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EDF Case Study

Denbury Resources Inc.: Falling Oil Prices Destabilize Oil And Gas Exploration and Production Sector

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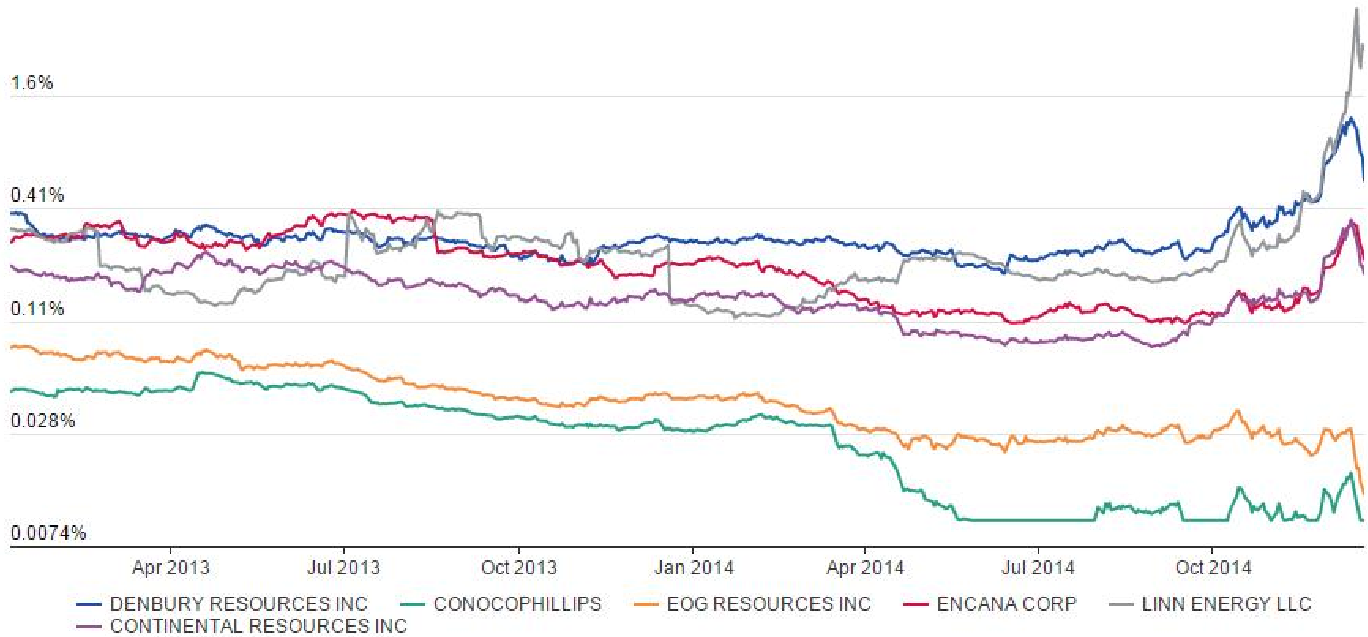
Summary

» Denbury Resources Inc. (DNR) is an independent oil and gas exploration and production company. Headquartered in Texas, the company focuses its operations in the Gulf Coast and Rocky Mountain regions. Over the past few months the company experienced declines in production and revenue. DNR is among many companies being negatively impacted by falling oil prices, which have declined by 48% since July 2014.

» On November 5, DNR posted a 6.1% decline in quarterly revenue on a year-over-year basis. Later in November, the company's management announced that it had halved its 2015 capital expenditure plan from $1.1 billion to $550 million in an effort to shore up its balance sheet amid the recent oil slump. DNR's one-year probability of default, which averaged 0.2% over the past two years, has increased from 0.23% in July to its current 0.6%. Despite the increase, the change in the DNR's EDF measure is in line with the overall rise in default risk for its peer industry group.

» The increase in DNR's EDF™ measure has been primarily driven by deterioration in its market leverage (financial risk). The heightened level of its EDF measure reflects investors' growing concerns that oil prices will continue dropping and not rebound for quite some time. DNR's market leverage has almost doubled since July 2014, to its current 45.4%. The current level of market leverage places DNR in the 60th percentile of its industry sector.

FIGURE 1. DNR'S ONE-YEAR EDF MEASURE VS. ITS INDUSTRY PEERS (%)
THE RISE IN DNR'S EDF MEASURE ACCELERATED IN NOVEMBER 2014



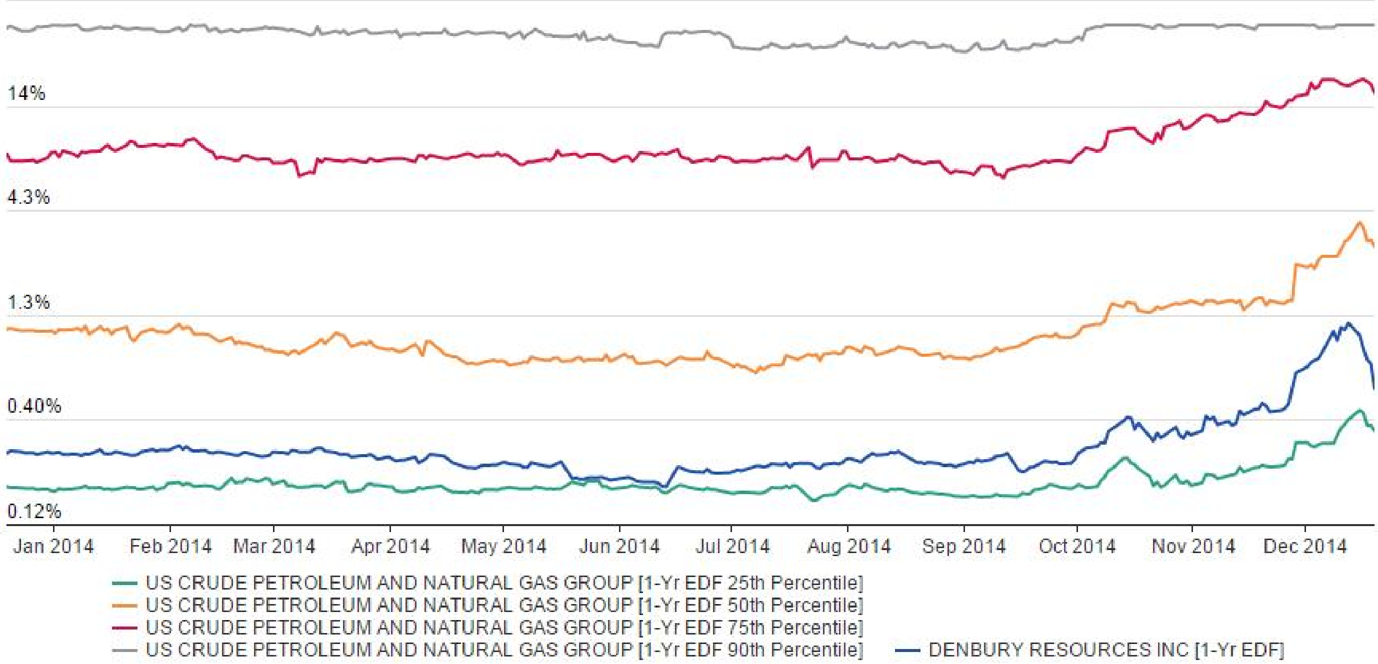
Global Oil Glut Leads to Widespread Rise in Credit Risk

Denbury Resources Inc. is one of the few oil companies in the United States that focuses on enhanced oil recovery (tertiary recovery) utilizing carbon dioxide and therefore allowing the company to have a low cost of production compared to its peers. The company's Expected Default Frequency (EDF™) reached its three-year high of 1.2% as of December 12, but then declined slightly as market participants saw a brief stabilization of the downward decline in global oil prices. DNR's EDF measure places its one-year probability of default at 0.6% as of December 19, 2014, an increase from 0.22% in July 2014. Amidst investor concerns that declining oil prices have yet to find a bottom, in an attempt to keep its 2015 production relatively flat, the company cut capital spending by 50%. As Figure 1 above shows, the increase in DNR's EDF measure has been in line with increases in the EDF measures of its direct competitors like ConocoPhillips, EOG Resources Inc., Encana Corp., Linn Energy LLC., and Continental Resources Inc. DNR is among other US oil and gas exploration and production companies that may face lower production growth if the global oil glut persists. As a result of lower production and lower prices, energy companies may experience lower than expected cash flow and debt capacity for future projects.

In November 2014, the company reported a slight decline in its revenues of $637.66 million in the third quarter 2014, compared to $684.83 million for the same quarter of 2013. Despite the recent rise in the DNR's one-year EDF measure, the company remains among the relatively less risky names in its industry peer group of US Crude Petroleum and Natural Gas. According to Phil Rykhoek, Denbury's President and CEO, the company experienced declines in non-tertiary fields, but tertiary production "increased 2% from the prior quarter level". He also noted that the company anticipates "production growth in the fourth quarter of 2014" and expects a daily production rate of 74,283 barrels of oil equivalent per day, up from its third quarter's average of 73,810 barrels of oil equivalent per day.

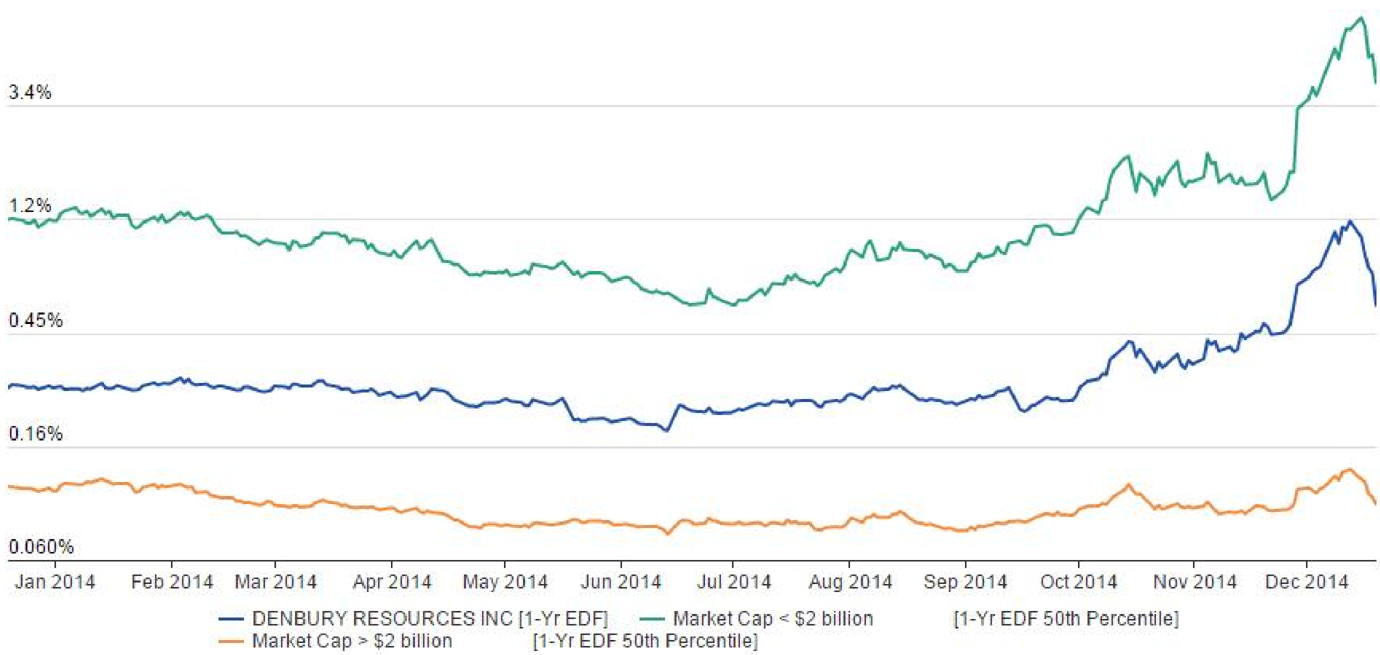
The company's recent events are clearly represented in the evolution of the level of the firm's EDF credit measure. However, an analysis of the trend and relative movement against its industry sector sheds additional light on just how risky the firm currently is. In addition to the level of DNR's EDF measure, Figure 2 below shows the median, 25th, 75th, and 90th percentiles of the EDF for DNR's industry peer group, the US Crude Petroleum and Natural Gas group. The rise in the company's EDF measure is in line with the overall deterioration of its peer industry group. The median EDF measure for the US Crude Petroleum and Natural Gas group increased fourfold from 0.7% in July to its current 2.9%.

FIGURE 2. DNR'S EDF MEASURE VS. EDF DISTRIBUTION FOR US CRUDE PETROLEUM AND NATURAL GAS GROUP
DNR'S EDF MEASURE HAS RISEN AS THE OIL INDUSTRY DETERIORATES



Among the 80 Moody's Investors Service rated companies in the US Crude Petroleum and Natural Gas group, DNR falls into the mid-cap companies' category with its current market capitalization of $2.9 billion. Figure 3 compares the recent trend in DNR's EDF measure with the trend of the median EDF measure for the companies in the US Crude Petroleum and Natural Gas group with less than $2 billion of market capitalization as well as with more than $2 billion of market capitalization. Here we show that the rapid deterioration in DNR's EDF measure was in sharp contrast to the changes observed in the companies with larger than $2 billion market cap. We also observe that smaller-size companies experienced a larger rise in default risk over the past three months, increasing from 0.8% in July to its current 4.09%.

FIGURE 3: DNR'S EDF MEASURE VS. EDF DISTRIBUTION FOR RATED US CRUDE PETROLEUM AND NATURAL GAS GROUP COMPANIES WITH DIFFERENT MARKET CAPITALIZATION
DETERIORATION IN DNR'S EDF MEASURE IS SIMILAR TO THE DETERIORATION IN THE SMALLER-SIZE COMPANIES IN ITS INDUSTRY GROUP



A Deeper Dive: Understanding the Drivers of DNR's EDF Measure

In this section we examine the drivers of Moody's Analytics' public EDF model and how the EDF measure reflected the deterioration in DNR's fundamental credit quality. In contrast to some black-box statistical models of credit risk, the drivers of the EDF model share many of the same basic approaches to measuring credit risk as fundamental credit analysis. Studying these drivers in addition to the EDF itself helps identify why a firm's default risk is changing.

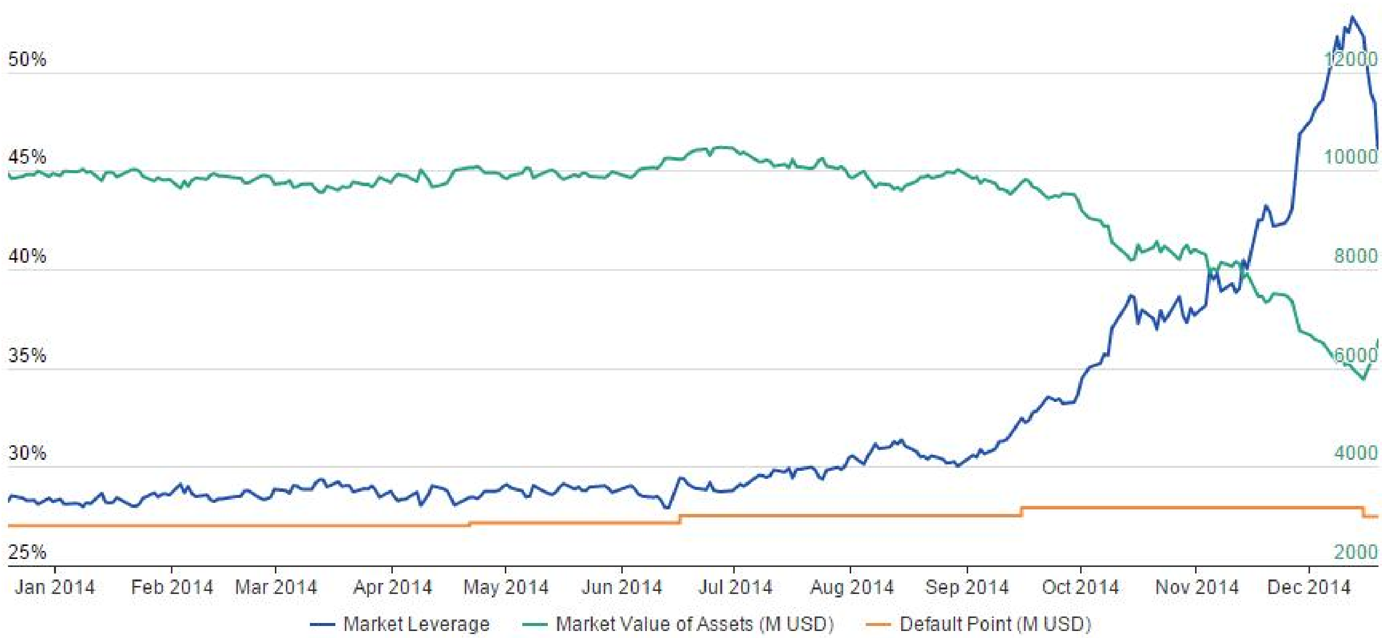
Moody's Analytics' public firm EDF model belongs to a class of credit risk models referred to as structural or asset value models. The basic assumption of asset value models is that there is a causal, economically motivated reason that default occurs. Default is highly likely to occur when the market value of the firm (the sum of the value of its market capitalization and debt) is insufficient to cover its liabilities due at some future date – i.e. firms tend to default when they are insolvent. This follows from the fact that equity holders are residual claimants on the value of the firm. If the market value of the firm is negative, equity holders can and often will "put" the residual value of the firm to creditors.

The above economic intuition can be translated into three quantifiable variables: the market value of a firm's assets, the volatility of those assets, and its default point, which is determined by a firm's liabilities. The interaction of the three variables is encapsulated by the firm's distance-to-default (DD) which, under some largely innocuous assumptions, can be expressed as:

$$\text{Distance to Default} = \frac{[\text{Market Value of Assets}] - [\text{Default Point}]}{\text{Asset Volatility}}$$

This simple ratio essentially states that a firm's relative credit risk (measured by DD) is a function of its financial risk and its business risk, two factors that are core concepts of fundamental credit analysis. The numerator of the above ratio measures market leverage – i.e. financial risk[1]. All else equal, higher leverage decreases DD and hence increases the probability of default. The denominator of the DD equation represents the firm's business risk. Firms in industries with high asset volatility tend to exhibit higher risk of default, all else equal[2]. Once we have calculated a firm's DD, we can derive its probability of default (its EDF measure) by looking at the historical average default rate consistent with each DD level.

FIGURE 4: DNR'S MARKET LEVERAGE, DEFAULT POINT AND MARKET VALUE OF ASSETS
DNR'S MARKET VALUE HAS ERODED SHARPLY WHILE LIABILITIES HAVE INCREASED, DRIVING MARKET LEVERAGE AND EDF HIGHER

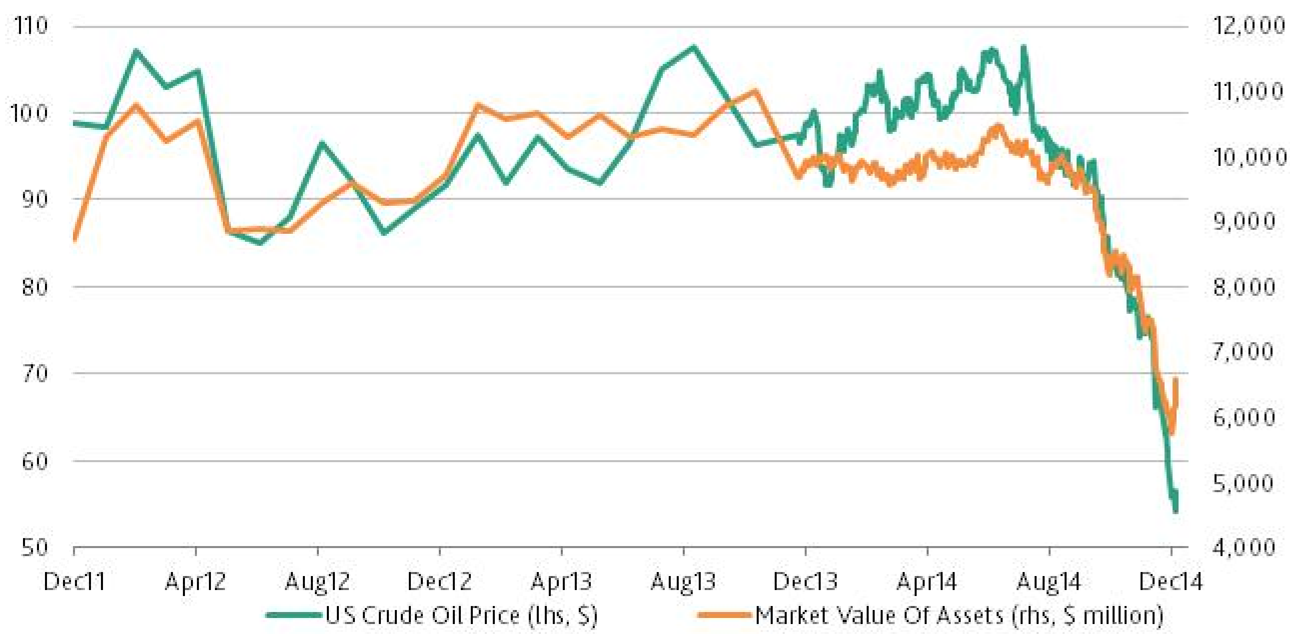


An analysis of the contribution of financial risk and business risk to changes in DNR's EDF measure over the past several months shows that the primary reasons for the sharp rise of its EDF metric was a significant decline in the market value of the firm, and a large increase in financial leverage. Figure 4 shows the time series of DNR's market value of assets, its default point, and its market leverage. Market leverage summarizes a firm's financial risk, and is the ratio of a firm's default point to its market value of assets (expressed in percent). Unlike book leverage, market leverage reflects the forward-looking views of investors. Market leverage goes up when a firm's liabilities increase and/or when the market value of its assets declines. One can view changes in the market value of a firm's assets as investors' collective view on the expected profitability of a company: when the market value of assets goes up, investors expect future cash flows to increase. The opposite is true when the market value of assets goes down – as in the current case. The graph shows that DNR's market leverage has increased since July 2014. Over the past month alone, DNR's market leverage has increased by 19%, from 38% to 45.4% as of December 19, 2014. Currently, its market leverage is in the 60th percentile of its industry group.

As crude oil prices plunged to the lowest levels in more than five years and DNR reported a 6.1% year-over-year decline in its third quarter revenues, the company's market value of assets dropped from $10.1 billion in July to $6.5 billion as of December 19 – a 35% decline. A contributing factor to the change in DNR's financial fortunes is the overall uncertainty about the future volatility of oil prices. On December 12, the International Energy Agency cut its demand growth forecast for 2015 by 230,000 barrels per day to 0.9 million barrels per day on expectations for lower fuel consumption in Russia and other oil-exporting countries. Falling oil prices cause concerns not only about oversupply, but also suggests that the global economy faces a weakening growth.

Figure 5 shows how DNR's financial condition worsened as the price of crude oil began to shrink. The market value of DNR's assets tracked the positive momentum in oil prices very closely until June 2014. In mid-2014 as the civil conflict in Libya eased, the country opened its two key export terminals, unexpectedly raising its exports. Moreover, oil demand in Asia and Europe began weakening. The combination of weaker demand and rising supply caused oil prices to start dropping from their peak of $107 in June to its current $56. Since then, as demand falls, investors are wary about the energy sector's ability to cover development costs and fund future projects.

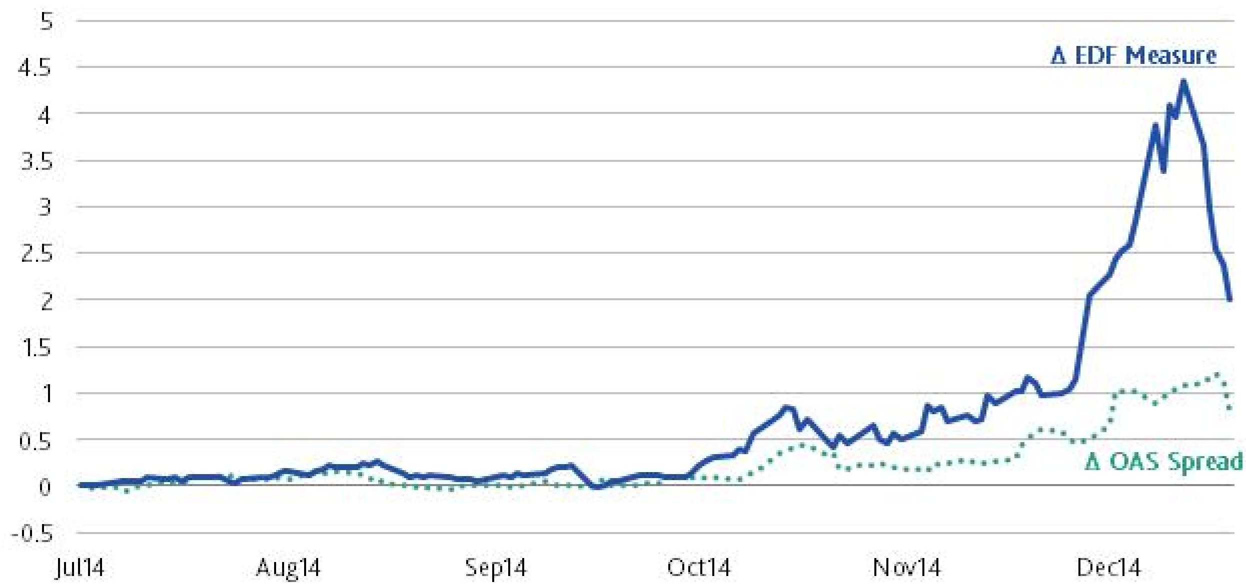
FIGURE 5: DNR'S MARKET VALUE OF ASSETS VS. WTI CRUDE OIL PRICES
THE DROP IN MARKET VALUE OF DNR'S ASSETS WAS IN LINE WITH DECLINING PRICE OF CRUDE OIL



EDF Measures versus Other Market Signals of Risk

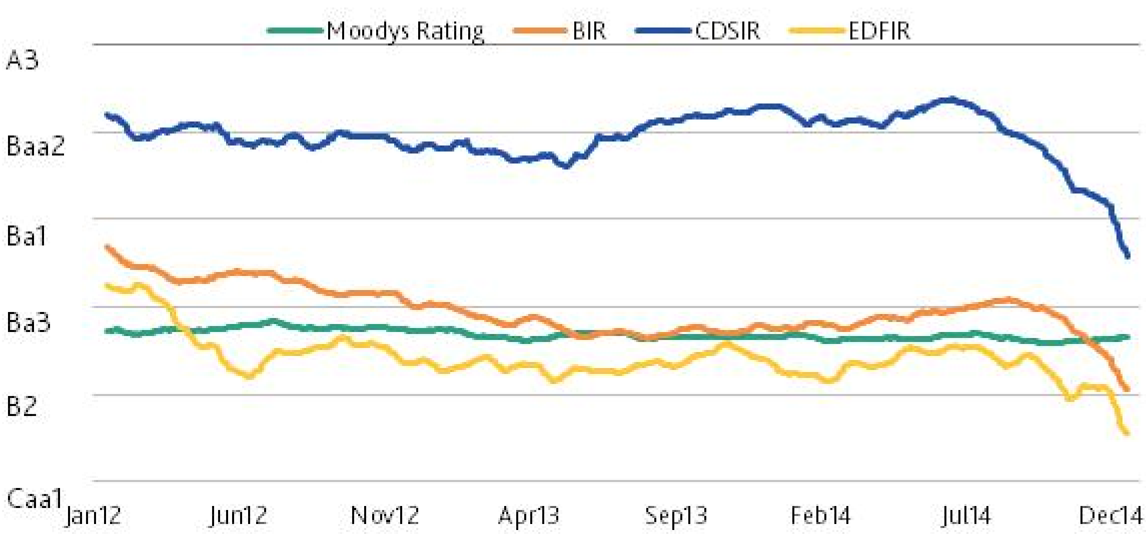
One of the advantages of the public EDF measure is that it uses equity market information as one of its inputs to estimate probabilities of default. The liquidity of the public equity market relative to the bond or even credit default swap market enables EDF credit measures to signal sudden changes in default risk. The bond market has been slower to re-price the risk of default for DNR. Figure 6 below shows the percent change in the public EDF measure for DNR together with the percent change in the spread over Libor on its 6.38% bonds maturing in 2021. Each line shows the percent change on a given date vs. July 2014 (the first date shown on the graph). Compared to its 0.2% EDF level in July, DNR's EDF measure increased by 200%, while its bond spread had a more gradual deterioration and widened by 79%.

FIGURE 6: PERCENT CHANGE IN DNR'S EDF MEASURE AND ITS BOND SPREAD OVER LIBOR SINCE DECEMBER 2011
DNR'S EDF MEASURE SHOWED A RAPID DETERIORATION COMPARED TO ITS BOND SPREAD



EDF credit measures, as well as credit spreads, are granular measures of the level of a firm's default risk. However, for some purposes, investors prefer to analyze credit risk in the language of credit ratings. Figure 7 shows the market-implied ratings for US Crude Petroleum and Natural Gas industry based on the one-year EDF measure, the bond option-adjusted spread, and the credit default swap spread, in addition to the senior unsecured ratings from Moody's Investors Service (MIS) for comparison. By viewing default probabilities and bond spreads in terms of implied ratings, we transform them from statements about the level of risk to comparisons of relative default risk expressed in an ordinal scale[3]. The graph shows that EDF measures were essentially in line with their bond-implied and MIS ratings prior to July 2014, but since then the protracted decline in the market-implied rating signaled a rise in default risk among the companies in the US Crude Petroleum and Natural Gas Group. The average EDF-implied rating for the industry is B3, which is one notch below the average bond-implied rating of B2 and two notches below the average Moody's rating of B1. At Caa1, DNR's EDF-implied rating is only one notch below the average EDF-implied rating for its industry peer group.

FIGURE 7: AVERAGE EDF– IMPLIED RATING, BOND-IMPLIED RATING, CDS-IMPLIED RATING, AND MOODY'S RATING FOR US CRUDE PETROLEUM AND NATURAL GAS GROUP



Summary

As crude oil prices began to plunge in June 2014, the US energy sector experienced a widespread rise in Expected Default Frequency (EDF) measures among its members. One example of a company with a sharp rise in its EDF measure was Denbury Resources Inc. DNR's one-year probability of default increased from 0.2% in July to its three-year peak of 1.04% as of December 16. The company's EDF measure has declined slightly since then as market participants saw a brief stabilization of the downward decline in global oil prices. Despite the overall increase from its July levels, the current level of the company's EDF measure is in the 32th percentile of its peer industry US Crude Petroleum and Natural Gas group. Moreover, relative change analysis of the company's EDF measure suggests that DNR's EDF measure increased as the whole sector showed deterioration.

The analysis of the contribution of financial risk and business risk to changes in DNR's EDF measure since July shows that the primary reason for the rise in its probability of default is high and rising financial risk as measured by the firm's market leverage. As a result of falling oil prices the company announced a year-over- year quarterly decline in revenues and plans to cut capital spending by 50% in 2015. Since July, company's market value of assets dropped by 35% to its current $6.5 billion, which in turn contributed to a 50% increase in DNR's market leverage. A contributing factor to the change in DNR's financial fortunes is the overall uncertainty about the future volatility of oil prices. As the global oil glut persists, investors are wary about the energy sector's ability to cover development costs and fund future projects.

Endnotes

1 A technical note is that all the terms in the DD ratio are measured in logs. So in nominal terms the numerator is itself the ratio of market asset value and default point, which has a natural interpretation as a leverage ratio.

2 Asset volatility is measured as the standard deviation of the annual change in the market value of assets.

3 Moody's Market Implied Ratings: Description, Methodology, and Analytical Applications. Sept 16, 2011.

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