

## SECTOR IN-DEPTH

23 May 2016

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### Contacts

David Keisman Senior Vice President david.keisman@moodys.com	212-553-1487
John E. Puchalla, CFA Senior Vice President john.puchalla@moodys.com	212-553-4026
Julia Chursin Associate Analyst julia.chursin@moodys.com	212-553-2932
Amol Joshi, CFA VP-Senior Analyst amol.joshi@moodys.com	212-553-7267
Tom Marshella Managing Director – US and Americas Corporate Finance tom.marshella@moodys.com	212-553-4668

## Corporate Defaults and Recoveries - US

### First-Tier Risk for Second-Lien Debt

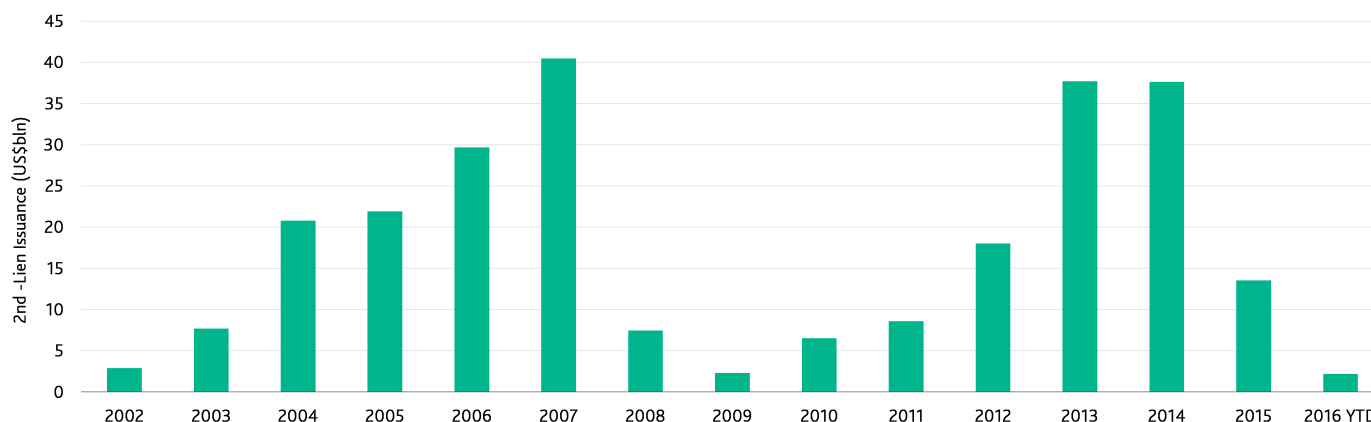
- » **Second-lien issuance outside of energy slowed dramatically after a 2013-2014 peak, as investors feared how the securities would fare in a default cycle.** While a new default cycle has not yet materialized outside of energy, our research continues to show that second-lien recoveries would be only slightly better than those of similarly structured unsecured debt.
- » **Structure matters.** The second-lien recovery drivers cited in our previous research continue to hold: family-level recoveries and the position of the debt in the capital structure are highly correlated with the second-lien recoveries. Second-lien recovery rates for complex structures, where there is debt above and below the second-lien securities, remain significantly higher than those for a simple structures, where the second lien has no debt cushion.
- » **Second-lien recoveries could get worse.** As a result of the continued trend to structure second-lien debt more as subordinated debt, rather than as mezzanine debt, we expect second-lien recovery prospects to resemble that of subordinated debt, rather than that of mezzanine debt with debt cushion.
- » **Moody's loss given default (LGD) assessments remain a good indicator of second-lien debt's realized ultimate recovery on a portfolio basis.** Prior research has demonstrated that our LGD assessments are good predictors of recovery rates and our updated research shows that this continues. Of 54 bankruptcies we looked at involving 63 second-lien instruments, realized average loss rates were substantially lower for issuers with low Moody's LGD assessments.
- » **Second-lien collateral value will likely be tested during the current energy-related default cycle.** Default rates in the energy sector have climbed, and this will inevitably lead to debt restructurings at some companies — and bankruptcies for others — that have issued second-lien debt in the last two years. We have seen a spike of distressed exchanges among oil & gas exploration and production (E&P) companies, many of which issued second-lien debt. While those securities are likely to remain an enduring feature of speculative-grade energy companies' capital structures, investor appetite and pricing will likely be influenced by the debt's performance in default.

## Second-Lien Debt Issuance Slowed Significantly, Reflecting Jitters About the Next Down Cycle

Between 2010 and 2014, second-lien debt issuance accelerated rapidly, as investors looked for a combination of security interest and yield. Since then, default fears from these same investors led to a slowdown in issuance in 2015 that carried into the first quarter of 2016, according to the data compiled by Thomson Reuters LPC (see Exhibit 1).

Exhibit 1

### Second-Lien Issuance Slows Drastically as Investors Grow Risk-Averse



\*2016 YTD number is completed deals only and through 5/4/16

Source: Thomson Reuters LPC

While the feared default cycle has not yet materialized, Moody's proprietary data suggests that the credit cycle is past its prime and approaching its turn. The US speculative-grade default rate rose to 4.4% at the end of April, more than double the 1.8% rate from a year ago. We now expect the default rate to exceed its long-term historical average of 4.7% (estimated since 1983) in the second quarter of 2016, and reach 6.2% by year end. Deteriorating credit quality and elevated default rates in commodity sectors will continue to fuel a rising overall default rate for most of 2016. In fact, our various proprietary indicators, including Moody's [B3 Negative and Lower Ratings List](#), and the [Liquidity Stress Index](#), are flashing caution signs indicating elevated default risk — though for now they do not point to a wide-spread distress.

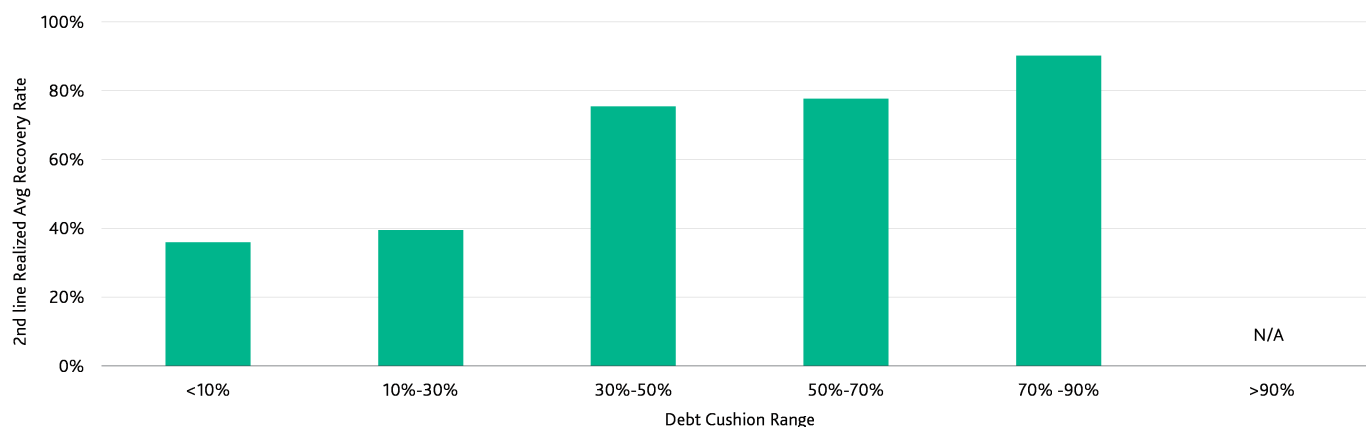
## Key Recovery Drivers Remain Intact

Second-lien recovery drivers from our previous research continue to hold true.

Family-level recoveries and the position of the second-lien debt in the capital structure are highly correlated with second-lien recoveries. Recoveries on second-lien debt are higher when the debt is part of a complex capital structure that includes a cushion of contractually subordinated debt (see Exhibit 2). Second-lien debt recoveries are weaker when part of a simple structure, where there is no tranche of subordinated debt to absorb first losses, which elevates the importance of family-level recovery.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on [www.moody.com](http://www.moody.com) for the most updated credit rating action information and rating history.

Exhibit 2

**Recovery Rates are Predicated on Debt Cushion**

Source: Moody's Ultimate Recovery Database

The 212 defaulted second liens on average had a much weaker recovery rate (51%) than first-lien debt (88%) within the same corporate family (see Exhibit 3). Similarly, for the 102 defaults that involved a company with a complex structure, second liens had a much higher recovery (60%) than unsecured debt (22%) within the same corporate family. Recovery rates of the second-lien debt in complex structures also surpassed those of second liens in simple structures, lacking any absorption capacity, that on average only recovered 38%.

Exhibit 3

**Second Lien Recoveries by Capital Structure**

Average Recovery						
Capital Structure						
	Simple	Population Size	Complex	Population Size	Total	Population Size
First-lien bank debt	81%	103	92%	169	88%	272
Second-Lien	38%	88	60%	124	51%	212
Unsecured	N/A	N/A	22%	207	22%	207
Firm-Wide	58%	71	53%	102	55%	173
Capital Structure						
Standard Deviations						
	Simple	Population Size	Complex	Population Size	Total	Population Size
First-lien bank debt	28%	103	17%	169	23%	272
Second-Lien	31%	88	40%	124	38%	212
Unsecured	N/A	N/A	32%	207	32%	207
Firm-Wide	27%	71	21%	102	24%	173

The only 212 defaulted second-lien debt facilities were part of 173 defaulting corporate families from 1988-present. The unsecured category includes only debt classes subordinate to second liens within the same issuer family.

Source: Moody's Ultimate Recovery Database

The influence of family recovery and debt cushion is also evident in the regression equations that we discuss in more detail in Appendices A-C.

Collateral value is important but the presence of a security pledge does not guaranty a higher recovery rate on defaulted debt instruments, rather debt instruments' priority of claim established by collateral is most important. Collateral is vital to establishing debt priority in reorganization (see Exhibit 4, which provides additional detail on the relative recovery performance of defaulted first- and second-lien instruments within the same issuer family.) First-lien creditors' recovery was substantially higher than second-lien recovery, except in the 44 instances when the firm-wide recovery was high enough to provide full recovery for both the first and second liens.

Exhibit 4

**Relative Recoveries of First- and Second-Lien Instruments**

	Number of Defaults	Avg. 1st Lien Recovery	Avg. 2nd Lien Recovery
<b>1st and 2nd Lien Both Full Recovery</b>	44	100.0%	100.0%
<b>1st Lien recovery &gt; 2nd Lien Recovery</b>			
1st Lien Full Recovery	86	100.0%	43.0%
1st lien less than Full Recovery	43	59.0%	11.9%
<b>Total</b>	<b>173</b>	<b>88.1%</b>	<b>51.0%</b>

Source: Moody's Ultimate Recovery Database

Second-lien recovery is poor (on average, just slightly above 36%) in simple capital structures, unless the family recovery is in the 80%-plus range (see Exhibits 5). In the case of the high firm-wide recoveries, second-lien debt does much better as well (76%). First-lien recoveries also tend to be quite high (greater than 70%), unless family recovery is 20% or below, which drives the debt recoveries down below the historical average.

Exhibit 5

**Simple Capital Structures  
(First and Second Lien Only)**

Firm-Wide Recovery	Number of defaults	Average First-Lien Recovery	Average Second-Lien Recovery
0-20%	8	41.0%	2.6%
20-40%	11	71.4%	6.9%
40-60%	18	79.0%	26.7%
60-80%	15	98.4%	37.9%
80-100%	19	100.0%	76.1%
<b>Total</b>	<b>71</b>	<b>81.1%</b>	<b>37.6%</b>

Source: Moody's Ultimate Recovery Database

Recoveries of second liens in complex capital structures tend to be much higher, owing to the presence of debt cushion (see Exhibit 6). This is evident even when the family recovery is close to the 50% average. Debt cushion of greater than 40% tends to push second-lien recoveries to almost 70% or higher. To achieve an equivalent second-lien recovery in simple capital structures, the firm-wide recovery needs to be very high (80% or more).

Exhibit 6

**Complex Capital Structure  
(First Lien, Second Lien and Unsecured)**

Debt Cushion	Number of defaults	Firm-Wide Recovery	Average First- Lien Recovery	Average Second-Lien Recovery
0-20%	31	56.06%	N/A	27.5%
20-40%	22	55.93%	84.4%	55.8%
40-60%	27	52.59%	88.2%	69.8%
60-80%	18	48.35%	97.6%	90.3%
80-100%	4	39.53%	100%	100.0%
<b>Total</b>	<b>102</b>	<b>53.1%</b>	<b>92.4%</b>	<b>60.4%</b>

In complex capital structures, the junior layer of debt is unsecured and/or subordinate bonds when the middle layer of debt is a second-lien obligation. When the middle layer of debt is senior unsecured bonds in a complex structure, the junior layer of debt is a contractually subordinate bond.

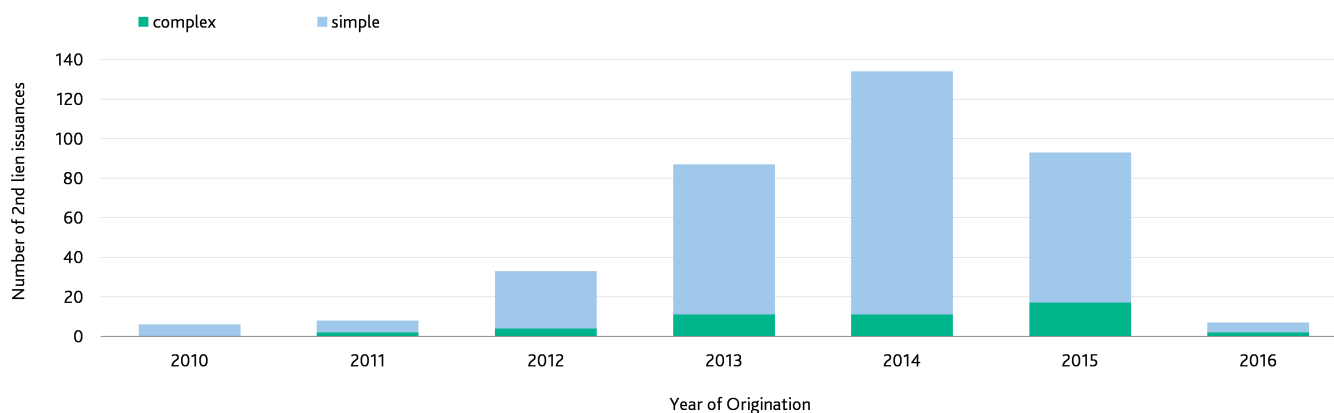
Source: Moody's Ultimate Recovery Database

## Our LGD Assessments Point to Second-Rate Recoveries for Second-Lien Debt

"Simple" structures with second-lien debt have been flourishing post-crisis, and imply overall lower expected second-lien recovery rates than the historical 51% average and relative to second lien instruments in "complex" structures (see Exhibit 7). Only 15 second-lien instruments originated since 2010 have defaulted, but the ultimate recovery for such obligations is slightly lower in both simple and complex structures relative to second liens originated prior to 2010. While it is premature to draw definitive conclusions from such a small data set, the results are consistent with the Exhibit 7 depiction of a greater willingness to aggressively structure second-liens with less debt cushion.

Exhibit 7

**"Simple" Structures with Second-Lien Debt Flourished in Post-Crisis Era, Point to Lower-than-Average Recovery Rates Looking Ahead**



Source: Moody's

According to Moody's loss given default assessments (LGDAs), the average expected recovery rate of currently rated second-lien debt is only 21% in the event of a default. This average is 4% lower than estimated in our [January 2014 report](#) and much weaker than the already subpar historical average second-lien recovery of 51% (see Exhibit 8). The expected second-lien recovery rates in default are lower in both simple and complex structures, which also suggests second liens are now more aggressively structured. Anticipated recovery rates for second-lien oil & gas debt are higher than the overall population – this might be attributed to differences in structuring in addition to the value of the collateral.

Exhibit 8

**Moody's LGDAs Predict Second-Rate Recovery for Second-Liens**

	Defaulted 2nd lien recovery (1)	Sample Size	Expected 2nd lien recovery if default (2)	Sample Size	Oil & Gas Expected 2nd lien recovery (2)	Sample Size
Simple structures (3)	38%	88	17%	321	25%	11
Complex structures (3)	60%	124	44%	47	63%	12
All structures	51%	212	21%	368	45%	23
Average family recovery (4)	55%	173	50%	340	51%	20

(1) Source: Moody's Ultimated Recovery Database; based on 173 default events where second-lien defaulted covering 212 second-lien instruments

(2) Moody's LGD rates on existing rated 2nd lien instruments that are not in default

(3) In a "simple" capital structure, the second-lien instrument is the most subordinated debt tranche. A "complex" structure includes subordinated debt such as unsecured obligations beneath the second lien instrument

(4) Family recovery is the combined recovery for all firm claimants

Source: Moody's

### About Moody's LGD Methodology

Moody's introduced LGD assessments in 2006 in order to increase the transparency and consistency underlying the assignment of individual loan and bond ratings. Our LGD assessments are based on analysts' expectations of a company's liability structure at default, as well as the expected enterprise value of a company when it emerges from default. Moody's analysts estimate enterprise value at emergence from default based on both the historical experience of defaulted issuers included in Moody's Ultimate Recovery Database (URD) and company-specific fundamental analysis. We express LGD as an assessment, such as LGD3, and an associated point estimate. For example, LGD3 – 48% indicates that we expect an instrument to incur a 48% loss, which falls into the LGD3 range. Point estimates are distributed across the following scale:

LGD Assessments	Loss Range
LGD1	0% and 10%
LGD2	10% and 30%
LGD3	30% and 50%
LGD4	50% and 70%
LGD5	70% and 90%
LGD6	90% and 100%

For more details about LGD approach, please click [here](#)

The distribution of Moody's LGDAs for currently outstanding second-lien debt (see Exhibits 9 and 10) shows that the majority of this debt consists of second-lien term loans in the LGD5 expected-loss bucket and with an overall average expected recovery rate of 15%. The overwhelming majority of second-lien term loans, 276 of 297, are part of "simple" capital structures and carry an expected recovery of 15%. In the case of second-lien bonds/notes, the majority of these instruments are also part of simple structures, but are clustered in LGD4 and LGD5 buckets, corresponding with expected average recovery rates of 40% and 21%, respectively. The difference is that second-lien term loans in simple structures tend to be behind a meaningful amount of first-lien term loans, whereas second-lien bonds in simple structures tend to represent the majority of the debt structure and are usually behind only a modestly-sized first-lien revolver (often an ABL).

Exhibit 9

#### Distribution of Expected Second-Lien Recovery Rates by Debt Class

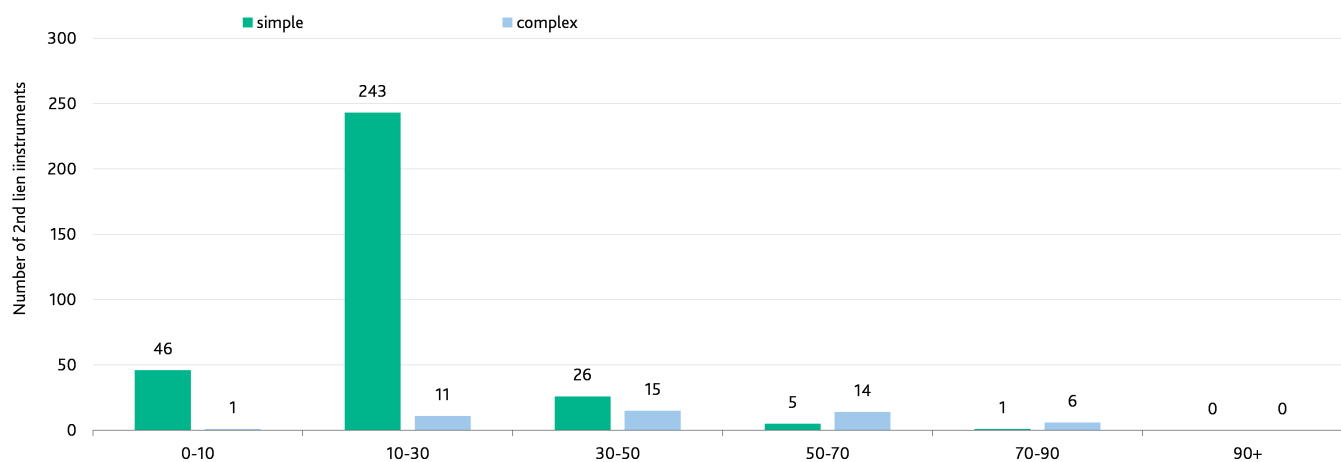
Current LGD Assessments *	Expected 2nd lien Recovery Rates			
	Bank Credit Facility	Sample Size	Regular Bond/Debenture	Sample Size
LGD2	80%	1	76%	6
LGD3	57%	11	57%	8
LGD4	36%	11	40%	27
LGD5	15%	228	21%	29
LGD6	9%	46	8%	1
Total	17%	297	37%	71

Moody's Loss Given Default Assessments as of March 16, 2016  
Source: Moody's

We continue to see significant differences in both realized and expected recovery rates between second liens in a "simple" and "complex" capital structures. In "simple" capital structures the second-lien security is the most-subordinated debt tranche, whereas a "complex" structure includes unsecured debt beneath the second-lien instrument.

The difference in recovery rates between the two structures is striking — more than 66% of the currently rated second-lien instruments are part of "simple" capital structures and would be expected to realize a recovery in the 10% - 30% range in the event of a default. "Complex" structures with second-tier debt are less common, with all such structures combined representing only around 13% of the total rated second-lien universe, and their anticipated recovery rates are skewed to the higher end of the spectrum, from 30% to 70%.

Exhibit 10

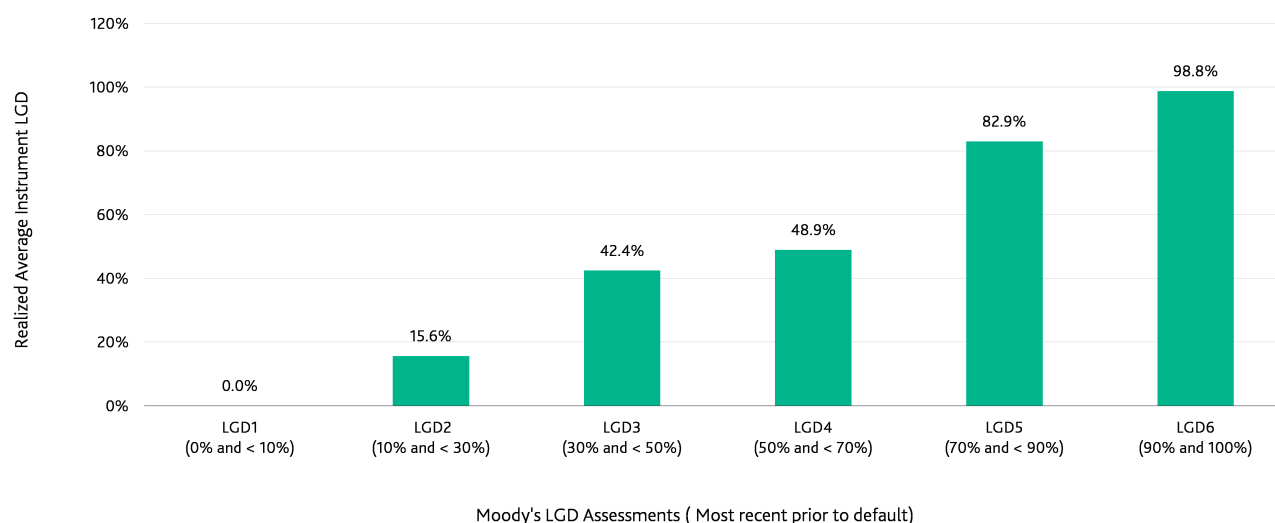
**Distribution of Expected Second-Lien Recovery Rates by Capital Structure Type**

Moody's Loss Given Default Assessments as of March 16, 2016

Source: Moody's

Previous research has demonstrated Moody's LGDAs are good predictors of recovery rates overall and we expect them to continue to be accurate predictors of second-lien recovery rates. We reviewed 54 bankruptcies of US-domiciled non-financial corporates involving 63 second-lien instruments with assigned Moody's LGDAs immediately prior to default. Average loss rates were much lower for issuers with low LGDAs (see Exhibit 11). For instance, the 42.4% average loss rate (or 57.6% recovery rate) for second-lien instruments with an LGD3 assessment prior to default was roughly at the midpoint of the 30%-50% loss range associated with that LGD bucket (70%-50% recovery range).

Exhibit 11

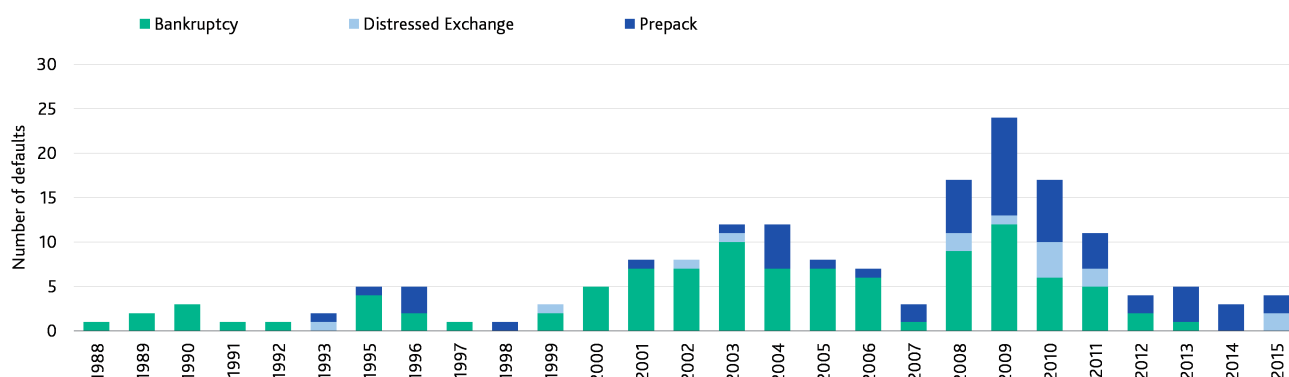
**Performance of LGDAs Close to Default,  
Based on 63 defaulted second-lien instruments with LGDAs**

Only bankruptcies were included

Source: Moody's Ultimate Recovery Database for realized loss; Moody's Loss Given Default Assessments prior to default

Our review of 173 historical defaults with 212 defaulted second-lien debt facilities in the capital structure shows the largest number of such defaults occurred during the Great Recession default cycle in the form of bankruptcies (see Exhibit 12). In the current cycle, these debt facilities were used as a tool to consummate distressed exchanges in many instances— as a new security for which to swap unsecured debt — and it remains to be seen how this debt will fare, should these distressed exchanges fail and the companies that completed them end up in bankruptcy.

Exhibit 12

**Second-Lien Default Types**

Source: Moody's Ultimate Recovery Database

## Recovery Rates of Second-Lien Debt Not Much Different from Similarly Positioned Unsecured Debt

Among the 173 non-financial corporate defaults where there was defaulted second-lien debt in the capital structure, we found the average second-lien recovery was only 4.8 percentage points better than the average recovery of similarly positioned senior unsecured debt (see Appendix A for the regression model used to derive this estimate).

Collateral value can deteriorate by the time a company defaults, weakening recovery if other protections, such as sufficient debt cushion, are not present.

Since the collateral packages for most of the first- and second-lien instruments in this report consisted of substantially all domestic assets, family recovery is a good proxy for the value of that collateral in default. As noted, second liens tend to recover highly when family recovery is high, but perform poorly when family recovery is not particularly strong.

The incremental value of holding a second lien after adjusting for the factors that heavily influence recovery (debt cushion and family recovery) is not very high. This shows there is some value to having a priority position over general unsecured (GU) claims, such as trade credit, pension obligations and leasehold rejections claims. However, GU claims are often small in relation to pre-petition debt and often reinstated with no impairment in reorganizations where the company continues to operate. In those situations, there could be a tangible business benefit to maintaining good relationships with the primary GU claimants – vendors, landlords and employees. It is unlikely investors in second-lien instruments were expecting such a slight 480-basis point advantage in recovery rates over similarly positioned senior unsecured debt that lacked this claim.



## Recovery Behavior of Recent E&P Second-Lien Debt Issues Will Be Tested as Energy Woes Continue

In 2015 and the first quarter of 2016 combined, distressed exchanges comprised 44% of the total number of defaults, continuing the trend that emerged in the Great Recession default cycle of employing this type of debt restructuring. The E&P sector, in particular, has seen a surge of distressed exchanges, with creditors willing to swap principal to improve their payment-priority position in the midst of a protracted slump in commodity prices. In most instances, creditors have exchanged senior unsecured debt for smaller amounts of secured debt, typically second or third liens. In fact, in 58% of the consummated distressed exchanges in this battered sector, oil & gas companies managed to have creditors swap old, unsecured debt for new, second-lien secured facilities.

The primary motivation behind the current oil & gas DE gusher is not only debt reduction, but also an exchange of senior unsecured debt for smaller amounts of secured second- or third-tier debt. If successful, this lessens the probability of default for the issuer, in addition to possibly decreasing the loss given default for the new debt versus the exchanged instrument. We say possibly, since this will only work if the new security ranks higher in repayment priority. If the only improvement is that the new debt is secured by a second or third lien — versus being unsecured — but remains at the same relative rank on the balance sheet, then Moody's research continues to demonstrate that the improvement in ultimate recovery is negligible.

## Energy Second-Lien Debt's Collateral Value Will Likely Be Tested in Default

Amol Joshi, CFA

With oil prices at robust levels for many years, investors chased yield and funded speculative-grade energy companies' capital intensive shale development with unsecured bonds. During these boom times, even weak energy credits were able to negotiate flexible covenant packages. For example, many indentures included a permitted lien that allows the issuer to grant liens on any of its assets to secure any credit facility debt permitted under the indenture, including loans, bonds and capital markets debt, providing the ability to raise secured debt higher in priority to the unsecured bonds.

The crude oil price collapse that began in the second half of 2014 led to a significant deterioration in cash flows for most energy companies, and in particular worsening the inherently limited financial flexibility of speculative-grade energy companies with weak credit profiles. It further reduced their liquidity, especially for highly levered companies with most of their assets encumbered by their revolving credit facilities. While unsecured bonds provided much of the funding needs of the capital intensive energy sector along with bank debt and equity, capital markets access for highly leveraged energy companies became highly constrained due to the collapse in oil prices and continued weak natural gas prices.

This inability to issue unsecured debt generated a market for secured note issuance at relatively lower yields — especially for companies with significant amounts of existing unsecured notes, which provide a debt cushion in case of default to the new secured-note investors given their priority position in the capital structure. Banks also sometimes prefer new debt as long as it ranks below the bank debt. This new debt, often a second lien, served to reduce the banks' first-lien exposure since the issuing company often used some of the second-lien proceeds to reduce its existing first-lien revolver, which also provided an incentive to banks with a first lien on the underlying collateral to allow investors to share in the collateral through a junior lien. Second lien debt issuance has provided a critical source of funding for such energy companies during the downturn in oil and gas prices.

Several issuers took advantage of a thaw in the capital markets as oil price stabilized and rallied during the first half of 2015 by issuing significant amounts of secured debt. Energy XXI and SandRidge Energy issued a combined \$2.7 billion of second lien debt which served to further subordinate unsecured bonds which were already behind an existing first-lien revolver. Some companies such as American Energy Woodford and Midstates Petroleum also issued secured debt through distressed exchanges, exchanging existing unsecured debt for new secured debt at a significant discount, in an attempt to correct unsustainable capital structures. Significant amounts of new capital was put to work by investors, assuming that sharing in collateral value alongside banks, albeit through junior liens, would lead to good recoveries in the event of bankruptcy.

While the issuance of second lien debt, and other secured debt variants such as third lien debt and possibly 1.5 lien debt, has led to material leverage creep in already levered energy capital structures, it has also served to fund capital expenditures and extend the financial viability of highly stressed companies. Therefore, it may be argued that this issuance of secured debt has helped sustain US oil and gas supply while prices have remained uneconomic for a significant swath of such oil and gas drilling.

We are now witnessing a surge in energy distressed exchanges and eventual bankruptcies, offering an interesting example of behavior when an entire industry segment is under significant stress. Some companies have fully drawn on their bank revolvers, while second lien debt issuers such as Energy XXI and SandRidge Energy have filed for bankruptcy.

Default rates in the energy sector have climbed, and this will inevitably lead to debt restructurings of some companies and to the bankruptcies of other companies that have issued second lien debt in the last two years. While first lien recovery rates are generally expected to be high as with other prior default cycles, it will be important to analyze recoveries on energy second lien debt during this downturn, and we will observe whether ultimate recoveries turn out to be adequate relative to non-energy second lien recovery rates. Collateral values of energy assets, particularly of E&P companies, have been considered highly suitable for secured debt issuance. Although second lien debt is likely to remain an enduring feature of speculative-grade energy companies' capital structures, future investor appetite and pricing will likely be influenced by second lien debt's upcoming performance in default. We'll be watching.

Exhibit 13

### Defaults of US E&P's Involving Second-Lien Debt 2015- May 2016

Default Date	Company	Default Type	Default Details
Mar-15	Quicksilver Resources Inc.	Chapter 11	2nd lien part of debt structure at default
Apr-15	Venoco, Inc.	Distressed exchange	Distressed exchange of \$194 million senior unsecured notes for \$150 million second -lien notes
May-15	RAAM Global Energy Company	Chapter 11	2nd lien part of debt structure at default
May-15	Sabine Oil & Gas Corporation	Chapter 11	2nd lien part of debt structure at default
Jun-15	White Star Petroleum, LLC (f.k.a American Energy - Woodford, LLC)	Distressed exchange	Distressed exchange of approximately \$340 million senior unsecured notes for approximately \$238 million second lien notes
Sep-15	Goodrich Petroleum Corporation	Distressed exchange	Distressed exchange of \$158.2 million senior notes due 2019 for \$75 million of new second lien notes due 2018 and \$55 million of unrated convertible notes due 2032 for \$27.5 million of new convertible notes due 2032
Sep-15	Samson Investment Company	Chapter 11	2nd lien part of debt structure at default
Oct-15	Warren Resources, Inc.	Distressed exchange	Distressed exchange of \$63.1 million of unsecured notes for \$11.0 million of new money and \$40.1 million of second lien term loans
Oct-15	EXCO Resources, Inc.	Distressed exchange	Distressed exchange of \$577 million of its existing unsecured notes for \$291 of new second lien debt
Nov-15	Linn Energy, LLC	Distressed exchange	Distressed exchange of \$2 billion of its unsecured notes for \$1 billion of second lien debt.
Dec-15	California Resources Corp.	Distressed exchange	Distressed Exchange of \$2.8 billion of senior unsecured notes for \$2.25 billion of second lien notes
Dec-15	Magnum Hunter Resources Corporation	Chapter 11	2nd lien part of debt structure at default
Dec-15	Chesapeake Energy Corporation	Distressed exchange	Distressed Exchange of outstanding senior unsecured notes for new 8.00% Senior Secured Second Lien Notes due 2022
Feb-16	Vanguard Natural Resources, LLC	Distressed exchange	Distressed exchange of \$168 million of existing senior unsecured notes due 2020 for \$75.6 million of new second lien notes due 2023
Feb-16	PetroQuest Energy, Inc	Distressed exchange	Distressed exchange of \$214.4 million of its unsecured notes for \$144.7 million of new secured second lien notes, \$53.6 million of cash, and 4.3 million shares of its common stock.
Mar-16	Denver Parent Corporation / Venoco, Inc	Chapter 11	2nd lien part of debt structure at default ( issued by Venoco)
Mar-16	Rex Energy Corporation	Distressed exchange	Distressed exchange of outstanding 8.875% Senior Notes due 2020 and 6.250% Senior Notes due 2022 for New 1.00%/8.00% Senior Secured Second Lien Notes due 2020 and Shares of Common Stock.
Apr-16	Energy XXI Gulf Coast, Inc.	Chapter 11	2nd lien part of debt structure at default
Apr-16	Goodrich Petroleum Corporation	Chapter 11	2nd lien part of debt structure at default
Apr-16	Midstates Petroleum Company Inc.	Chapter 11	2nd lien part of debt structure at default
May-16	Denbury Resources Inc.	Distressed exchange	Distressed exchange of approximately \$1.1 billion of senior subordinated notes for \$615 million of second lien secured notes and 40.7 million of shares
May-16	Linn Energy, LLC	Chapter 11	2nd lien part of debt structure at default
May-16	SandRidge Energy, Inc.	Chapter 11	2nd lien part of debt structure at default
May-16	Breitbart Energy Partners LP	Chapter 11	2nd lien part of debt structure at default

In many cases of distressed exchanges 2nd lien debt didn't default but was used as a new security to exchange for old unsecured debt

Source: Moody's

## Appendix A

A regression of recovery including a dummy variable for second-lien debt indicates holding the second lien, rather than a similarly positioned\* unsecured bond, only improved recovery by approximately 4.80-percentage points. The second-lien dummy variable has a t-statistic of 2.64, indicating significance at the 95% level. In fact, the rest of t-statistics exceed 10 except for a t-statistics of -11.38 for debt above %. The effect of the second lien was smaller and less significant than the influence of family recovery and debt cushion. The regression equation is:

$$\text{Instrument Recovery Rate} \sim -0.077 + 1.038 * \text{family recovery \%} + 0.599 * \text{debt below \%} - \\ -0.414 * \text{debt above \%} + 0.048 * \text{second lien indicator (1 = yes; 0 = no)}$$

Instrument recovery refers to second lien when the second lien indicator is "1" and unsecured debt when the second lien indicator is "0". The data set includes 492 defaulting issuer families (we excluded capital structures consisting of one class of secured debt and a subordinate note) and the regression formula has an overall adjusted r-square of 73.92%.

To achieve the same recovery on an unsecured bond as holding a similarly positioned second lien obligation, the (1) family recovery would need to be roughly 4.62-percentage points higher; or (2) debt cushion would need to be 8-percentage points larger.

\* Similarly positioned means unsecured debt in one issuer family that has a similar debt cushion to that of the second lien debt in an unrelated issuer family

## Appendix B

The regression equation below depicts the influence of family recovery and debt cushion. Second-lien debt recovery is roughly one percentage point higher for each one percentage point increase in family recovery. Similarly, second-lien debt recovery is roughly 0.8-percentage points higher for each one percentage point increase in debt cushion.

### Calculating Second-Lien Recovery Rates

Family recovery and debt cushion explain 68% of the variation in second lien recovery. The regression equation based on 212 defaulted second lien instruments is:

$$\text{2nd lien recovery} \sim -0.236 + 1.005 * \text{family recovery \%} + 0.818 * \text{debt cushion \%}$$

Both factors are highly significant with t-statistics of 16.4 for family recovery and 14.6 for debt cushion.

## Appendix C

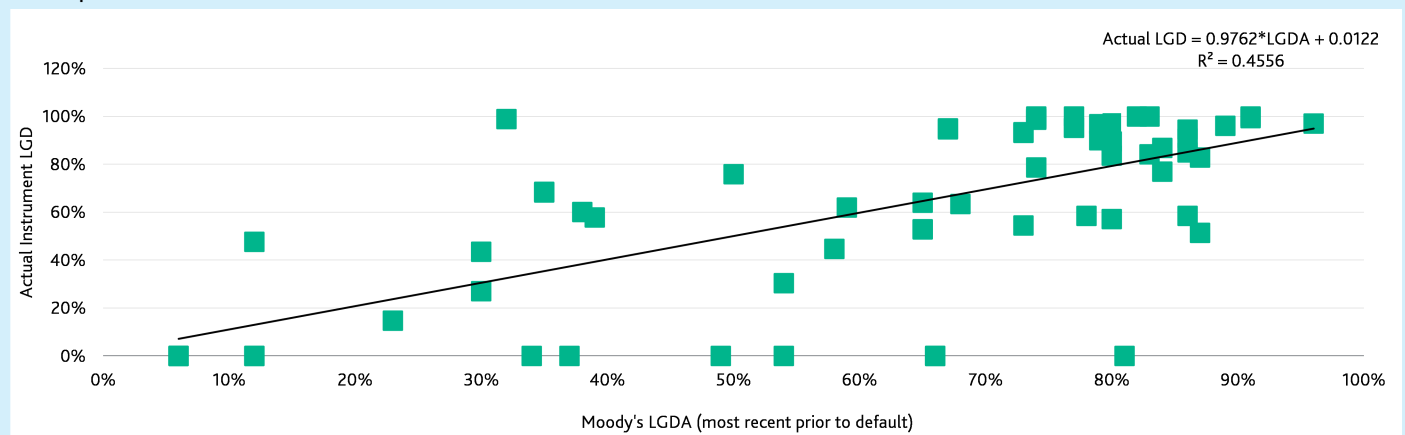
We believe that differences between actual realized family recovery rates and the assumptions embedded in our LGD framework help to explain any meaningful deviations of the actual recovery rates from that predicted by LGDAs prior to default. For instance, Ahern Rentals Inc.'s second-lien notes had no losses, despite a predicted loss estimate of 66% inferred from LGD4 assessment at the time of default. This discrepancy can be attributed to an unusually high ultimate family-level recovery of 100%, meaning that each debt class recovered in full when the company exited bankruptcy.

The relatively high 0.98 coefficient for the independent variable (Moody's LGD assessment prior to default) of a regression of the data in Exhibit below indicates a nearly one-to-one relationship, on average, with the dependent variable (actual second-lien loss). The overall 45.6% r-squared is negatively affected by individual instances where the actual family recovery was meaningfully different from the LGD model assumption, which resulted in several instances with large gaps between the actual second-lien loss and the level predicted by Moody's LGDA

Exhibit 14

### LGD Assessments Illuminate Actual Losses

Scatter plot of the 63 defaulted second-lien instruments with LGDAs



Only bankruptcies were included

Source: Moody's Ultimate Recovery Database for realized instrument loss; Moody's Loss Given Default Assessments prior to default

## Moody's Related Research

### Sector In-Depth:

- » [US Corporate Default Monitor - First Quarter 2016: Defaults and Restructuring Risk Indicators Jump in First Quarter](#), May 2016
- » [B3 Negative and Lower Corporate Ratings List: List Matches Record High, But Credit Distress Not Widespread Yet](#), April 2016
- » [US Leveraged Finance: First Lien with Less to Lean On - Riskier Credits, Weaker Protection Will Hasten Distress](#), April 2016
- » [Non-Financial Corporations - US: Credit Conditions Deteriorating as Investors Retreat to Safer Havens](#), March 2016
- » [Corporate Defaults and Recoveries - US: For High-Yield, 2015 Was a Year of Discontent](#), February 2016
- » [Corporate Defaults and Recoveries - US: Distressed Exchanges Remain Frequent Thanks to Oil and Gas, PE Firms](#), November 2015
- » [LGD Assessments Provide Accurate Forecasts of Losses on Defaulted Debts](#), October 2014
- » [Still Second Rate: LGD assessments point to low recoveries for defaulted second liens](#), January 2014

### Newsletters:

- » [SGL Monitor - Flash: LSI Takes a Breather, But Liquidity Pressures Remain](#), May 2016
- » [SGL Monitor: LSI Levels as Rating Activity Slows](#), April 2016
- » [Leveraged Finance Interest: Investor Enthusiasm Remains Cool](#), April 2016

### Rating Methodology:

- » [Loss Given Default for Speculative-Grade Non-Financial Companies in the U.S., Canada and EMEA](#), June 2009

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

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REPORT NUMBER 1021701

## Contacts

David Keisman  
Senior Vice President  
david.keisman@moody.com

212-553-1487

John E. Puchalla, CFA  
Senior Vice President  
john.puchalla@moody.com

212-553-4026

Julia Chursin  
Associate Analyst  
julia.chursin@moody.com

212-553-2932

## CLIENT SERVICES

Americas	1-212-553-1653
Asia Pacific	852-3551-3077
Japan	81-3-5408-4100
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