

Are Bankruptcies Healthy For The Tight Oil Sector?

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Summary

Between January 2015 and mid-2020, about 69 of the approximately 2,160 small-to-medium independent oil companies operating in the tight oil sector filed for Chapter 11 protection. These filings mostly occurred in 2016 and 2019. A lack of financial discipline and poor financial risk assessment meant that these companies were negatively impacted by the low oil prices in these years. Hence, they declared bankruptcy.

News outlets tend to amplify bankruptcy filing announcements in the oil sector. Such reports may suggest that the shale oil and gas sector is on the verge of extinction. We therefore assess whether this suggestion is accurate. **Our analysis shows that neither these bankruptcy declarations nor future declarations imply that United States (U.S.) tight oil production is on the verge of collapse.**

First, although ailing operators have filed for bankruptcy protection in the last few years, their combined oil production is relatively small. Specifically, they collectively produced about 8.5% of the total U.S. tight oil production in 2019, estimated to be 7.75 million barrels per day. This volume did not disappear from the market. Instead, distressed operators are given a grace period during which they can operate without interruption. In this period, they can file motions to continue the use of cash collateral to preserve their businesses, including royalty and surety obligation payments.

Second, even when operators choose to sell their assets to pay off debts, these assets are sold to more efficient operators. These operators, in turn, may choose to develop them, use them for production, and generate revenues. In other words, ownership changes do not dilute the value of these assets, and the reserves do not disappear. On the contrary, during a fire sale, the buyer acquires assets at favorable terms.

Over 33 independent companies emerged from bankruptcy after successfully reaching resolutions with their investors on debt restructuring, transferring equity ownership to investors, or selling or leasing their assets to other operators. Those who failed to adapt simply exited the oil market through either liquidation or being acquired by other companies. Some independent companies that filed for bankruptcy in 2019 are still in the process of reorganizing. Much of this delay is being caused by the COVID-19 pandemic. Many operators faced challenges and had to revise their plans for restructuring their business models.

This year, investors in distressed tight oil operators are highly likely to favor returns over growth. In particular, their positions in these companies have likely been increased owing to increased debt-for-equity swaps. The biggest winners are perhaps the secured debtors whose positions increased because of these equity swaps.

Going forward, more defaults are expected in the shale industry. More independent producers, especially medium-to-large ones that accrued arduous debts in previous years, will enter bankruptcy owing to fears of financial headwinds and market uncertainty.

The industry should aim for more market efficiency, consolidation and financial discipline through bankruptcies, possible mergers and acquisitions, and capital shifts toward carbon neutrality. A bankruptcy may be a positive or negative outcome in the tight oil sector, depending on the situation and perspective taken. Operators, equity owners, debtors-in-possession and the industry all have different perspectives on these bankruptcies. Overall, however, bankruptcies are never healthy, and they incur different types of costs and losses to many parties.

Introduction

On June 28, 2020, **Chesapeake Energy**, a leading United States (U.S.) shale¹ producer, filed for bankruptcy under Chapter 11.² It produced 483,000 barrels of oil equivalent in 2019, and over 65% of this production was gas from shale reservoirs (Chesapeake Energy 2020). However, the majority of its revenues came from the production of oil and natural gas liquids. Thus, the recent oil price crash brought on by the COVID-19 pandemic made **Chesapeake** financially vulnerable.

Chesapeake is the largest shale producer that has filed for Chapter 11 protection. Following its bankruptcy declaration, it intends to remove \$7 billion in debt from its books in the form of debt-for-equity swaps (Oil and Gas Journal 2020). However, this filing is just one in a series of bankruptcy announcements by many independent oil companies amid lingering, weak oil and gas prices. **Chesapeake** is not the last independent oil and gas company to file for bankruptcy; more companies may follow if the low oil price environment persists.

Nevertheless, despite these recent bankruptcy declarations and those to come, tight oil production is not on the verge of collapse in the U.S. In fact, tight oil production has demonstrated resiliency during volatile periods, especially in 2008 and 2015, when oil prices reached a minimum of around \$30 per barrel. Most importantly, the combined production of the tight oil companies that have applied for bankruptcy since 2015 is 710,000 barrels per day. This amount is 8.5% of the total U.S. tight oil production as of 2019, which is roughly 7.75 million barrels per day (MMb/d) on average.

Furthermore, only 69 independent operators in the U.S. tight oil sector have sought bankruptcy protection since 2015. Thus, low oil prices may not be the only trigger for the wave of bankruptcies.

These bankruptcies can also be attributed to the operators' lack of financial discipline and poor financial risk assessment.

In addition to the technological improvements that led to the shale sector's boom, the era of low interest rates following the 2008 financial crisis benefited the shale industry. The improved access to capital led to a wave of expansion in shale oil and gas extraction. Oil production from tight oil formations started to rise and, as of 2019, it accounts for over 60% of U.S. oil production.

Thus, the ongoing oil and gas bankruptcy crisis, which began in 2015 and still continues, is analogous to the 2008 subprime mortgage crisis. In both cases, low-cost, unrestricted bank loans were easily accessible. Companies that filed for Chapter 11 bankruptcy and rated below investment grade by rating agencies, such as Standard & Poor's and Moody's, could borrow at low cost with relaxed lending terms. Secured debtors used hydrocarbon assets as collateral, but these assets lost significant value, leading to massive asset impairment losses. A lack of calculated financial decisions and fiscal discipline by oil companies' management to sustain production led to heavy debt burdens. Profits eroded as a result, creating a surge of defaults.

These bankruptcy filings underscore the stress that tight oil and shale developers face as commodity prices hover below their breakeven prices. Major companies, such as **Chevron**, have diversified portfolios and major resource bases to withstand such prices, but very few heavily indebted independent companies can compete. Persistently low oil prices may devalue much of the energy sector's \$1.9 trillion in debt, including about \$300 billion in bank loans. For comparison, the total value of the subprime mortgages held by Americans in 2007 was \$1.3 billion (Helman 2020).

Bankruptcy filings may be inherently good or bad for the U.S. oil and gas sector, depending on the situation and perspective. Bankruptcies are never healthy, and many parties incur costs and losses as a result. Despite these losses, however, the Chapter 11 code allows ailing tight oil developers to regroup and re-enter the oil market after restructuring their balance sheets. Those who cannot do so may opt to liquidate or be acquired. Eventually, their shale assets are transferred to new owners, and hence, tight oil production continues to saturate the U.S. oil market.

This study is one in a series of studies within the **Future of Shale Development** project. This project examines the performance of U.S. shale production. It highlights challenges that may hinder or contribute to shale oil and gas growth, including dynamic innovation, environmental policies and access to capital.

Bankruptcies in the Tight Oil Industry

The oil recession from mid-2014 to early 2016 deeply impacted the tight oil industry. Independent companies switched to survival mode, focusing on improving efficiency and cutting costs. Many shale producers filed for bankruptcy when they could no longer pay their debts and were pressured by investors to generate profits.

The **Oil Patch Bankruptcy Monitor** quarterly reports, published by **Hynes & Boone**, have tracked North American oil and gas companies' bankruptcy announcements since January 2015. Our analysis based on these filings shows that 255 independent companies³ filed for bankruptcy from January 2015 through the middle of 2020. Of these, about 69 small-to-medium sized independent companies had tight oil assets in their portfolios. In other words, tight oil comprised different percentages of each of these companies' assets. Unlike major oil producers, such as **Chevron**, these independent companies were not vertically integrated, and their operations were focused solely on the upstream sector. Thus, they were financially vulnerable to oil price volatility. Furthermore, as explained earlier, independent companies tend to fund their capital expenditures and operations mostly through debt and, thus, can easily fall into debt traps.

Some of these operators, such as **Pioneer Natural Resources**, used hedging to shield themselves from falling prices. Using derivative transactions, this company locked in a minimum price of \$60 per barrel for 85% of its 2016 production (Resnick-Ault and Schneyer 2016). Other operators, which were not as lucky as **Pioneer**, had to sell oil at the market price of around \$30. This price was not high enough to cover their capital expenditures and operational expenses (Resnick-Ault and Schneyer 2016). Bloomberg reports that only 50% of tight oil producers have hedged 2021 production,

whereas 60% had done so by the same time in 2020 (LP 2020).

Unlike conventional oil wells, tight oil wells have initial high production rates and steep base declines. To offset these declines, more tight oil wells must be drilled and brought into production simultaneously. Thus, production requires a continuous flow of investments and access to capital. However, investor sentiment toward U.S. tight oil producers has become increasingly negative as operations have become unprofitable, generating negative **free cash flows**⁴ (FCFs) (Scheyder 2017). Investors and debtors have become wary of these risky investments and are urging these producers to control their capital spending. They are becoming less willing to fund expansion projects and restructure debt payments.

As their scale expands, most tight oil independent companies have been reinvesting their returns to acquire more shale prospects and have been borrowing more. This strategy can pay dividends, especially if it coincides with production growth, as in the case of **Concho Resources**, which has reported negative cash flows as it expands drilling and scales up its oil production in the Permian Basin. Unlike **Chesapeake**, which diversified its operations across many shale basins, **Concho** efficiently exploited **economies of scope** in its Permian Basin operations. Although many analysts were skeptical about the company's growth (Adams 2019), **Concho's** management ran the Permian Basin expansion projects efficiently. In particular, the company focused on high-impact drilling and production operations and cost optimization. This strategy was apparent in the past few months, as **Concho** was among the most dialed-back producers in the Permian Basin. Tight oil production in this region has grown fivefold since 2014, and this slow and consistent growth has curbed negative

FCFs. **Concho** is one of the few independent companies to attain positive FCFs in 2020 despite the pandemic, as shown in Figure 1.

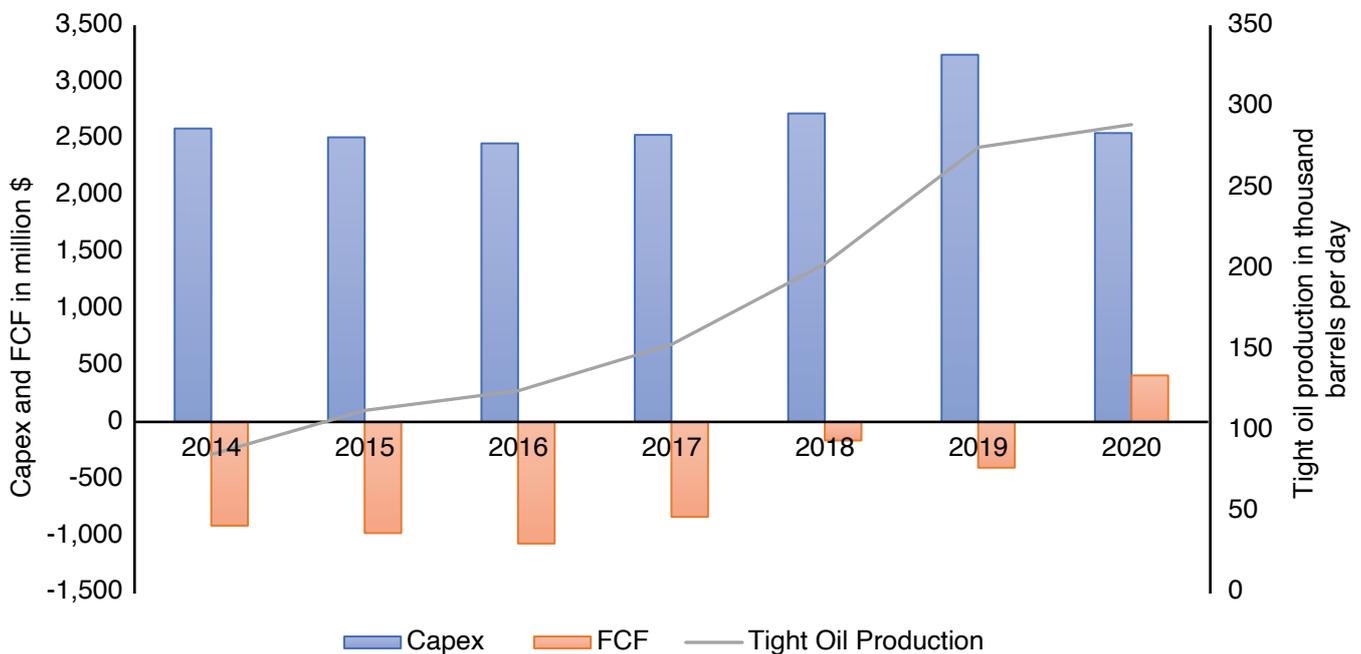
Overall, the tight oil industry faced negative FCFs between 2015 and 2017, as depicted in Figure

2, and many operators' finances were stretched.

Figure 2 also shows that reported FCFs can rebound at higher prices, as in 2018 and 2019.

However, the FCFs reported by tight oil producers in 2020 are expected to be negative owing to lingering low oil prices.

Figure 1. Concho's capital expenditure (capex), FCF and tight oil production performance.



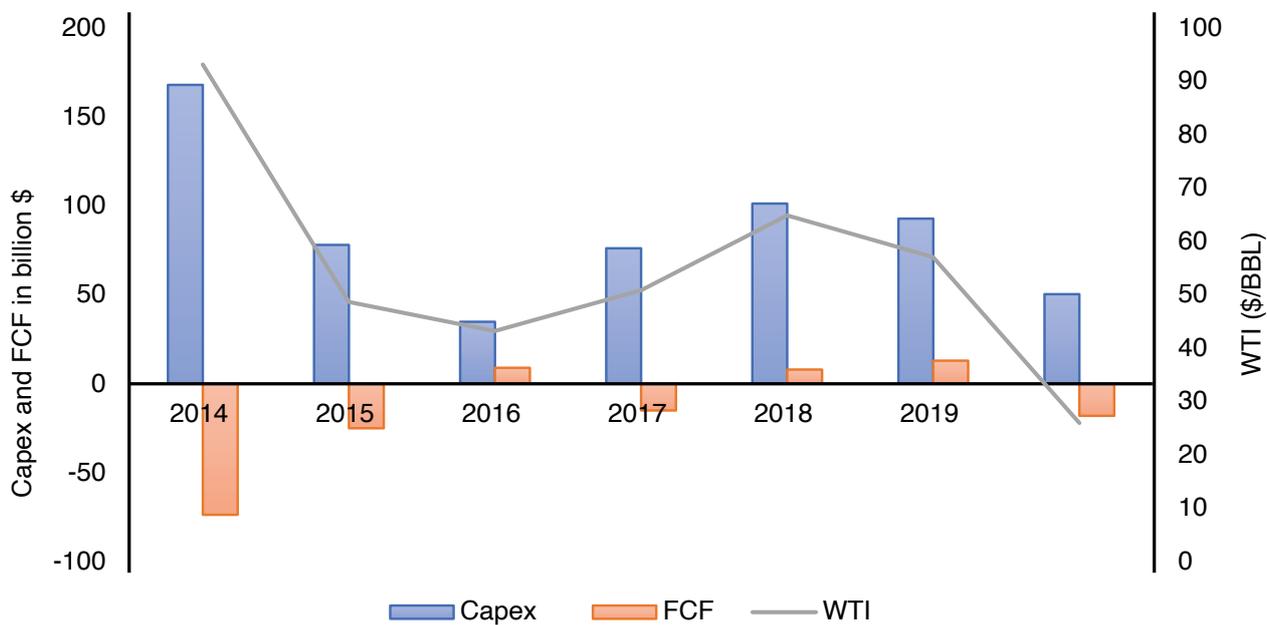
Source: Bloomberg and Rystad ShaleWellCube Data.

After the fall in oil prices in 2014 and the recession that occurred between 2014 and 2016, some operators were unable to service their debts and secure new funding. Bankruptcy declarations surged

in 2019 owing to the mounting debt maturities that had accumulated since 2015. Figure 3, in which the size of a bubble corresponds to the total debt of distressed companies, illustrates this point.

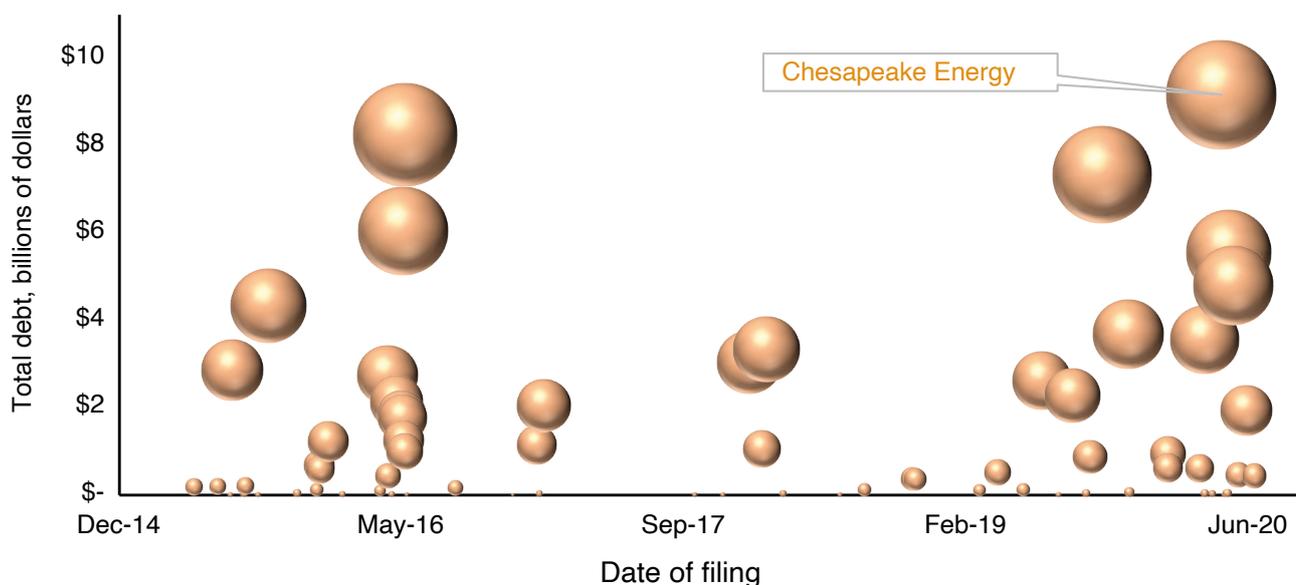
Bankruptcies in the Tight Oil Industry

Figure 2. U.S. tight oil industry capex, FCF and West Texas Intermediate (WTI) crude prices.



Source: S&P Platts analysis.

Figure 3. Tight oil bankruptcies.



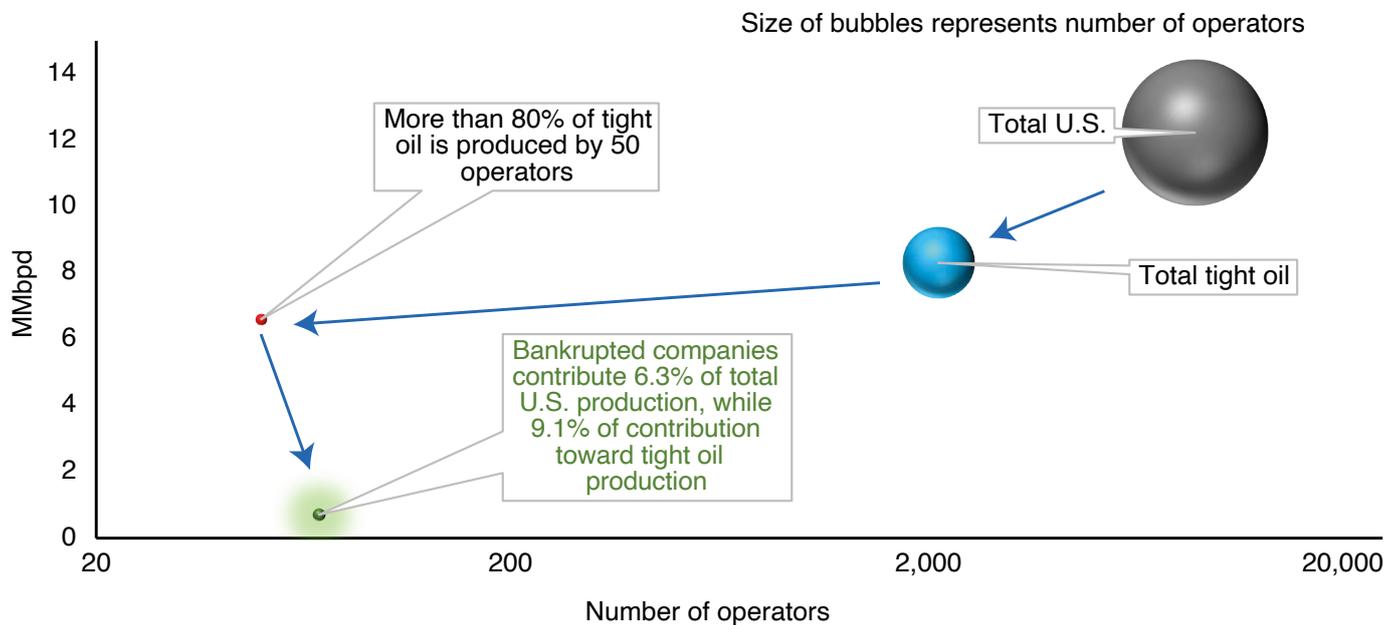
Source: KAPSARC analysis based on Haynes & Boone and Rystad ShaleWellCube.

Impact of Bankruptcy Declarations on the Oil Industry

Next, we investigate the impact of the 69 ailing independent companies that sought court protection from creditors between 2015 and 2020. Their total oil production is low compared with the entire industry, which numbers some 2,160 tight oil operators, including big oil

companies such as **Chevron**. The total tight oil production of the companies that declared bankruptcy but continued to operate in 2019 was about 8.5% of U.S. crude production on average. Figure 4 illustrates this point.

Figure 4. Contribution of tight oil production by category.



Source: KAPSARC analysis based on Rystad ShaleWellCube.

One could argue that eliminating 8.5% of the total production from the market would affect tight oil production. However, most of these companies remained in business. Filing for bankruptcy under Chapter 11 does not necessarily mean that their tight oil assets are no longer extractable, nor does the company necessarily cease to operate. **Chapter 11 determines that oil operators are 'debtors in possession,' giving them immunity from equity and debt holders seizing their assets or suspending operations. During this**

time, they can develop plans to reorganize their capital structures.

Thus, distressed independent companies are given a grace period for restructuring their loans and regaining the financial flexibility to produce their assets. During this period, they can continue to operate without interruption. They can also file a motion to continue the use of cash collateral to preserve their businesses, including royalty and surety obligation payments.

Impact of Bankruptcy Declarations on the Oil Industry

A reorganizing period can be as short as 45 days, as in the case of **Fieldwood Energy**. It can also stretch up to two years, as in the case of **Exco Resources**, which emerged from bankruptcy after nearly 18 months. The average grace period between filing and emerging from bankruptcy tends to be one year. Additionally, a company can

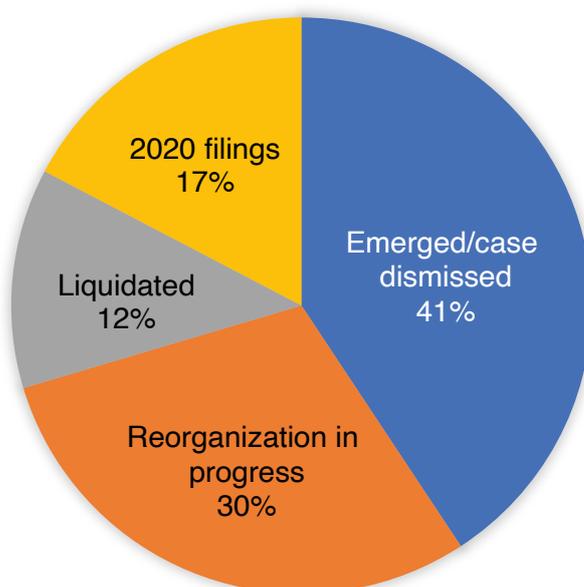
file for Chapter 11 bankruptcy for a second time if it fails to reorganize its capital structure and emerge successfully. Four independent companies, **Battalion Oil, Ultra Petroleum, Sheridan Holding Company** and **Vanguard Natural Resources**, along with their subsidiaries, have done so.

Emerging from Bankruptcy

More than 33 U.S. independent companies that filed for bankruptcy after 2015 have emerged from bankruptcy, as shown in Figure 5. These companies either successfully reached a resolution with their investors to restructure their debt, transferred equity ownership

to investors, or sold or leased their assets to other operators. However, a few of them, such as **Sabine Oil and Gas** and **Edgemarc Energy**, failed to adapt and opted to exit the market. Exiting can take the form of liquidation or acquisition by a larger independent company.

Figure 5. Post-bankruptcy filing outcomes.



Source: KAPSARC analysis based on Haynes & Boone and Rystad ShaleWellCube.

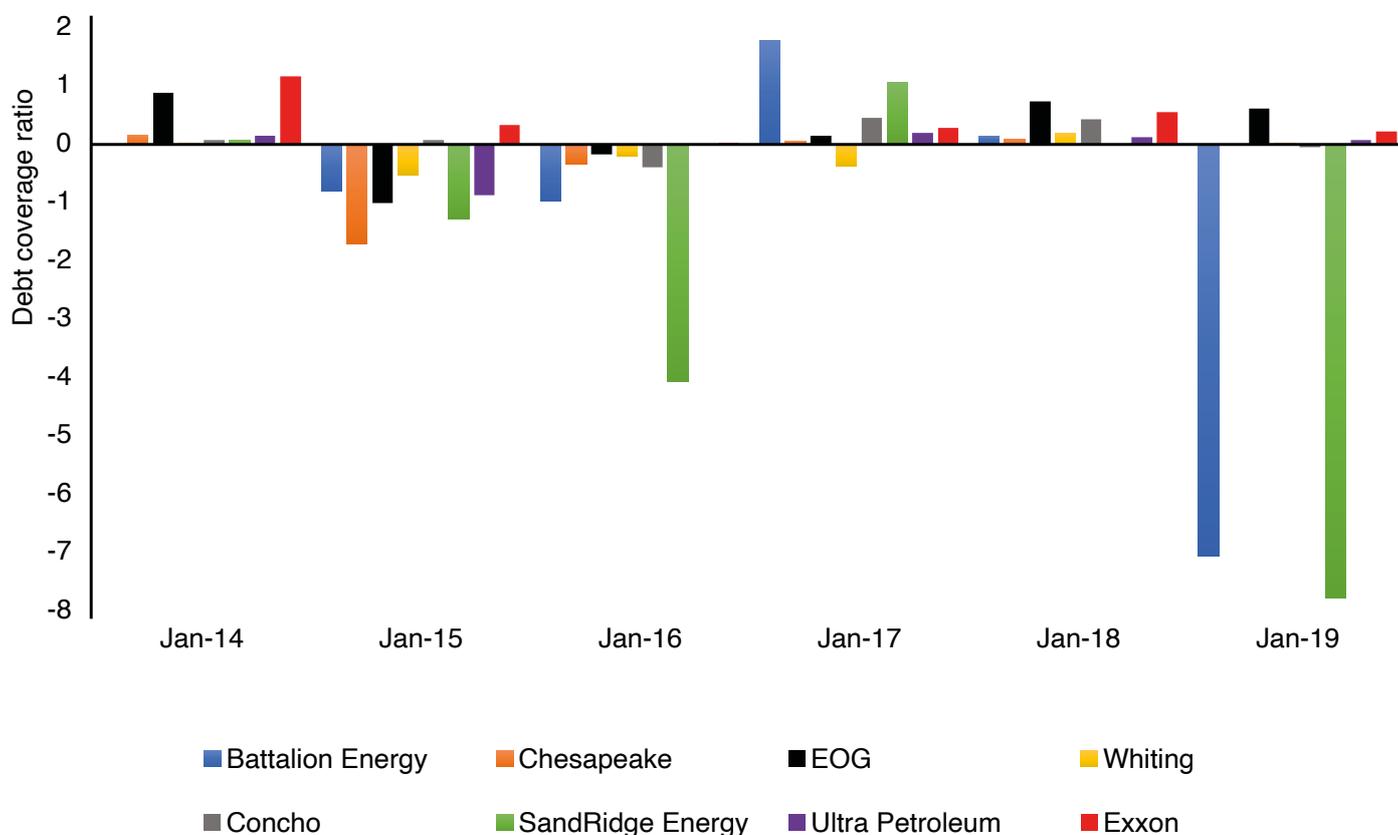
Some independent companies are still in the process of reorganizing even though they filed for bankruptcy in 2019. Much of this delay has been caused by the COVID-19 pandemic, which has created challenges for operators. Companies have had to revise their plans to restructure their business models, slowing down the process of emerging from bankruptcy. The filings for 2020 are still being examined. Some companies have already taken measures to reorganize, including **Chesapeake Energy**, as discussed earlier.

Our analysis shows that Chapter 11 has, in many cases, helped operators lighten their heavy

debt loads, improve their operational efficiency and restore profitability. Operators improve their capital discipline, restructure their debt and learn to optimize their capital and operational expenditures. As Figure 6 shows, nearly all major and independent companies operating in the shale sector have positive debt coverage⁵ ratios after the 2015-2016 oil price collapse. The debt coverage ratio improvements after 2016 can be attributed to both oil price growth and better debt management strategies. Companies became financially disciplined, improving their incomes to cover their total debts.

Emerging from Bankruptcy

Figure 6. Debt coverage ratios, calculated from financial statements.



Source: Bloomberg.

Holding all other factors constant, a producer's average oil production drops from 2.122 million barrels per month to 1.73 million barrels per month after emerging from bankruptcy. **These losses in production represent gains for other operators that acquired these companies' assets and produced them until they were depleted. In other words, the tight oil industry was not affected by ownership transfers of tight oil assets.**

Furthermore, some operators that underwent the bankruptcy process quickly returned to stability or growth. For example, after emerging from bankruptcy in 2018, **Fieldwood Energy** successfully added 25,000 barrels per day to its net production of 72,000 barrels per day of oil equivalent. It did so by acquiring more conventional oil assets in the Gulf of Mexico (Resnick-Ault and DiNapoli 2018). Another example is **Berry Petroleum**, which launched an aggressive investment program through an initial public offering to bolster its finances and expand its operations base. In 2018, it bought oilfield leases on 214 acres from **Linn Energy** and lease options on 490 acres from **Chevron** (Cox 2018).

Are Bankruptcy Filings Good or Bad?

Filing for Chapter 11 bankruptcy is an operator's last resort. It may be necessary in times of unprecedented market volatility, when the capital market for energy producers is highly constrained. An operator may also file if attempts to reorganize the business and regain financial flexibility to preserve the business have failed. Financial duress typically creates direct and inferred costs and benefits for oil developers, equity owners and debt owners.

Bankruptcy cases are typically protracted and challenging. They involve dozens of complex substantive and procedural issues to reach a resolution, incur hefty administrative and legal fees and take time. In some cases, debtholders oppose reorganization plans, and negotiations run into roadblocks. A subsequent settlement can end these disagreements, and a consensus can be reached when reorganization plans are revised, as in the case of **Penn Virginia's** bankruptcy declaration (Rizzo 2016). Additionally, some companies may incur losses from auctions and fire sales. Furthermore, auctions may occur when there are no buyers or when potential buyers offer fire-sale prices, prompting many companies to consider discounted debt-for-equity swaps instead.

A restructuring agreement requires a distressed firm to file a reorganization plan and obtain approval from U.S. bankruptcy judges. For approval, operators must negotiate with key creditors and solicit votes on the firm's restructuring plan. This plan may entail converting much of the debt into equity, eliminating sizeable interest payments or issuing new equity through rights offerings. Such agreements must be reached in accordance with the creditors, as per U.S. bankruptcy law.

In the case of **Bonanza Creek Energy**, the company exited bankruptcy with debt clearance,

with bondholders, who were owed \$867 million, taking over ownership (Zacks Equity Research 2017). During **Whiting Petroleum's** bankruptcy filing, its owners formalized a plan to hand over 97% of its equity to its creditors. It gave its existing shareholders 3% of the shares in the reorganized company (Kohler 2020). Recently, the company emerged from Chapter 11 bankruptcy after a court approval of its reorganization plans (Jumchai 2020).

Bankruptcy filings allow ailing independent companies to explore alternative options. For example, they may divest their non-core oil and gas assets, especially gas, owing to decreasing gas prices. They may then renegotiate existing rig and pipeline contracts with their suppliers to ensure business continuity. Independent companies that historically had more gas output have shifted to oil to take advantage of its higher prices. For example, **Penn Virginia's** production was 71% oil, and the rest gas. After emerging from bankruptcy, it shifted its production to reach 79% oil by the end of 2018 (Resnick-Ault and DiNapoli 2017).

Chapter 11 bankruptcy can enable massive cost cutting. This cost cutting helps distressed independent companies keep their wells profitable and their businesses operational by divesting assets and reorganizing their businesses. Independent companies, such as **Penn Virginia** and **Chaparral Energy**, have reduced their workforces, reshuffled their executives and appointed new board members (Stech 2016). Their goal is to achieve optimal management structures and reduce general and administrative costs.

Unfortunately, these restructuring plans do not satisfy every stakeholder, and unsecured creditors and stockholders tend to be adversely impacted. Some ailing independent companies that declare bankruptcy, such as **Chesapeake Energy**, are

Are Bankruptcy Filings Good or Bad?

publicly owned. After they file for bankruptcy, these companies' common stocks are often cancelled, and the companies are delisted because they cannot meet the listing standards. Their shareholders incur huge losses as a result of the stock devaluation. For example, **Exco Resources** could not maintain an average global market capitalization of at least \$15 million over 30 consecutive trading days. Thus, it could not remain listed on the New York Stock Exchange (Financier Worldwide Magazine 2019). In many cases, public companies, such as **SandRidge Energy**, do emerge successfully, and their stocks are then relisted on the New York Stock Exchange (PR Newswire 2016). In others, independent companies exit bankruptcy with new names. For example, **Memorial Production Partners** changed its name to **Amplify Energy Corp** (Hart Energy 2017). Rebranding seems to be a good strategy for changing investors' perceptions given past financial distresses. Most importantly, rebranding can help a company raise money through common shares if it has difficulty doing so under its previous name.

The U.S. shale sector's boom and bust cycles reveal that the sector has a shaky and weak foundation. The core of this foundation is financial discipline. Almost all the companies that have filed for Chapter 11 bankruptcy have been highly leveraged and have had low returns. Independent companies in this sector are risk takers because they place much emphasis on growth in a very competitive market. Independent companies have chosen to borrow more than their current and prospective future returns on invested debts. Debts acquired during periods of high oil prices, with low productivity

and high operating expenditures, ultimately fail the low oil price stress test. These companies' poor financial risk assessments can be attributed to poor management, as was apparent during the oil price downturn. Thus, as discussed before, some independent companies have appointed new managers to position themselves for profitability.

As a result of the poor returns on their investments, financial institutions have increased the requirements for loans to shale oil and gas producers. If lenders instead continued to fund unsustainable projects, their risk exposure would increase further, and the subprime mortgage crisis of 2008 could be replicated in this industry. Equity swaps and other types of debt restructuring agreements make the secured debtors temporary owners of oil and gas assets. Because oil and gas operations are not these debtors' core businesses, the assets and companies under their supervision are either acquired or sold to other operators once their value rises.

Bankruptcy filings impact all stakeholders in positive and negative ways. Workers lose their jobs, stockholders lose their shares and investors may lose their investments. These outcomes are some of the bitter realities of bankruptcies. However, bankruptcies have also caused strong re-emergences with better financial results by consolidating the sector and making it more financially resilient and disciplined. The sector's production may fall, but a stronger financial foundation has and will continue to lead to slow and steady production growth.

More Bankruptcies to Come

The year 2020 has been tumultuous for the oil and gas industry and the shale sector. After a failed OPEC+ meeting in March 2020, West Texas Intermediate (WTI) crude prices plummeted from \$46.8 per barrel (b) on March 4 to \$14/b on March 30. Many operators were obliged to shut down their wells until oil sale prices made resuming production economically feasible (Blas 2020). The situation was exacerbated when WTI prices dropped by almost 300% in April 2020. WTI traded at around minus \$37/b for the first time in history amid the crash in demand following the spread of COVID-19 (Lee 2020). More wells were shut down, and many independent companies filed for waivers to allow them to keep their wells shut for prolonged periods.

As a result, U.S. tight oil production fell from 8.2 million barrels per day in March to 6.8 million barrels per day in June 2020. Recent reports suggest that production levels have stabilized. In dealing with the current price environment, many operators, including major companies, are gradually opening shut-in wells and increasingly fracking the growing number of drilled but uncompleted wells (DUCs) to offset production declines and remain in business (Brower and McCormick 2020). The tight oil plays include many DUCs, and the cost of bringing these wells to production is significantly lower than that of drilling and completing new wells.

Nevertheless, more defaults are expected in the shale industry. More independent companies, especially medium-to-large companies that accrued arduous debts over the past years, will enter bankruptcy owing to fears of financial headwinds and market uncertainty. Companies that hedge may have a cushion until the end of 2020. Nevertheless, more investor pressure and bankruptcy filings are strongly expected if oil prices remain below \$50/b in 2021.

It is difficult to measure the number of independent companies precisely because not all of them are publicly traded. However, we examined the credit ratings and financial ratios, such as interest coverage, the debt-to-equity ratio and the return on invested capital, of available publicly traded companies. We found that 11 of them are financially distressed and may file for bankruptcy protection by the end of 2020 or in 2021.

Companies that filed for bankruptcy previously, such as **Oasis Petroleum** and **SandRidge Energy**, may file for bankruptcy protection again.

The distressed companies identified in our analysis account for less than 1% of U.S. tight oil production. This amount is not significant given the scale of total U.S. production. Moreover, as mentioned before, these companies will continue to produce until they emerge from bankruptcy or sell their shale assets to another developer. In turn, a new developer will place these assets into production whenever economically feasible.

Emergence from bankruptcy will depend purely on a company's ability to turn its investors' money into profit when WTI prices are low. The elimination of billions of loans through bankruptcy filings does not equate to loan forgiveness but rather a change in the owner or operator. Our analysis in Figure 7 suggests that the oil price must be above \$50 with positive cashflows for companies to serve their debts and operating expenses and stay in business.

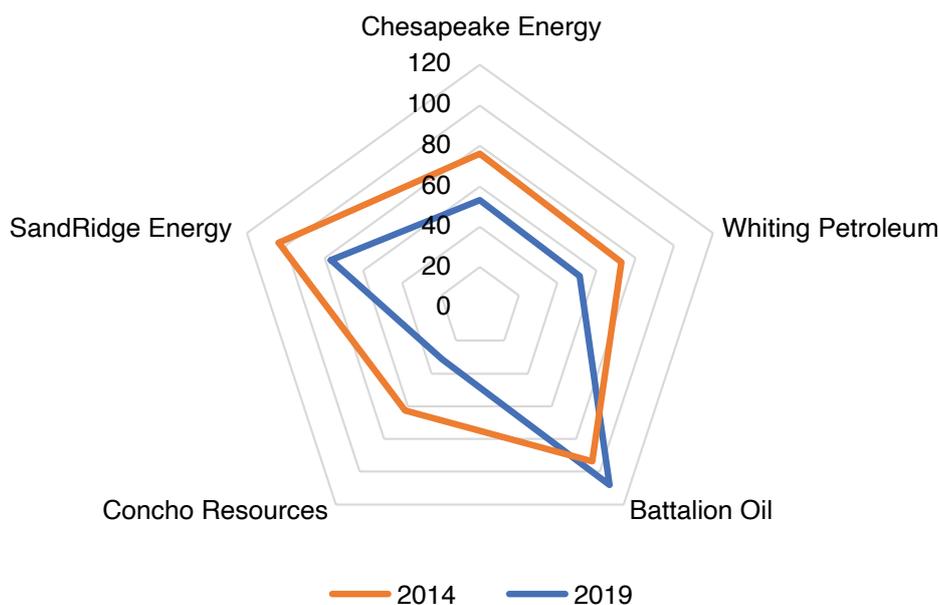
Many independent companies have managed to lower their breakeven prices since the oil price crash in 2014. Nevertheless, the current oil prices are not favorable to tight oil developers. However, tax breaks from the federal and state governments for oil and gas exploration and production companies can help them recover their costs. Shale operators can benefit from many tax breaks.

More Bankruptcies to Come

According to the Center for American Progress, repealing these tax breaks for oil and gas operators, including tight oil developers, would

save the U.S. treasury \$37.7 billion over 10 years (Hang 2016).

Figure 7. Calculated breakeven costs for selected tight oil producers as of 2019.



Source: KAPSARC analysis based on corporate financial statements*

*The breakeven prices for the companies in this chart are calculated using financial statements obtained from the U.S. Securities and Exchange Commission. The full-cycle breakeven prices in this chart refer to revenues at the WTI price level prior to taxes; interest; exploration expenses; depreciation and amortization, which support lifting and extraction; and debt interest expenses and production maintenance capex. The prices reflect the minimum WTI price floor that can sustain oil production and operations.

The current U.S. administration enacted a stimulus package in March 2020, when oil prices fell. This stimulus will help many independent companies absorb the oil price shock and will position them for a speedy recovery. **Marathon Petroleum**, for example, is expected to claim a \$1.1 billion tax refund because of this package. The package includes a tax provision that allows companies to immediately deduct their net operating losses and apply them to previous returns for five years from 2018, 2019 and 2020. Typically, they can only apply

such deductions to future years (Dlouhy and Wethe 2020).

In 2020, many operators, including major companies, reported significant losses. To overcome the low-price environment, **Marathon**, for example, almost halved its capital expenditure (capex) and has suspended drilling activity in its Permian position (Patsy 2020). Most companies in the oil and gas industry are now downsizing their workforces. Most of

the unemployment has been reported in the oil service sector, which carries out drilling and completion jobs (Carpenter 2020). Despite these measures and tax breaks, however, many distressed independent companies find themselves forced to sell their assets and convince their investors to swap debt for equity. As few players are willing to spend money, it is very challenging for these companies to find buyers. Many independent companies will resort to fire sales of their shale assets or filing for Chapter 11 protection.

Re-emergence from bankruptcy may not imply that long-term operations are sustainable. Filing for Chapter 11 bankruptcy twice or thrice is unhealthy for the long-term continuity of a business. For instance, **Battalion Oil** has filed for bankruptcy twice but still struggles to optimize its operations and lower its breakeven costs, as shown in Figure 7.

Creating Value vs. Growth

Finding a balance between value creation and growth is not easy. Lower production with increased operational and financial efficiency may sustain companies longer without inflating the loan bubble associated with higher production. The natural reservoir decline in the tight oil and shale oil basins requires continual capex, which is the main reason for the sector's large debts. However, reduced capex may result in lower production and, hence, lower revenues.

The shale industry remains profitable because it is built on short-cycle investments, and producing wells tend to deliver most of the sector's production. Investments in conventional producers, by contrast, may take longer to attain returns. Although many investors may be discouraged by the lower returns on investments as oil prices remain low, capital markets remain accessible. After the 2008 financial crisis, investments poured into the shale oil and gas industry. Similarly, we anticipate growing interest in and a shift in investments toward renewable energy and clean energy technology after the COVID-19 pandemic. In fact, the World Bank announced in late 2017 that it would halt investments in upstream oil and gas in 2020. The few exceptions were projects that provided affordable energy access and were aligned with the Paris Agreement (World Bank 2017).

Moreover, capital discipline is more important now than ever before. In the short run, operators are obliged to slow production growth and focus on value creation. Investors in distressed tight oil operators are highly likely to demand returns rather than growth after COVID-19. This outcome is especially likely if their positions in these companies have increased owing to increased debt-for-equity swaps. The biggest winners are perhaps the secured debtors whose positions increased owing to equity swaps.

Chapter 11 has ensured a continuous supply of tight oil in the oil market and may have contributed to lower domestic oil prices over time. As it helped many companies re-enter the market, Chapter 11 may have inadvertently saturated the market with more tight oil. During bankruptcy, independent companies were permitted to operate without lenders seizing and auctioning their assets while they developed reorganization plans. On a microlevel, Chapter 11 served to rationalize shale development after years of financial mismanagement. It helped many operators lighten their heavy debt loads, divest from non-core assets, operate more efficiently and re-enter the market.

From the perspective of unsecured creditors and stockholders, bankruptcy is **bad**. Following bankruptcy filings, common stocks are often canceled, and companies are delisted because they can no longer meet the listing standards. Hence, shareholders of bankrupt companies incur huge losses because their stocks lose value.

Will the market witness a surge in bankruptcies in the future?

The U.S. shale industry has shown resiliency during volatile oil periods, especially in 2008 and 2015, when oil prices fell to \$30/b. Companies discovered efficient extraction methods through research and development, thereby reducing their costs. Independent companies will continue to explore ways to optimize operations, lower their overall costs and continue marginal crude production. Timed hedging contracts, tax breaks and bankruptcy filings can help distressed operators. However, if low oil prices persist for a long time, these operators may prefer other alternatives, including consolidations to exploit economies of scale.

Mergers and acquisitions thrive in low oil price environments, especially among companies whose valuations are below the fair market price. However, buyers will acquire or merge with indebted companies only if their assets are prolific and diversified enough to justify the investment and risk. For example, **Chevron** acquired **Noble Energy** for \$5 billion. **Noble**

Energy is a major tight oil producer in the Permian Basin, and its operations span many assets. Its many overseas assets can justify a major company's interest in acquiring it (Wethe 2020). Small operators whose assets are not diversified or that are solely dependent on shale are less likely to be consolidated.

Endnotes

1 The literature uses the terms 'shale' and 'tight' interchangeably. The U.S. Energy Information Administration describes gas found in shale formations as shale gas and oil found in shale layers as tight oil.

2 Chapter 11 is a bankruptcy code that permits businesses to reorganize and re-enter the market (United States Courts 2020).

3 Independent companies are oil and gas companies engaged solely in the exploration and production segments of hydrocarbons. Unlike integrated oil companies, such as Chevron, these companies do not engage in the processing, refining, marketing or selling of hydrocarbons to end users (DiLallo 2014).

4 FCFs are the cash generated by a company after capital expenditures to support its operations are accounted for.

5 The debt coverage ratio measures a company's ability to pay off its debts.

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About the Project

This project aims to assess the impact of U.S. shale oil and gas on the balance of supply and demand. With a time series of available production data, we investigate the drivers (both below and above ground) of the successful growth of the U.S. shale industry thus far. We consider these drivers in retrospect and in detail, and analyze whether these mechanisms are sustainable going forward.

This project also examines the performance of U.S. shale production. We highlight challenges that may hinder or contribute to shale oil and gas growth, including technologies, environmental policies and access to capital.



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