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Financial Liquidity Adequacy
...for Energy and Commodity
Trading Firms*Carlos Blanco, Ph.D., risk management consultant*

In our previous article, we discussed the role of economic capital as the basis to perform risk-adjusted return on capital (RAROC) calculations and some strategic uses for energy trading firms. We argued that economic capital lies at the heart of enterprise-wide risk management and its management and optimization provide a link with shareholder value creation. We also presented expected tail loss as a superior measure to VaR, particularly for economic capital and liquidity adequacy determination.

In this article, we will concentrate on capital adequacy assessment for energy trading firms from a regulatory, credit rating agency and internal firm perspective,

analyzing recent proposals by the CCRO and Standard & Poors regarding financial liquidity adequacy to cover short-term unexpected events that could impair the firm's ability to meet its short-term financial obligations, as well as economic capital to support medium- and long-term business operations.

In our opinion, the most salient point from the analysis and guidelines provided by S&P and the CCRO is that traditional risk models (e.g. VaR systems) used by many institutions do not capture liquidity risk adequately. As part of any comprehensive model review and validation exercise, risk managers and internal and external auditors, and potentially other outside observers such as regulators and credit rating agencies, should start looking closer at the ability of existing VaR systems to capture liquidity risk, particularly under market and credit stress conditions

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when liquidity problems surface to endanger the financial health of a trading firm.

The use of standard VaR methodologies for determining capital requirements is inadequate, and energy and commodity trading firms should implement a framework to measure and manage this key risk effectively. In our next article, we will present a framework based on dynamic simulations that explicitly captures liquidity risk to estimate cash-flow-at-risk (CFaR) and liquidity-at-risk (LaR) measures, possibly using extreme value theory and other nonGaussian approaches to model tail risk, and adopt expected tail loss or other coherent risk measures.

The Need for a Capital Adequacy Framework for Energy Trading Firms

A capital adequacy framework is designed to make sure that the firm has sufficient capital (or access to capital) during extreme market, credit and liquidity environments that could lead to large unexpected collateral calls and/or losses.

Because most large energy forward deals are bilateral transactions, the associated counterparty risk has played an increasing role, sometimes mirroring or exceeding the price risk in those transactions. During the past three years, it has clearly been shown that energy trading firms must be ready to face large collateral calls caused by unexpected market and credit events. On the other side, credit rating agencies, investors, creditors and regulators have stepped up scrutiny of balance sheets and cash flows in the wake of the Enron debacle and the subsequent fallout of bankruptcies. Any missteps on the reporting, management or disclosure front are heavily penalized by the markets.

Credit rating agencies have played an increasing role in shifting the burden of proof to energy merchants to ensure that they can meet their obligations in the event of a market or credit crisis. (This after underestimating the risk taken by many energy trading firms throughout the last years due to the impact of sudden collateral calls). The message sent to energy merchants: They were carrying too much risk for the capital in their balance sheet, so they needed to reduce risk and increase capital reserves or experience a credit downgrade. After three years of continuous and widespread downgrades of energy merchants, the general belief is that there is currently an “overshooting” effect, that the credit rating agencies are penalizing energy trading firms excessively.

As part of the effort to restore confidence in the ability of energy merchants to meet their financial obligations, market participants, credit rating agencies, regulators and other stakeholders are pushing for a liquidity adequacy framework for energy trading firms.

Energy Trading and Capital Adequacy Standards: Basle capital adequacy and Inadequacies Applied to Energy Trading Firms.

The “Basel Accord” capital adequacy standards (CAD) allow banks to use the results from internal VaR models to set their regulatory risk capital. In particular, VaR should be calculated for a horizon of 10 days and a confidence level of 99 percent and multiplied by a factor of three to account for “extreme events” not captured by the models. In fact, regulators assume

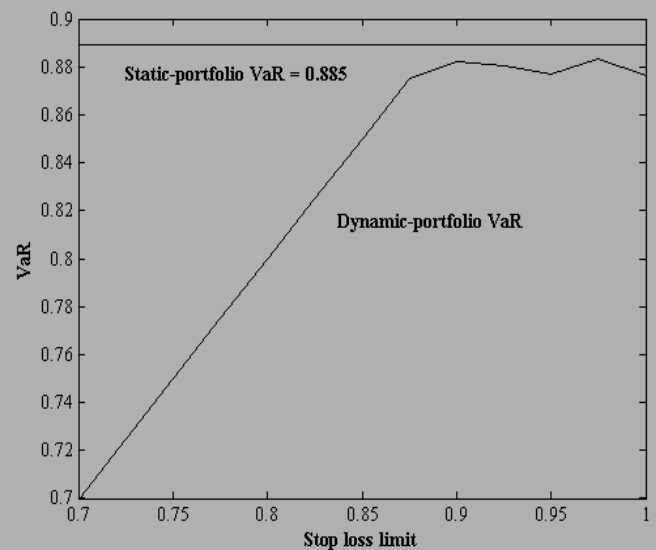
that VaR models are inaccurate, mistaking an implementation of a risk model with the model itself, and penalizing “good” risk modellers.

Hickman, Rich and Tange (2002) estimate that a direct implementation of the Basle Accord for Capital Adequacy can underestimate the required capital by 20 percent, suggesting that energy trading firms should take at least three key factors into consideration:

- **Inter-risk diversification.** The authors estimate that the diversification benefits between different types of risk faced by energy trading firms (market, credit and operational) is only about 5 percent versus 15 percent for financial services firms.
- **Targeted selected solvency standard.** Depending on the target credit rating, the capital set aside as a “buffer” should also change.
- **Management behavior and dynamic trading limits.**

In many instances, management has clear policies to reduce risk in certain circumstances, such as having stop-loss limits or stress test limits to reduce potentially devastating losses. Most risk models assume that positions are held constant and there is infinite liquidity in the marketplace, or are taken to expiration, and therefore do not explicitly capture trading behavior and trading and risk policies outlined by management. In energy markets, particularly in power, the “static” assumption of markets and portfolios is clearly unrealistic. When the optimal economic capital is determined, the individual policies for intervention to mitigate losses should clearly be assessed because they considerably alter the tail risk estimates.

Simulation methods can take into account dynamic trading rules, path dependencies and complex stochastic processes for the underlying risk drivers, including market, credit and liquidity risk. In the graph below, we can see the VaR of a static portfolio (constant) and as a function of a stop-loss limit using simulation methods. We can see how the VaR for the dynamic portfolio increases up to a point where it levels off, due to the fact that the stop-loss limit “kicks in” and reduces the risk of the position.



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From this point of view, choosing the right variables to model in the risk analysis (e.g. MtM vs., earnings versus cash flows), the material risk factors (e.g. spot versus forward prices, implied volatilities, volume, counterparty risk, rating downgrades...), trading strategy and liquidation period (e.g. stop-loss, delta-neutral, taking positions until expiration...), and the right risk metric (VaR, expected tail loss...) are key decisions in terms of setting short-term and long-term capital requirements.

Emerging Practices for a Capital Adequacy Framework

Two proposals on assessing capital adequacy for energy trading firms have been recently released. The industry response comes from the Committee of Chief Risk Officers (CCRO) through an ambitious white paper on *Emerging Practices for Assessing Capital Adequacy*. Standard & Poors has recently released its own set of guidelines in a report entitled *Analyzing the Liquidity Adequacy of US Trading and Marketing operations*.

S&P Recommendations for Liquidity Adequacy

S&P's liquidity adequacy guidelines focus on a company's liquidity under stress scenarios that combine a crisis of confidence in the firm's financial condition and a possible 30 percent adverse move in power and oil/gas prices. S&P indicates that these benchmark measures would allow them to establish minimum guidelines to enhance analytics and expedite comparisons. The report also clearly states that a shortfall from their guidelines could cause a rating downgrade.

The authors of the report say that VaR (calculated using traditional methods) is not a good proxy for capturing liquidity requirements, due to the fact that VaR is usually calculated using open (unhedged) positions while collateral calls could come from hedged and unhedged positions (hedged positions often outnumber their open positions by 20 times or more.) S&P's comments are accurate, but we believe they only apply to VaR models that do not attempt to model liquidity explicitly. In our next article, we will discuss in more detail different approaches to estimate "liquidity-at-risk" measures and present a comprehensive framework.

S&P has recently started surveying all investor-owned electric and gas companies, requiring firms to estimate their liquidity requirements at a point in time each month, with a particular focus on potential collateral calls from their trading and marketing operations. The report presents two key ratios:

- **Credit event liquidity adequacy (CELA)** = Primary liquidity / (negative current MtM + other liquidity calls).
- **Market and credit risk liquidity adequacy (MCELA)** = Primary liquidity (negative MtM with 30 percent price stress and other liquidity calls).

Primary liquidity is defined as unrestricted cash on hand and availability under credit facilities, plus cash and letters of

credit already posted to offset negative MtM exposures. Secondary liquidity is taken into account and includes a company's free cash flow, cash generated from selling inventory and receivables and uncommitted credit lines. Cash held as collateral is not considered as primary or secondary liquidity, and parent guarantees are only considered as liquidity under certain provisions.

Negative MtM and collateral exposures depend on the type of collateral triggers (hard versus soft) in the event of a credit downgrade expressed in the trading agreement

The 30 percent price shock for power, gas and oil prices was based on the historical increase or decrease on a year-to-year basis of average annual spot prices as a proxy for historical variability of the 12-month forward strip.

CCRO Recommendations for Capital Adequacy

The CCRO white paper is broader in scope and goes beyond short-term financial liquidity. The CCRO differentiates between two key measures of capital adequacy that should be addressed separately:

- **Short-run financial liquidity** refers to a company's ability to meet demands for cash under adverse conditions.
- **Long-run economic value** relates to a company's to execute its planned business activities while creating or enhancing shareholder value.

We will focus on the financial liquidity component of the capital adequacy framework.

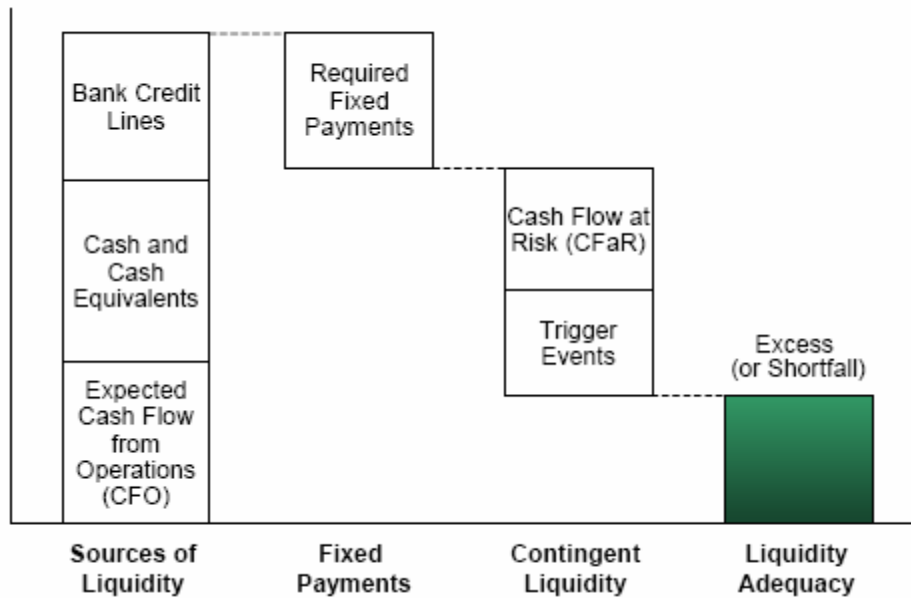
Managerial Benefits from having a capital adequacy framework from the CCRO perspective

1. Assess the long-run viability of a company's business model.
2. Adopt a decision-making support tool for capital allocation decisions by bringing to the forefront risks implicit in a proposed project or business plan.
3. Evaluate the effects of specific corrective actions in the event of a capital shortfall.
4. Promote transparency throughout the industry by allowing stakeholders a more complete assessment of the business and financial risks the company faces.

The CCRO white paper defines economic capital as the "the capital a company is required to hold to support the risk of unexpected loss in the value of its physical and financial portfolio." For energy companies, the primary sources of risk covered by economic capital are market risk, credit risk and operational risk. The white paper shows different ways to obtain an aggregate capital measure that go from a simple sum of the capital required to cover each risk, to an integrated simulation framework adding multiple sources of risk.

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 CCRO framework for measuring liquidity adequacy.



Source: CCRO white paper, pp. 49

The white paper differentiates between cash-flow-at-risk (CFaR), associated with investing and financing activities that are not included in the cash flow requirements from operations under normal day-to-day conditions, and liquidity at risk, which includes CFaR plus an additional cushion to support demand for liquidity triggered by credit or market stresses.

The CCRO white paper states that “modelling liquidity is a complex but necessary effort in measuring liquidity adequacy.” It recommends the use of dynamic simulations using a similar price propagation or price modelling process used in market, and credit risk assessments combined with financial relationships used in the construction of forward-looking financial cash flow statements. In order to estimate CFaR or liquidity at risk, it is necessary to include “trigger” events that could impact the liquidity conditions in the simulation framework. Those events could range from counterparty defaults to potential credit downgrades and the impact on the collateral calls, depending on whether there are soft and hard “triggers.” The S&P recommendations follow a similar framework, but they require firms to conduct a set of stress tests and estimate liquidity requirements based on those results, rather than a probabilistic measure of liquidity at risk.

Conclusion

Establishing a liquidity adequacy framework for energy trading firms is an idea gaining momentum among market participants, skeptical regulators and “trigger-happy” credit rating agencies and investors. First-generation risk models rarely account for liquidity issues explicitly, and there should be growing

pressure (internally and externally) to enhance them to take into account cash flow and liquidity risk drivers. In two recent papers, the CCRO and S&P have started the process by providing guidelines on financial liquidity adequacy for energy trading firms. Both groups are now discussing a common framework to define the most adequate metrics to assess liquidity for energy trading firms.

As the CCRO white paper states, “modelling liquidity is a complex but necessary effort in measuring liquidity adequacy.” Liquidity-related risks are complex to quantify and risk managers may have to rely on a combination of quantitative methods based on the assumption that the future will replicate the past, and other methods that take into account the fact that we may not be able to appreciate the possible range of scenarios we may face in the future. Due to the complexity of the problem, firms should complement their own analysis with the judgment of experienced professionals.

In our next article, we will present a simulation-based framework to capture liquidity requirements and measure CFaR and liquidity at risk, incorporating stress tests and using “coherent” risk measures.

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