

A commercial banking lending decision involving environmental risks: a case study

Mary Tone Rodgers
SUNY Oswego

Kathleen Locklear
SUNY Oswego

Richard Skolnik
SUNY Oswego

ABSTRACT

This case study focuses on a lending decision to a small business involved in the hydraulic fracturing (“fracking”) industry. The protagonist, a loan officer at a regional bank, must evaluate a loan request by a fracking equipment rental company. The case study includes a suite of implementation tools, including financial statements for the loan applicant, background information on the fracking industry, a grading rubric, and teaching notes. Additionally, the case includes, at the discretion of the instructor, input from guest speakers in the banking industry discussing how they would approach similar situations. Learning objectives include analyzing financial statements for lending decisions, understanding the impact of changing terms of the loan, undertaking an industry analysis to support a lending decision, and recognizing ESG factors' influence on financial decisions. The case study provides students an opportunity to learn how commercial lending decisions can be influenced by climate change concerns held by a larger community of stakeholders besides the narrower group of borrowers, depositors, and shareholders.

Keywords: Commercial lending decisions, industry analysis, environmental risks, case study

Acknowledgments: The authors appreciate valuable feedback from participants at the Business Research Consortium 16th Annual Conference on April 24, 2021, especially Michael Fischer, Rick Proctor, and James Murtaugh. Industry practitioners also provided important insights, including Ashly Arbizu, Trevor Bacon, James Piccirillo and Nick Schneller.

Copyright statement: Authors retain the copyright to the manuscripts published in AABRI journals. Please see the AABRI Copyright Policy at <http://www.aabri.com/copyright.html>

INTRODUCTION

Environmental risk factors are growing in importance in financial decision-making as global warming becomes a reality (Kramer, et al. 2021; Gaffney & Steffen 2017). Furthermore, environmental risks exist for firms engaging in projects and financial institutions providing funding (Breitenstein et al., 2021; McKenzie, G., & Wolfe, S. 2004; Thompson, 1998). As a result, business schools are increasingly preparing students to consider environmental, social, and governance factors in their analysis (AACSB, 2020).

Case studies offer students an opportunity to apply skills and knowledge in situations that they may encounter professionally. Additionally, case studies enhance oral communication and critical thinking (Noblitt et al., 2010). This case involves a traditional commercial credit analysis for a business expansion within the context of the hydraulic fracturing (“fracking”) supply industry. The case consists of a community bank lending decision to a local business renting equipment to frackers in the Pennsylvania Marcellus shale region. This is a fictitious case. All information contained herein was fabricated by the author(s). Any similarity contained herein to actual persons, businesses, events, etc. is purely coincidental and is the responsibility of the author(s). Please contact the case author(s) directly with any concerns.

The risks inherent in the Marcellus fracking industry are complex and dynamic. The potential for these risks to materialize in an undesirable way, combined with fluctuating energy prices, creates notable business uncertainty in the industry (Kargbo, et al. 2010; van der Ploeg, F. 2016).

One particular category of uncertainty relates to Environmental Sustainability and Governance (ESG) risks. It has become increasingly common for companies to be evaluated on ESG factors, with performance in this area serving to influence shareholder and investor engagement (Huber & Comstock, 2017). In light of this trend, attention to ESG risks merits particular consideration.

Environmental Risk

Environmental risks associated with fracking include contamination of groundwater, induced seismic activity, potential degradation of surface water, air pollution and pollution due to improper handling and disposal of wastewater (Zucker & Dreslin, 2014; Hagstrom & Adams, 2012). The fracking process releases methane, a greenhouse gas that exacerbates climate change (Carpenter, 2016). Furthermore, the consumption of fossil fuel that is generated through fracking generates greenhouse gasses that contribute to global warming (Hook & Tang, 2013). Environmental concerns such as these have been the focus of environmental activists, contributing to the ongoing, and sometimes contentious, debate about fracking (Pollard & Rose, 2019).

Sustainability Risk

Fracking consumes very large volumes of water and, since those become contaminated during the fracking process, they are permanently removed from the hydrological cycle (Webb, 2017; Mazur, 2016). This raises questions about the sustainability of fracking, particularly in locations where there is competing high demand for groundwater for other purposes such as agriculture and drinking.

Governance Risk

The fracking industry is subject to a complex array of regulations at both the state and local level. These regulations are evolving and have become increasingly more restrictive (Roddewig, & Hughes, 2015). Stricter regulatory obligations can increase costs of operations, including resources required to ensure compliance and proper governance. Over time, increasingly stringent regulatory obligations may present a threat to the sustainability of the fracking industry. In addition to the imposition of restrictive regulations, numerous states have imposed fracking moratoria or permanently banned fracking (Mazur, 2018).

This case requires students to include risk assessment into a financial analysis. Students utilize supplemental information provided by the instructor along with publicly available industry data. Questions direct students to consider the lender's reputational exposure, which involves both environmental and economic factors. Additionally, the case uses discussions by external professionals for insight into the decision-making process of lenders.

This paper is organized as follows. The case is presented, along with financial tables and background information. Next are the questions, teaching notes, a rubric, and references.

LENDING IN THE NATURAL GAS HYDROFRACKING INDUSTRY: CASE STUDY

Marvin Jones, a loan officer at the Mid-Pennsylvania Regional Bank (MPR Bank) in Harrisburg PA, sat at his desk in early October 2021. He began reviewing a loan request for \$400,000 from Nathan Dexter, the sole shareholder of Dexter Fracking Equipment Rental, Inc. Dexter's company rented tools and equipment to the natural gas hydro-frackers in the Appalachian Marcellus and Utica Shale region. The request was for a 20-year loan to build a new warehouse, replacing space he was presently renting, plus adding more space. Jones had three concerns after reading the request: whether the business could generate the cash necessary to cover the new loan payments given the boom/bust nature of the fracking business, whether MPR Bank's loan committee would be open to lending more money to a fracking-related business in the midst growing global appeals to reduce dependence on fossil fuels, and whether he should risk his reputation at the bank by pushing for approval of Dexter's request.

Background on Dexter Fracking Equipment Rental, Inc.

Now aged 46, Dexter purchased a Harrisburg industrial supply business back in 2004. At the time, fracking technology had just begun to disseminate across Pennsylvania. Anticipating strong growth in demand for equipment rentals by natural gas drillers, Dexter changed the firm's focus to specialize in renting fracking equipment. His hunch about the fracking business was spot on, and he had since expanded the company into a full-service provider of equipment to Pennsylvania fracking firms. (See Appendix A for equipment descriptions.)

Dexter's first entrepreneurial attempt in 2000 had been a purchase of a truck and trailer rental equipment company, funded by his father. He sold it at a small loss in order to buy the Harrisburg industrial supply firm and had been successful at growing the fracking equipment rental business, participating in the Marcellus shale fracking boom. By 2020, Dexter had accumulated \$800,000 in blue chip stocks in his personal brokerage account.

Now, with a 17-year long reputation as a reliable source for specialized, state-of-the-art equipment, Dexter believed this was the time to expand his equipment offerings further. He

believed a new source of demand for natural gas, exports to foreign countries, would support further growth in the fracking industry, despite recent calls by climate change activists to reduce the use of natural gas. He felt that as long as his firm could continue to offer quick delivery and insights on how to use high-tech equipment effectively, he could capitalize on the new source of demand.

History of loans from MPR Bank to fund Dexter's growth

In 2004, Dexter took over payments on an unsecured loan that MPR Bank had made to the original founder back in 1998. The loan still had 7 years left to go until it was fully paid off. Two years later, when business was good, Dexter purchased his firm's rented warehouse and office space. At the time, Jones had arranged the loan for the building purchase. The loan was current; no payments had ever been missed. Despite some lean years, Dexter had used both loans from MPR Bank to grow his business. Jones knew the bank considered Dexter to be a good borrower.

Jones created a table showing the history of two loans MPR Bank had made to the company. He added a third row to the table that described the new loan request, using the loan terms as proposed by Dexter. (See Appendix B). His data projected the loans' status as of the end of 2021 (See Appendix C for amortization schedules.)

Situation at MPR Bank

MPR Bank had been the only bank servicing Dexter's company since 1998. The Bank had grown from about \$300 million in assets to over \$1 billion largely by pursuing many gas drillers as clients because the fracking technology supported strong economic expansion in the Marcellus Utica shale region. Now, loans to fracking-related businesses accounted for 18% of MPR Bank's portfolio compared to less than 10% at other regional banks.

The bank's Board of Directors had concerns about its strategy for lending to fracking industry borrowers. In the short-term, a few of its borrowers in that business had asked for loan forbearance during the pandemic, and separately, the bank had recently been the target of "fractivists," groups who protested bank lending policies to the fossil fuel industry. Such groups and many sympathetic investors believed that one way to combat global climate change was to reduce fossil fuel companies' access to capital. One long-term concern was that insurers were stepping away from frackers over fears that groundwater contamination could create a liability for fracking related businesses. The Board interpreted the insurance industry's decision to avoid covering such risks as a sign that it should manage its exposure to the fracking industry cautiously. However, offsetting the general sense that loans to frackers were becoming riskier, the Board also worried that it might miss a huge growth opportunity for profits by missing out on the potential boom if the export market for natural gas took off—there weren't very many other solid opportunities for loan growth in central Pennsylvania.

Discussions about the bank's evolving stance on lending to frackers had been well communicated to its loan officers, including Marvin Jones. Starting at the bank in 2000, Jones had been very careful about drafting loan proposals that would pass muster with the bank's Loan Committee. He was loath to risk his hard-earned reputation among his colleagues by advocating for loans that could cause problems to the bank.

Status of the Fracking Industry and of local competition

Fracking wells accounted for about 90% of the natural gas production in Pennsylvania, a state with some of the highest quality reserves in the world. Production had grown over forty-fold during the 17 years in which Dexter had managed the business, from 0.16 trillion cubic feet in 2004 to about 7.3 trillion cubic feet in 2020. Ten drillers, all of whom were Dexter's customers, were responsible for about two-thirds of production. Despite a sharp drop in demand related to a slowing economy during the 2020 pandemic, production still eked out a 5.7% gain that year, small in relation to previous years, but a gain, nonetheless. Prices for natural gas had peaked in 2018 at \$3.10 per mBTU, dropped to \$1.90 in 2020, recovered to \$2.60 in 2021 but were not expected to return to \$3.00 again until 2025 (Statistica, 2021). The result of the plunge in prices in 2020 was that several drillers filed bankruptcy that year, including Mountainpeake Energy, an important customer of Dexter's.

Dexter believed that consolidation among the frackers posed a competitive threat as the sale of medium and lower quality equipment from distressed frackers made owning the equipment more attractive to the surviving drillers than renting it. Longer-term, Dexter believed that exporting natural gas provided an enormous drilling opportunity for Pennsylvania frackers, and that firms that survived the current downturn would demand substantial supplies of top-quality rental equipment in years to come. (See Appendix D for Natural Gas Industry statistics, including export markets.)

Dexter had been the only full-service fracking equipment rental company in Pennsylvania until 2015. Some competition had always come from Texan fracking rental equipment companies, but in 2015 a new rental equipment company opened in Erie, Pennsylvania. The Erie competitor only rented lower-end equipment, but Dexter offered a complete product line, both low-end and specialized high-end equipment.

The entrance of about a half-dozen of smaller mom-and-pop shops in the Harrisburg area for peripheral fracking equipment posed new competition, especially for some of the lower quality rental items. Some of the Texan firms were also making bigger inroads into Dexter's market by promising to waive transportation fees for delivering high-end rental equipment to Pennsylvania frackers.

Financial Projections for Expansion

From conversations with his customers, Dexter believed that his firm had about a 40% market share of the total fracking rental equipment market in the Pennsylvania Marcellus and Utica shale. Given the long-term export potential for natural gas and the near-term recovery in post-pandemic natural gas prices, Dexter projected his revenues for 2021 would rise by 66% to \$2 million, by 40% to \$2.8 million for 2022, and by 10% to over \$3 million for 2023. Moreover, he was very confident that his revenues could boom for many more years to come. Marvin Jones was persuaded those revenues could grow sharply over the short-term but was less convinced about the long-term.

Dexter planned to reduce his salary from \$90,000 to \$80,000 now that his children were out of college, but he expected overall employee wages to rise. Rising wage expense would bring his Cost of Goods sold to 80% of revenues up from 75%, where it had hovered before the pandemic. When so many frackers experienced business distress during the pandemic, they stopped paying Dexter what they owed him. Indeed, Mountainpeake's bankruptcy filing

prompted Dexter to take a sizable write-off for uncollectible receivables in 2020. However, with belt-tightening on inventory, some sales of aging rental equipment, and a stricter Accounts Receivable policy, Dexter believed he would be able to avoid asking for a line of credit from MPR Bank to manage cash shortfalls. He also planned to continue contributions to his self-insurance reserve to cover claims against his business that his insurance company would not cover. (See Appendix C for Dexter's financial statement projections.)

The Decision

Marvin Jones faced some tough judgment calls about whether to argue Dexter's case for the \$400,000 mortgage loan. The company had performed well during fracking's heydays, but the threat of renewable energy substitutes and the pace of recovery from the COVID-related drop in demand for energy worried Jones. He was also worried that MPR Bank had more loans outstanding to natural gas frackers than its peer banks, meaning the Loan Committee might not be willing to approve the loan even if Jones could convince Dexter to go along with modifications to the request. His task at hand was to find ways to restructure Dexter's request so as to reduce the risk to the bank, keep Dexter a satisfied customer, and help grow the bank's profits. The bonus he could earn from securing a \$400,000 loan for the bank was enough to pay for a nice vacation for his family, but Jones viewed the risk to his reputation as far more costly than any family vacation if he pushed for a loan that went sour.

Appendix A: Dexter Fracking Equipment Rental, Inc. products

From the company's website:

Fracking consists of pumping large amounts of fluid at high rates and pressures downhole to create fractures in the earth to extract an energy source such as oil and gas. Because all frac jobs pose unique challenges, each job typically requires a different collection of specialized tools and equipment. The Marcellus and Utica shales are some of the highest quality reserves in the US.

Dexter Fracking Equipment Rental is your go-to source for up-to-date equipment with the latest industry standards for maintenance and quality assurance processes. We provide a Certificate of Services (COS) and a Certificate of Conformance (COC) documents for each job. All equipment has full material traceability from the top original equipment manufacturers (OEM). Preliminary and final, Piping and Instrumentation Diagrams (P&ID) are provided for each job.

Dexter offers a complete line of manifolds (both choke and plug catcher), and iron rentals for gas field flowback purposes.

We support your cementing operations by delivering process systems to straight to your multi-pad drilling sites. Our equipment consultants can customize to your specifications.

Casing swage rentals and testing services

Dexter provides casing swage equipment and flange equipment rentals in dozens of sizes and connection types. Additionally, Dexter can provide testing services to verify API-Q2 requirements are met, including hydrostatic testing and visual inspections of connections.

Appendix B: Table Showing Terms of Prior Loans and New Loan Request

Loan Terms	Amount remaining to be paid	2022 Annual Principal Payment	2022 Annual Interest Payment	Total 2022 Annual Payment
1998, 6% assumed in 2004 from founder, not secured, 6 years left to go, due on Jan 1, 2028	\$53,585; originally had been \$150,000 on Jan. 1, 1998	\$7,682	\$3,215	\$10,897
2006, 8% 30-year building secured, 14 years left to go	\$219,694; originally was \$300,000 on Jan. 1, 2006	\$9,072	\$17,575	\$26,648
2022, 5% 20-year secured by new building	\$400,000, proposed on Jan. 1, 2022	\$12,097	\$20,000	\$32,097

Appendix C: Financial Statements for Dexter Fracking Equipment Rental, Inc., including Amortization Schedule**Dexter Income Statement**

	Forecast					
	2018	2019	2020	2021	2022	2023
Net Sales	\$918,000	\$1,601,564	\$1,200,000	\$1,992,000	\$2,788,800	\$3,067,680
COGS	\$688,500	\$1,201,173	\$900,000	\$1,593,600	\$2,231,040	\$2,454,144
Gross Profit	\$229,500	\$400,391	\$300,000	\$398,400	\$557,760	\$613,536
Operating Expenses						
Rent	\$27,500	\$29,000	\$34,000	\$34,000	\$0	\$0
Prov. for Uncollected Receivables	\$15,000	\$0	\$73,000	\$25,000	\$5,000	\$0
General Selling Expenses	\$91,800	\$160,156	\$120,000	\$199,200	\$278,880	\$306,768
General Administrative Expenses	\$27,540	\$48,047	\$36,000	\$59,760	\$83,664	\$92,030
Depreciation	\$55,264	\$82,961	\$67,200	\$70,704	\$91,819	\$101,301
Total Operating Expenses	\$217,104	\$320,164	\$330,200	\$388,664	\$459,363	\$500,100
EBIT	\$12,396	\$80,227	(\$30,200)	\$9,736	\$98,397	\$113,436
Interest expense	\$24,792	\$23,893	\$22,930	\$21,898	\$40,791	\$38,999
Taxable Income	(\$12,395)	\$56,333	(\$53,130)	(\$12,162)	\$57,606	\$74,437
Income Taxes (21%)	\$0	\$11,830	\$0	(\$2,554)	\$12,097	\$15,632
Net Income or Loss	(\$12,395)	\$44,503	(\$53,130)	(\$9,608)	\$45,509	\$58,806

Notes: Dexter forecasts a sales increase of 66%, 40%, and 10% in 2022, 2023 and 2024, respectively.

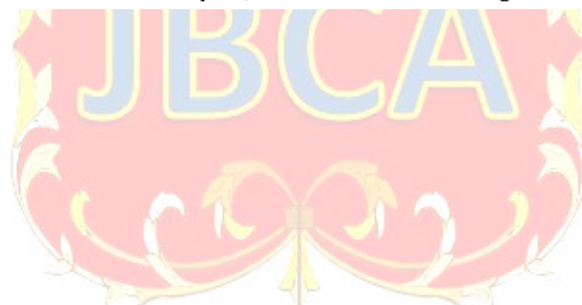
COGS in the forecast includes the cost of self-insurance.

Dexter pays no rent after moving into the new building.

Dexter plans on improving the collection of receivables.

Selling expenses for client acquisition and retention are 10% of revenues

Depreciation expense is 10% and increases by \$5,000 with the new building.



Appendix C: Financial Statements for Dexter Fracking Equipment Rental, Inc., including Amortization Schedule

Notes: Dexter forecasts a sales increase of 66%, 40%, and 10% in 2022, 2023 and 2024, respectively.

COGS in the forecast includes the cost of self-insurance.

Dexter pays no rent after moving into the new building.

Dexter plans on improving the collection of receivables.

Selling expenses for client acquisition and retention are 10% of revenues

Depreciation expense is 10% and increases by \$5,000 with the new building.



Dexter Balance Sheet		Forecast					
Assets	2018	2019	2020	2021	2022	2023	Forecast Assumptions
Cash	\$70,500	\$4,170	\$417	\$6,665	\$11,533	\$60,515	Plug
Accounts Receivable	\$146,880	\$256,250	\$300,000	\$219,120	\$264,936	\$276,091	16% of sales, declining to 9%
Inventory	\$27,540	\$36,000	\$36,000	\$39,840	\$41,832	\$61,354	Declining to 2% of sales
Self-insurance reserve	\$99,020	\$100,000	\$101,740	\$105,740	\$111,740	\$112,740	Grows as needed
Total Current Assets	\$343,940	\$396,421	\$438,157	\$371,365	\$430,041	\$510,700	
Equipment	\$394,740	\$592,579	\$480,000	\$657,040	\$868,192	\$963,011	Disposals of 80k per year
Dexter's SUV	\$14,350	\$14,350	\$14,350	\$14,350	\$14,350	\$14,350	Does not change
Building	\$130,000	\$130,000	\$130,000	\$130,000	\$530,000	\$530,000	Add 400k new building
Subtotal	\$539,090	\$736,929	\$624,350	\$801,390	\$1,412,542	\$1,507,361	
Less acc. depreciation	\$80,000	\$162,961	\$230,161	\$300,865	\$392,684	\$493,985	
Net Fixed Assets	\$459,090	\$573,968	\$394,189	\$500,525	\$1,019,858	\$1,013,376	
Deferred Charges	\$6,570	\$0	\$0	\$0	\$0	\$0	Unchanged
Total Assets	\$809,600	\$970,388	\$832,346	\$871,890	\$1,449,899	\$1,524,076	
Liabilities							
Accounts Payable	\$174,420	\$304,297	\$234,000	\$298,800	\$460,152	\$506,167	15% & then 16.5 % of sales
Other current Liabilities	\$790	\$850	\$850	\$850	\$850	\$850	Unchanged
Total Current Liabilities	\$175,210	\$305,147	\$234,850	\$299,650	\$461,002	\$507,017	
Unsecured Bank Loan, 2004	\$74,120	\$67,670	\$60,833	\$53,586	\$45,903	\$37,760	See amortization table
Mortgage, 2006	\$243,076	\$235,873	\$228,095	\$219,694	\$210,622	\$200,823	See amortization table
New MPB mortgage, 2022	\$0	\$0	\$0	\$0	\$387,903	\$375,201	See amortization table
Total Long-term liabilities	\$317,196	\$303,543	\$288,928	\$273,280	\$644,428	\$613,784	
Equity							
Common Stock	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	No new shares issued
Retained Earnings	\$167,194	\$211,698	\$158,568	\$148,960	\$194,469	\$253,274	No dividends paid
Total Equity	\$317,194	\$361,698	\$308,568	\$298,960	\$344,469	\$403,274	
Total Equity and Liabilities	\$809,600	\$970,388	\$832,346	\$871,890	\$1,449,899	\$1,524,076	



Common Sized Balance Sheet as % of Total Assets

Assets

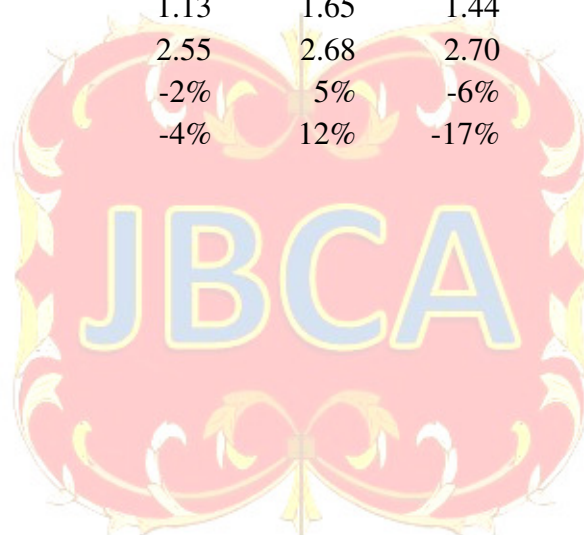
Cash	0.09	0.00	0.00	0.01	0.01	0.04
Accounts Receivable	0.18	0.26	0.36	0.25	0.18	0.18
Inventory	0.03	0.04	0.04	0.05	0.03	0.04
Self-insurance reserve	0.12	0.10	0.12	0.12	0.08	0.07
Total Current Assets	0.42	0.41	0.53	0.43	0.30	0.34
Equipment	0.49	0.61	0.58	0.75	0.60	0.63
Dexter's SUV	0.02	0.01	0.02	0.02	0.01	0.01
Building	0.16	0.13	0.16	0.15	0.37	0.35
Subtotal						
Less accumulated depreciation	0.10	0.17	0.28	0.35	0.27	0.32
Net Fixed Assets	0.57	0.59	0.47	0.57	0.70	0.66
Deferred Charges	0.01	0.00	0.00	0.00	0.00	0.00
Total Assets	1.00	1.00	1.00	1.00	1.00	1.00

Liabilities

Accounts Payable	0.22	0.31	0.28	0.34	0.32	0.33
Other current Liabilities	0.00	0.00	0.00	0.00	0.00	0.00
Total Current Liabilities	0.22	0.31	0.28	0.34	0.32	0.33
Unsecured Bank Loan, 2004	0.09	0.07	0.07	0.06	0.03	0.02
Mortgage, 2006	0.30	0.24	0.27	0.25	0.15	0.13
New MPB mortgage, 2022	0.00	0.00	0.00	0.00	0.27	0.25
Total Long-term liabilities	0.39	0.31	0.35	0.31	0.44	0.40
Equity						
Common Stock	0.19	0.15	0.18	0.17	0.10	0.10
Retained Earnings	0.21	0.22	0.19	0.17	0.13	0.17
Total Equity	0.39	0.37	0.37	0.34	0.24	0.26
Total Equity and Liabilities	1.00	1.00	1.00	1.00	1.00	1.00

Financial Ratio Analysis

	2018	2019	2020	Forecast		
				2021	2022	2023
Receivables Turnover	6.25	6.25	4.00	9.09	10.53	11.11
Payables Turnover	3.95	3.95	3.85	5.33	4.85	4.85
EBITDA/(Prin+Int due in year)	1.80	4.35	0.99	2.14	2.73	3.08
Current Ratio	1.96	1.30	1.87	1.24	0.93	1.01
Quick Ratio	1.24	0.85	1.28	0.75	0.60	0.66
Cash Ratio	0.40	0.01	0.00	0.02	0.03	0.12
Total Debt Ratio	0.61	0.63	0.63	0.66	0.76	0.74
Long Term Debt Ratio	0.39	0.31	0.35	0.31	0.44	0.40
Profit Margin	-0.01	0.03	-0.04	0.00	0.02	0.02
Total Asset Turnover	1.13	1.65	1.44	2.28	1.92	2.01
Financial Leverage	2.55	2.68	2.70	2.92	4.21	3.78
ROA	-2%	5%	-6%	-1%	3%	4%
ROE	-4%	12%	-17%	-3%	13%	15%



Amortization Tables

		Year	Opening Balance	Annual Payment	Interest	Principal	Ending Balance
Unsecured Bank Loan, dated 2004							
Loan Amount	\$150,000	2018	\$80,205	\$10,897	\$4,812	\$6,085	\$74,120
Number of periods	30	2019	\$74,120	\$10,897	\$4,447	\$6,450	\$67,670
Rate	6%	2020	\$67,670	\$10,897	\$4,060	\$6,837	\$60,833
Payment, Annual	\$10,897	2021	\$60,833	\$10,897	\$3,650	\$7,247	\$53,586
		2022	\$53,586	\$10,897	\$3,215	\$7,682	\$45,903
		2023	\$45,903	\$10,897	\$2,754	\$8,143	\$37,760
Mortgage, First Warehouse purchase from landlord							
		Year	Opening Balance	Annual Payment	Interest Payment	Principal Payment	Ending Balance
Loan Amount	\$300,000	2018	\$249,744	\$26,648	\$19,980	\$6,669	\$243,076
Number of periods	30	2019	\$243,076	\$26,648	\$19,446	\$7,202	\$235,873
Rate	8%	2020	\$235,873	\$26,648	\$18,870	\$7,778	\$228,095
Payment, Annual	\$26,648	2021	\$228,095	\$26,648	\$18,248	\$8,401	\$219,694
		2022	\$219,694	\$26,648	\$17,576	\$9,073	\$210,622
		2023	\$210,622	\$26,648	\$16,850	\$9,798	\$200,823
Mortgage, Second Warehouse, new construction							
		Year	Opening Balance	Annual Payment	Interest Payment	Principal Payment	Ending Balance
Loan Amount	\$400,000	2022	\$400,000	\$32,097	\$20,000	\$12,097	\$387,903
Number of periods	20	2023	\$387,903	\$32,097	\$19,395	\$12,702	\$375,201
Rate	5%	2024	\$375,201	\$32,097	\$18,760	\$13,337	\$361,864
Payment, Annual	\$2,097	2025	\$361,864	\$32,097	\$18,093	\$14,004	\$347,860

Appendix D: Gas Industry Statistics

The US became a net exporter of natural gas in 2018, and exports quadrupled from that level only two years later, during the 2020 pandemic year. (eia.gov) 718 billion cubic feet to 2,729 billion. As of April 2021, 7 export terminals were in operation, but the Federal Energy Regulatory Commission (FERC, 2021) has approved the construction of 18 more terminals, primarily on the Gulf Coast. Pennsylvania gas for export travels through pipelines to export terminals.

Renewable energy is growing fast in the US, but fossil fuels still dominate. The Pew Research Center (2020) reports that in 2018 fossil fuels fed about 80% of the nation's energy demand, down from 84% a decade earlier. Although coal use has declined from 23% of demand to 13% of demand since 2000, natural gas use has soared from 24% to 31% of the total energy used. Speaking to the effectiveness of conservation, energy demand had only increased from 98.7 quadrillion BTUs in 2000 to 101.19 quadrillion BTUs in 2018. Renewables accounted for about 11% of total energy used in 2018.



TEACHING NOTES

Synopsis

This case is primarily a financial statement analysis case. The central point of the case study is a commercial loan application that has been submitted by a small company that provides equipment to the fracking industry. The case challenges students to analyze the loan request from the perspective of the loan officer. In doing this, students are also asked to take into consideration the controversial nature of the industry. This includes concerns held by the larger community of stakeholders beyond the bank's Lending Committee and shareholders. As students consider various sources of controversy, including environmental activism, there are opportunities to experience business decision-making under conditions of uncertainty.

Case Design and Implementation

This case has been designed to allow for flexibility in implementation at the discretion of the instructor. For this reason, the case study includes a suite of implementation tools, including financial statements for the loan applicant.

Instructors may wish to consider providing information about the fracking process, including its inherent controversies. Ample resources are available on the internet, including photos and explanatory videos. Incorporating this type of content may be particularly helpful for visual learners.

Another option when using this case is to invite guest speakers from the banking industry to share how they would approach the scenario presented in the case. Incorporating this type of input from seasoned professionals enriches the learning experience by infusing it with practical industry knowledge.

Target Audience

The primary target audience for this case study is undergraduate, upper-division students of business, management and finance. The case is also suitable for use in MBA courses, executive education and certificate programs. Pre-requisite skills and knowledge include experience working with balance and income statements and forecasting. Students should also understand Porter's Five Forces analysis and SWOT analysis.

Learning Objectives

After completing this case study, students should be able to:

1. Analyze financial statements for lending decisions
2. Forecast a balance and income statement
3. Construct a set of alternative financial statements
4. Justify a lending decision using a SWOT analysis and Porter's Five Forces analysis
5. Demonstrate how changing the loan terms impacts the final lending decision
6. Describe ESG risk factors present in the fracking industry and explain how those might influence the lending decision
7. Develop alternative loan structures, including amortization tables

ACTIVITIES AND QUESTIONS FOR DISCUSSION

Activities

As students take on the role of the loan officer, there are several activities to be completed. One of those involves forecasting a balance sheet and income statement for the fracking equipment rental company. This activity is carried out based upon the borrower's projections for business over the upcoming two-year period. The loan officer has not developed any scenario analysis to allow for disappointing revenue growth rates. Therefore, students should do this. Another activity involves constructing one, or more, sets of alternative financial statements that incorporate a loan structure that is more likely to be approved by the bank's Loan Committee. This activity takes into account that, as outlined in the case study, the loan officer has tended to adopt a conservative approach that involved drafting loan proposals that would likely receive approval from the bank's Loan Committee. The alternative loan structures should also include matching amortization schedules. It should be assumed that the 20-year fixed rate loan will be approved, using the new warehouse as collateral. Finally, students should prepare a Porter's Five Forces analysis of the fracking industry. This analysis can incorporate government-sourced information. It might also include a SWOT analysis of the rental company.

Questions for Discussion

To stimulate classroom discussion, instructors can utilize the questions provided here, related to risk assessment and SWOT analysis. This list is certainly not exhaustive, and instructors are encouraged to draw from the case study's information to develop additional questions.

Risk Assessment

How, and in what ways, should risk assessment inform the loan decision?
What consideration should be given to ESG risks, including evolving government policy?
To what extent should the bank consider the potential for reputational risk impact due to environmental activism, including protests?

SWOT Analysis

As the renewable energy sector continues to exert pressure on the fracking industry, how might this present an up-side opportunity for Thompson Fracking Rental Equipment?

How might businesses in a controversial industry, including Thompson Fracking Rental Equipment, pivot and innovate in order to survive and thrive?

Are there opportunities for Thompson Fracking Rental to add a new business line segment to the Income Statement? If so, what might those be?

In what ways might Thompson Fracking Rental diversify its offerings in order to reduce reliance on natural gas usage forecasts?

Dexter Fracking Case Study Rubric

Please address the following questions in your case response. Points earned are dependent upon the detail of your answers. Detailed responses maximize points with fewer points awarded in each category as detail declines. Inaccurate or superficial financial analysis will mean fewer points will be earned in #7.

1. What is the central problem faced by the protagonist, Marvin Jones, loan officer for Mid-Pennsylvania Bank? (15 points)

Write down the details that define the conflict. (results of loan ratio analysis, mismatched assets, and liabilities in the common-size balance sheet)

What motivates the protagonist to act?

2. Describe a historical growth path of assets, retained earnings, debt, revenues and income and articulate the vision, mission, and strategic objectives of Dexter Fracking Rental Equipment. History is provided in the case to give perspective to help frame the solution that you can write. (5 points)

3. Incorporate remarks from guest speakers about their experiences in handling real client dilemmas. (5 points)

4. Make a timeline of Dexter's events (his space requirements, debt, revenues) and issues in the case study. Timelines provide clues for the next steps the owner can take with his company. Timelines also offer insights into the next set of challenges the company may face. (10 points)

5. Focus on the central problem and several additional but related issues in the case and prioritize a list of problems to be solved with the help of a SWOT analysis and a Porter's Five Forces analysis of Dexter's company. By mapping out the strengths, weaknesses, opportunities, and threats that the firm faces, you will understand what problems are urgent to solve. You can also rank the elements in each of the four categories---that will help you figure out which problems to solve first, second, etc. For instance, what is the state of the natural gas industry, what is likely for its future? What is Dexter's competitive advantage? What else do you want to know about Dexter and his business? (15 points)

6. What will constrain potential solutions? Porter's Five Forces or SWOT diagrams are tools that will help you understand the relative powers of the key players in the case, their respective strategies and what sort of pragmatic and actionable case solution is realistic. Also, an analysis of Political, Economic, Social, Technological, Environmental & Legal issues that make up the environment the firm operates in can help you devise a case solution that fits within the constraints. (15 points)

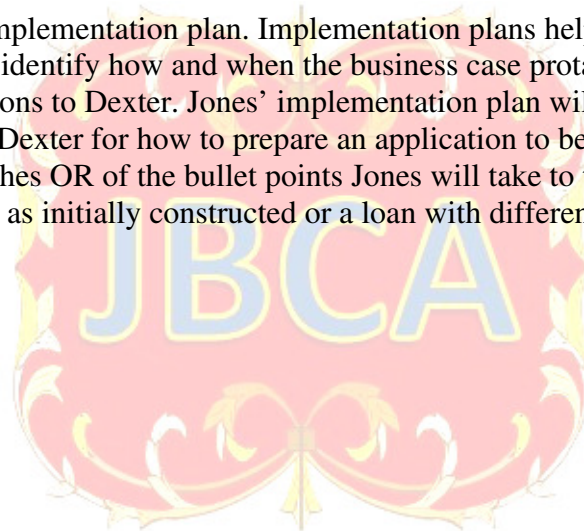
7. Organize the solution.

Build Marvin Jones' strategy for dealing with Dexter Fracking - organizing your analysis and recommendations for how Jones can support the objectives of MPR Bank (earning profits and making sound loans, being aware of the risks of too much exposure to fossil fuel borrowers), and preserve his reputation for structuring good loans. Jones's strategy for responding to Dexter will include assessing Dexter's revenue forecasts for '22 and '23. Using outside industry data,

how realistic are those forecasts? Jones's strategy for responding to Dexter will include assessing future interest rates and post-COVID economic growth on a macro-economic level, including the anticipated global demand for US natural gas. Will foreign countries really want to import US natural gas rather than develop their own domestic fracking industries?

Build a plan for how Jones should respond to Dexter. Your solution will be to justify why Jones should or should not go to bat to get Dexter's loan approved by the Loan Committee at MPB. Can you suggest alternatives for structuring the loan---lengthen the maturity to reduce principal payments, restructure other loans to reduce principal payments, consolidate loans, reduce long-term risk by inserting call features into the loan? Can Dexter use his personal assets as collateral to reduce the risk to the bank? Can you suggest ways for Dexter to improve his balance sheet and earnings to get MPB approval? For example, how can Dexter reduce expenses to improve Net Income and Retained Earnings? Can he raise equity from outsiders? Are there assets Dexter could sell? Should Jones prompt Dexter to consider developing diversified lines of business? Should Dexter reapply a year from now? How does your recommendation help Dexter Fracking achieve its vision, mission, and critical objectives? (25 points)

8. Recommend an implementation plan. Implementation plans help make case studies more like real life. You should identify how and when the business case protagonist (Jones) will deliver his recommendations to Dexter. Jones' implementation plan will consist of the bullet points he would make to Dexter for how to prepare an application to be submitted in the future when uncertainty diminishes OR of the bullet points Jones will take to the credit department today to approve the loan as initially constructed or a loan with different terms. (10 points)



REFERENCES

- AACSB (2020). *Connected for Better: Exploring the Positive Societal Impact of Business Schools*, AACSB Briefing Paper. <https://www.aacsb.edu/about/advocacy-and-awareness/-/media/a34c23171bcb477b893408ccc690d956.ashx>
- Breitenstein, M., Nguyen, D. C., & Walther, T. (2021). Environmental hazards and risk management in the financial sector: A systematic literature review. *Journal of Economic Surveys*, 35(2), 512–538.
- Carpenter, D.O. (2016). Hydraulic fracturing for natural gas: Impact on health and environment. *Review of Environmental Health*, 31(1), 47-51.
- Federal Energy Regulatory Commission. (2021, April 20). *North American LNG export terminals- Existing, approved not yet built, and proposed*. <https://cms.ferc.gov/media/north-american-lng-export-terminals-existing-approved-not-yet-built-and-proposed-1>
- Gaffney O., & Steffen W. (2017). The Anthropocene equation. *The Anthropocene Review*, 4(1):53-61. <https://doi:10.1177/2053019616688022>
- Hagstrom, E.L., & Adams, J.M. (2012). Hydraulic fracturing: Identifying and managing the risks. *Environmental Claims Law Journal*, 24(2), 93-115.
- Höök, M., & Tang, X. (2013). Depletion of fossil fuels and anthropogenic climate change- A review. *Energy Policy*, 52, 797-809. <https://doi.org/10.1016/j.enpol.2012.10.046>
- Huber, B.M., & Comstock, M. (2017). ESG reports and ratings: What they are, why they matter? *Corporate Governance Advisor*, 25(5), 1-12.
- Kargbo, D.M., Wilhelm R.G., & Campbell, D.J. (2010). Natural gas plays in the Marcellus Shale: Challenges and potential opportunities. *Environmental Science & Technology*, 44 (15), 5679-5684. <https://doi: 10.1021/es903811>
- Kramer, R. J., He, H., Soden, B. J., Oreopoulos, L., Myhre, G., Forster, P. M., & Smith, C. J. (2021). Observational evidence of increasing global radiative forcing. *Geophysical Research Letters*, 48, e2020GL091585. <https://doi.org/10.1029/2020GL091585>.
- Mazur, A. (2016). How did the fracking controversy emerge in in the period 2010 – 2012? *Public Understanding of Science*, 25(2), 207-222. <https://doi:10.1177/096366251454311>
- Mazur, A. (2018). Birth and death(?) of the anti-fracking movement: Inferences from quantity of coverage theory. *Society*, 55, 531-539. <https://doi:10.1007/s12115-018-0305-3>
- McKenzie, G., & Wolfe, S. (2004). The impact of environmental risk on the UK banking sector. *Applied Financial Economics*, 14(14), 1005-1016. <https://doi:10.1080/0960310042000261880>
- Noblitt, L., Vance, D. E., & Smith, M. L. D. (2010). A comparison of case study and traditional teaching methods for improvement of oral communication and critical-thinking skills. *Journal of College Science Teaching*, 39(5), 26-32.
- Pew Research Center. (2020). *Renewable energy is growing fast in the U.S., but fossil fuels still dominate*. <https://www.pewresearch.org/fact-tank/2020/01/15/renewable-energy-is-growing-fast-in-the-u-s-but-fossil-fuels-still-dominate/>
- Pollard, J.A., & Rose, D.C. (2019). Lightning rods, earthquakes, and regional identities: Towards a multi-scale framework of assessing fracking risk perception. *Risk Analysis*, 39(2), 473-487. <https://doi:10.1111/risa.13167>

Roddewig, R.J., & Hughes, W. (2015). Underbalanced drilling: Can it solve the economic, environmental and regulatory taking problems associated with fracking? *John Marshall Law Review*, 49(2), 511-570.

van der Ploeg, F. (2016). Fossil fuel producers under threat. *Oxford Review of Economic Policy*, 32(2), 206–222.

Statista.com Retrieved June 20, 2021, from <https://statista.com/statistics/252791/natural-gas-prices/>

Thompson, P. (1998). Assessing the environmental risk exposure of UK banks. *The International Journal of Bank Marketing*, 16(3), 129-139.

Webb, R. M. (2017). Changing tides in water management: Policy options to encourage greater recycling of fracking wastewater. *William & Mary Environmental Law and Policy Review*, 42(1), 85-144.

Zucker, H. A., & Dreslin, S. (2014). *A public health review of high volume hydraulic fracturing for shale gas development*. New York State Department of Health, 100.

https://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf

