between these 3 terms reveals the term structure of the probability of default. We calculate the 5Year-1Year spread, the 5year- 3month spread, and the 1Year- 3month spread. The probability of default is investigated over the following key events:

1- The Lehman Brothers Default of 09/2008,
2- The Arab Spring 18/12/2010 and 2011,
3- War in Yemen 05/17/2016,
4- Embargo on Qatar 05/06/2017 and
5- Arrest of Emirs in Saudi Arabia 04/11/2017

3. Results

Table 1:

Distribution of Variables used in Analysis of Probability of Default for Qatar National Bank and Coefficient of Variation ranking							
Qatar National Bank							
	BB_3M_PD	BB_1YR_P	BB_5Y_PD		5y-1y	5y-3m	1y-3m
Ave	0.0000	0.0005	0.0133		0.0129	0.0133	0.0005
Var	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000
SD	0.0000	0.0004	**0.0025**		0.0021	0.0024	0.0003
MIN	0.0000	0.0001	0.0092		0.0091	0.0092	0.0001
MAX	0.0002	0.0020	0.0201		0.0182	0.0199	0.0018
MX-MN	0.0002	0.0019	0.0110		0.0091	0.0108	0.0017
SD/AV	**1.2269**	0.7616	0.1839		0.1632	0.1819	0.7335
SD/Dif	0.1736	0.1968	0.2239		0.2312	0.2252	0.2001

Table 1 represents the probability default statistics distribution of variables used in analysis of probability of default and probability of default 5 year–1 year, 5 years–3month and 1 year-3 month spreads for QNB.

Graph 1
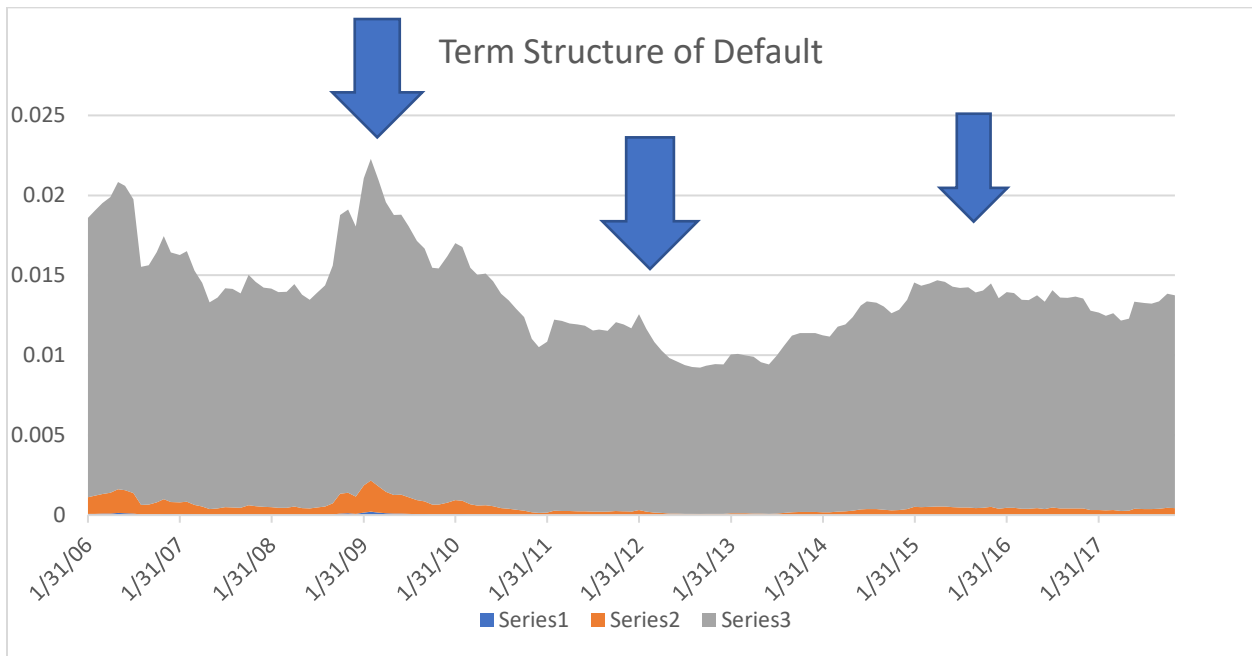
Graph 1 shows the term structure of the probability of default for the Qatar bank over the period of study. The arrows highlight the impact that the events previously listed had on the change in the probability of default on the Qatar National bank.

The results indicate that the variability in the probability of default is generated by short term movement in probability of default. The probability of Default can shed insights on the market perception of the stability of QNB. A similar analysis can be performed for other institutions and the results compared to those of QNB.

4. References

- Acharya, Viral V, Deniz Anginer, and A Joseph Warburton, 2016, The end of market discipline? investor expectations of implicit state guarantees, Working paper, New York University.

- Merton R (1974), 'On the Pricing of Corporate Debt: The risk structure of interest rates', The Journal of Finance, Vol (2), pp 449–470.

- Schweikhard, Frederic A, Zoe Tsesmelidakis, and Robert C Merton: The value of implicit guarantees, Working paper, Oxford University, 2014