

## The Evolution of Valuation in Bankruptcy

Professor Michael Simkovic\*

### Abstract:

*Financial analyses such as valuation, solvency and capital adequacy play a crucial role in bankruptcy. Over the course of the 20<sup>th</sup> century, methods of financial analysis in bankruptcy have shifted from earnings multiples to discounted cash flow (DCF) and recently to market-based approaches such as auctions, market pricing of equity and unsecured debt, and credit spreads. Each shift in bankruptcy court practice followed shifts in financial services industry practice and developments in academic finance. Bankruptcy courts shifted gradually, often several decades after the financial community. Newer methods encountered resistance and skepticism, and older methods continued to be used by courts in conjunction with newer methods for many years. Approaches to corporate solvency analysis used in bankruptcy courts and Delaware state courts appear to have mutually influenced each other. The overall pattern reflects a movement toward greater financial and quantitative sophistication by bankruptcy courts and practitioners and, especially in recent years, seems to be driven by a desire for greater accuracy and objectivity.*

Financial analyses such as valuation, solvency and capital adequacy play a crucial role in bankruptcy.<sup>1</sup> They are central to a court's consideration of allowance of claims,<sup>2</sup> adequate protection,<sup>3</sup> avoidance actions to recover fraudulent transfers<sup>4</sup> and preferences,<sup>5</sup> rejection of collective bargaining agreements,<sup>6</sup> plan confirmation,<sup>7</sup> and § 363 sales.<sup>8</sup> Today, established methods of analysis accepted by most bankruptcy courts include discounted cash flow (DCF), comparable companies, and comparable transactions. However, newer methods based on market prices for equity, debt, or options and derivatives are supplementing, and in some cases supplanting, more established approaches.<sup>9</sup>

---

\* Associate Professor, Seton Hall Law School. Thanks to Professors Barry Adler, Melissa B. Jacoby, Stephen Lubben, John A.E. Pottow, Robert Rasmussen, and Bernard Trujillo and to Judge Melvin Hoffman for helpful suggestions. Thanks to Kevin Gallagher, Sheena Shah, and Sarah Jones for research assistance. This article was presented at the 2016 National Conference of Bankruptcy Judges as part of a panel on "The NCBJ at 90: The Evolution, Role and Impact of Bankruptcy Courts from 1926 to 2016."

<sup>1</sup> The Bankruptcy Act of 1898 and the Chandler Act of 1938 explicitly required valuation for plan confirmation under Chapter X of the Bankruptcy Act. See Chaim J. Fortgang & Thomas Moers Mayer, *Valuation in Bankruptcy*, 32 UCLA L. REV. 1061, 1105–06, 1114 (1985). However, early courts appear to have been suspicious of market valuations and reluctant to apply the absolute priority rule. Walter J. Blum, *The Law and Language of Corporate Reorganization*, 17 U. CHI. L. REV. 565–603, 566–71 (1950).

<sup>2</sup> 11 U.S.C §§ 502(b)(3)-(4); 503(b)(9); 506.

<sup>3</sup> 11 U.S.C §§ 361; 362(d).

<sup>4</sup> 11 U.S.C §§ 544, 548.

<sup>5</sup> 11 U.S.C § 547(b)(3), (b)(5), (c)(1)(A), (c)(5), (f).

<sup>6</sup> 11 U.S.C § 1113(b)(1)(A), (e).

<sup>7</sup> 11 U.S.C. § 1129(a)(7), (8), (9), (11), (b)(2).

<sup>8</sup> 11 U.S.C. § 363(b), (c), (n), (p); *In re Lionel Corp.*, 722 F.2d 1063, 1069-72 (2d Cir. 1983); *In re Chateaugay Corp.*, 973 F.2d 141 (2d Cir. 1992); *In re Oneida Lake Dev., Inc.*, 114 B.R. 352, 355 (Bankr. N.D.N.Y. 1990); *In re Chrysler*, 405 B.R. 84, 95-98 (Bankr. S.D.N.Y. 2009); *In re General Motors Corp.*, 407 B.R. 463, 490 (Bankr. S.D.N.Y. 2009); *cf. In re Braniff Airways, Inc.*, 700 F.2d 935 (5th Cir. 1983).

<sup>9</sup> *VFB LLC v. Campbell Soup Co.*, 482 F.3d 624 (3d Cir. 2007); *In re Iridium Operating LLC*, 373 B.R. 283 (Bankr. S.D.N.Y. 2007); *In re TOUSA, Inc.*, 422 B.R. 783, 791-92 (Bankr. S.D. Fla.

In this time of transition between methods of financial analysis, it may be helpful to look back, tracing the evolution of methods of valuation in bankruptcy. Today’s “established” methods—DCF and comparables—were also once new, less than fully understood, and met with suspicion by the courts.<sup>10</sup> Understanding how these methods went from novel and controversial to established and accepted can help shed light on what we might expect to see during the anticipated transition from DCF and comparables toward more fully market-based approaches.

Novel methods of financial analysis have traditionally been developed first by financial economists, mathematicians, professional accountants, risk managers, or investors. Promising financial analytic methods then gain the attention of legal scholars, who consider how these methods could be adapted and applied to help resolve litigation or solve other legal problems. Legal academics explain the benefits of the new methods to a legal audience and outline how the methods can be applied in a legal context. Gradually, attorneys and financial experts incorporate the new methods into their legal briefs and expert reports, typically minimizing risk by simultaneously presenting analyses using older, more established methods.

Judges, using their equitable powers to select the appropriate methods for valuation and solvency analysis, begin to signal that they find a newer method as persuasive or more persuasive than the older methods. Other litigants and judges follow their lead, refining and further adapting the method through an iterative process involving the bankruptcy and corporate law community—courts, litigants, financial advisors, and academic researchers. The newer method gradually spreads and slowly overtakes the older methods, becoming the primary focus of legal briefs, expert opinions, and judicial decisions.

If history is any guide, lag time from industry use to academic acceptance to widespread adoption within the legal system can be substantial. The mathematics underlying net present value were published in the late 1500s.<sup>11</sup> Early versions of DCF were used in the coal mining and railroad industries as early as the 1800s, but DCF was not widely discussed in the finance literature until the mid 20<sup>th</sup> century.<sup>12</sup> The Supreme Court embraced an approach to valuation resembling DCF as early as the 1940s in its discussion in *Consolidated Rock Products v. Dubois*.<sup>13</sup> But lower courts interpreted *Consolidated*

---

2009) *quashed in part*, 444 B.R. 613 (S.D. Fla. 2011) *aff'd in part, rev'd in part*, 680 F.3d 1298 (11th Cir 2012).

<sup>10</sup> The Delaware Chancery Court once “rejected [the] discounted cash flow method of valuing ... stock, as not corresponding with ‘either logic or the existing law’” in part because of DCF’s inherent subjectivity. *Weinberger v. UOP, Inc.*, 457 A. 2d 701, 712 (1983) citing *Weinberger v. UOP, Inc.*, 426 A. 2d 1333, 1359–60 (1981).

<sup>11</sup> R. H. Parker, *Discounted Cash Flow in Historical Perspective*, 6 J. ACCT. RES. 58, 59–60 (1968).

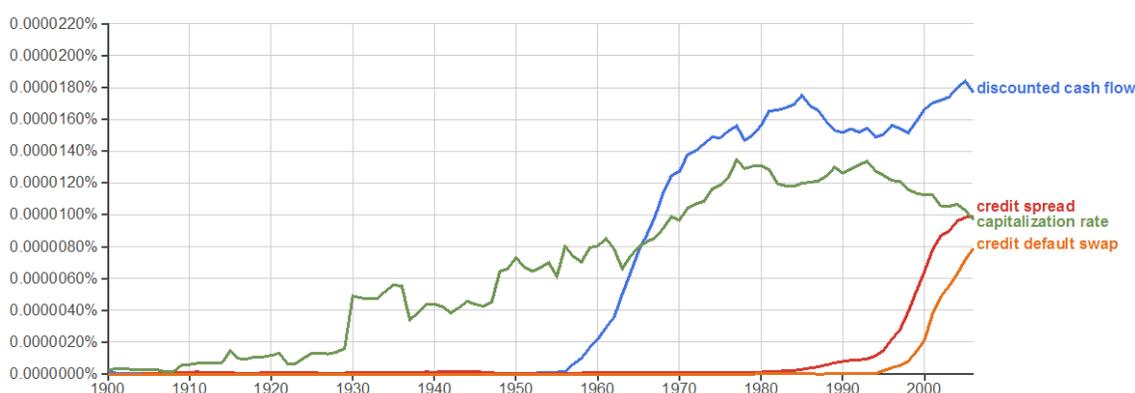
<sup>12</sup> Susie Brackenborough, Tom McLean, & David Oldroyd, *The Emergence of Discounted Cash Flow Analysis in the Tyneside Coal Industry C.1700–1820*, 33 BRIT. ACCT. REV. 137–55 (2001); Parker, *supra* note 11.

<sup>13</sup> *Consolidated Rock Products Co. V. Du Bois*, 312 U.S. 510, 526-27 (1941).

Rock by using earnings multiples or “capitalization rates”—an approach similar to the analysis of comparable companies.<sup>14</sup>

Figure 1 below shows awareness of discounted cash flow analysis growing from the 1960s through the 1980s and then leveling off. The figure specifically shows the frequency with which the term “discounted cash flow” appears in English-language books, which is a proxy for awareness by specialists and the educated public.<sup>15</sup> Awareness of capitalization rates, an earlier valuation approach similar to comparables or multiples, spread from the early 1900s until around 1980 and started to drop off in the 1990s. More recently, from the 1980s through the mid 2000s, awareness of credit spreads and related credit derivatives (starting in the 1990s) has increased.

*Figure 1. Frequency of Valuation and Solvency Terms in Books, 1900-2006*



Source: Google Books NGram Viewer

DCF was rarely used for bankruptcy valuation until the mid 1980s and did not become the leading method of valuation analysis until the 1990s.<sup>16</sup> Growth in the use of DCF in bankruptcy is shown in Figure 2 below. Interestingly, increased use of DCF in bankruptcy followed shortly after Delaware state courts embraced valuation methods commonly used by financial professionals, including DCF.<sup>17</sup> It is possible that the methods of valuation

<sup>14</sup> *Group of Investors v. Milwaukee R. Co.*, 318 U.S. 523 (1943); Walter J. Blum & Stanley A. Kaplan, *The Absolute Priority Doctrine in Corporate Reorganizations*, 41 U. CHI. L. REV. 651, 656 (1974); Fortgang and Mayer, *supra* note 1 at 1128–29.

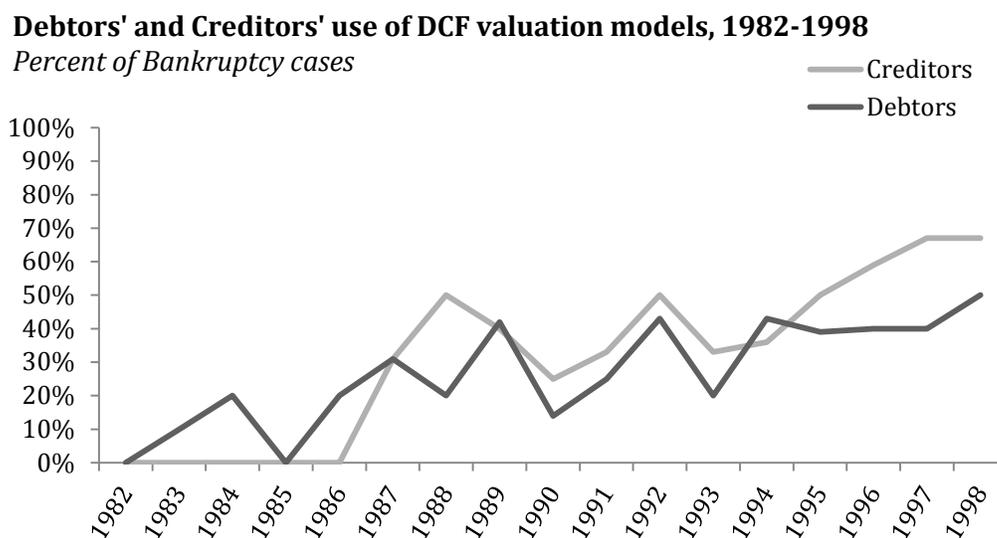
<sup>15</sup> New developments in finance are typically initially disseminated within industry and among academic specialists through informal channels such as word of mouth, conference presentations, and through articles in trade journals, newsletters, and peer reviewed scholarly journals. New developments typically only appear in books later, since books can take years to write and publish. Books often summarize, explain, synthesize and contextualize material that previously appeared in more specialized channels so that the material can reach a wider, less highly specialized audience.

<sup>16</sup> Walter J. Blum, *Corporate Reorganizations Based on Cash Flow Valuations*, 38 U. CHI. L. REV. 173 (1970); Bernard Trujillo, *Patterns in a Complex System: An Empirical Study of Valuation in Business Bankruptcy Cases*, 53 UCLA L. REV. 357, 393–94 (2005); Blum, *supra* note 1 at 574–75 (describing valuation under the Bankruptcy Act as a version of comparables analysis tied to a multiple of earnings).

<sup>17</sup> *Weinberger v. UOP, Inc.*, 457 A. 2d 701, 712–13 (1983). The extent to which *Weinberg* may have influenced valuation in bankruptcy is unclear. Bankruptcy courts do not appear to have

and solvency analysis favored by Delaware state courts may have influenced bankruptcy courts, or vice versa.

Even with the rise of DCF, litigants in bankruptcy courts continued to present and courts continued to consider other methods in conjunction with DCF. Other methods declined gradually as DCF ascended, as shown in Figure 3 below.<sup>18</sup>



Note: Missing data for 1983 and 1996 interpolated by averaging previous and following years' data.  
 Source: Trujillo (2005), figures 13 and 14.

*Figure 2. Growing Frequency of DCF Valuation Models in Bankruptcy Cases*

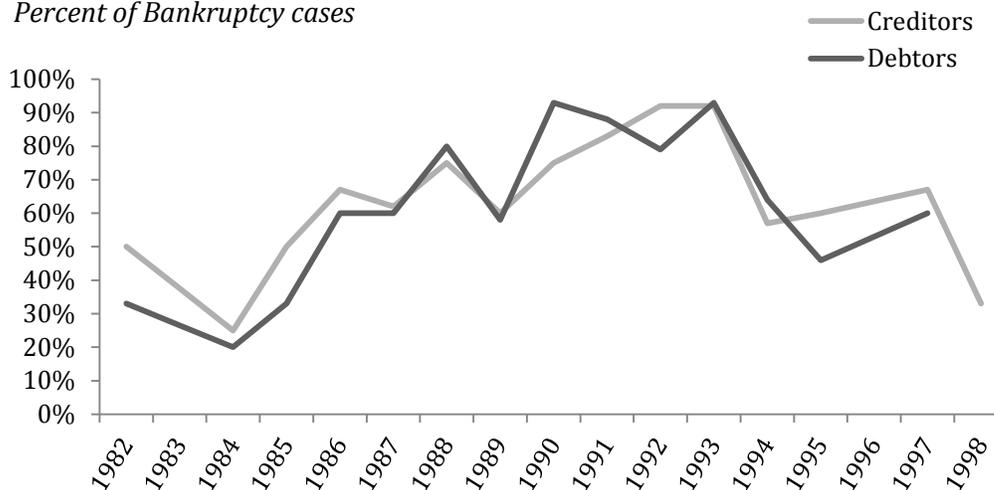
---

explicitly cited *Weinberg* for its approach to valuation until 1999. *In re Zenith Elecs. Corp.*, 241 B.R. 92, 110 (Bankr. D. Del. 1999).

<sup>18</sup> Trujillo, *supra* note 16 at 393–95.

*Figure 3. Growth and Decline in Comparables (Multiples) Valuation Models in Bankruptcy Cases*

**Debtors' and Creditors' use of Comparables valuation models, 1982-1998**  
*Percent of Bankruptcy cases*



Note: Missing data for 1983 and 1996 interpolated by averaging previous and following years' data.  
 Source: Trujillo (2005), figures 15 and 16.

Established methods of financial analysis such as DCF, though quantitative and grounded in assumptions of efficient markets, largely depend on subjective judgments.<sup>19</sup> Multiples analysis embraces market value as a reality check on DCF analysis.<sup>20</sup> However, rather

<sup>19</sup> TIM KOLLER, MARK GOEDHART & DAVID WESSELS, VALUATION MEASURING AND MANAGING THE VALUE OF COMPANIES 355 (4th ed. 2005); *Iridium Capital Corp. v. Motorola, Inc. (In re Iridium Operating LLC)*, 373 B.R. 283, 347–48 (Bankr. S.D.N.Y. 2007); *Peltz v. Hatten*, 279 B.R. 710, 737–38 (D. Del. 2002); *Global GT LP v. Golden Telecom, Inc.*, 993 A.2d 497, 497 (Del. Ch. 2010); *JPMorgan Chase Bank, N.A. v. Charter Commc'ns Operating, LLC (In re Charter Commc'ns)*, 419 B.R. 221, 236 (Bankr. S.D.N.Y. 2009); Stan Bernstein, Susan H. Seabury & Jack F. Williams, *Squaring Bankruptcy Valuation Practice with Daubert Demands*, 16 AM. BANKR. INST. L. REV. 161, 171 (2008).

DCF has three components: (1) projections of future cash flows of the debtor; (2) a discount rate that is used to convert future cash flows into their present value; and (3) a terminal value used to limit the necessary projection period. RICHARD A. BREALEY, STEWART C. MYERS & FRANKLIN ALLEN, PRINCIPLES OF CORPORATE FINANCE 65 (8th ed. 2006); *Doft & Co. v. Travelocity.com, Inc.*, No. 19734, 2004 WL 1152338, at \*5 (Del. Ch. May 20, 2004). Projecting future cash flows involves making a subjective judgment about the future based on imperfect and limited information about the past and the present. Douglas Baird & Robert Rasmussen, *Anti-Bankruptcy*, 119 YALE L. J. 648, 655 (2010); KOLLER, GOEDHART & WESSELS, *supra* note 19 at 159. In many cases, courts have reached seemingly inconsistent determinations about whether a particular type of business setback is foreseeable. Discount rates can be calculated using several methods that can produce different results. BREALEY, MYERS & ALLEN, at 66–7, 222–26; Bernstein, Seabury & Williams, at 191 n.102. In addition, within each method, different results can flow from different assumptions about financial arcana such as equity risk premiums and systemic risk (beta). See *Del. Open MRI Radiology Assocs. v. Kessler*, 898 A.2d 290, 338 (Del. Ch. 2006); BREALEY, MYERS & ALLEN, at 217, 219–21; KOLLER, GOEDHART & WESSELS, *supra* note 19, at 297–98, 307–08; Bernstein, Seabury & Williams, at 190–93. Terminal value depends on the last year of cash-flow projections and assumptions about a perpetual growth rate for the company.

<sup>20</sup> KOLLER, GOEDHART & WESSELS, *supra* note 19 at 361.

than using market prices of the debtor, this approach uses market prices of similar firms.<sup>21</sup> The problem with the multiples approach is that no two companies are ever perfectly comparable.<sup>22</sup> There is ample room for differences of opinion about the appropriate group of comparable companies.<sup>23</sup>

New market-based methods can be more objective, less susceptible to hindsight bias, harder to manipulate, and less expensive to implement.<sup>24</sup> However, courts may not fully understand how market information should be interpreted. In addition, such information could be of limited value if critical contemporaneously known information was not available to investors.<sup>25</sup>

In the context of plan confirmation and alternatives to chapter 11 reorganization, the rise of § 363 sales has been driven in part by preferences for market valuation through a judicially supervised auction process rather than through purely judicial valuations.<sup>26</sup> The Supreme Court has also favored the use of an auction process within a plan of reorganization to help price equity of the reorganized firm and avoid absolute priority rule violations.<sup>27</sup>

In other contexts, where judicial valuations are necessary—such as adjudication of avoidance actions—bankruptcy courts have considered equity prices, unsecured bond prices relative to par, and the ability to raise equity or debt (especially unsecured debt) as evidence that is relevant to valuation, solvency, and adequate capitalization analysis. When important information was not known to investors, courts have effectively backdated market valuations to the date when such information was publicly disclosed.

The first judicial use of market prices as a substitute for, rather than as a supplement to, expert opinion in a fraudulent transfer case was by the Delaware District Court in *VFB*

---

<sup>21</sup> *Id.*

<sup>22</sup> *Id.* at 366–68, 380; BREALEY, MYERS & ALLEN, *supra* note 19 at 511; Bernstein, Seabury & Williams, *supra* note 19 at 196; Prescott Group Small Cap, L.P. v. Coleman Co., No. 17802, 2004 WL 2059515, at \*22 (Del. Ch. Sept. 8, 2004); *In re Radiology Assocs., Inc.*, 611 A.2d 485, 490 (Del. Ch. 1991).

<sup>23</sup> KOLLER, GOEDHART & WESSELS, *supra* note 19 at 362–63, 366–67.

<sup>24</sup> Michael Simkovic & Benjamin S. Kaminetzky, *Leveraged Buyout Bankruptcies, the Problem of Hindsight Bias, and the Credit Default Swap Solution*, 2011 COLUM. BUS. L. REV. 118 (2011); Michael Simkovic, *Making Fraudulent Transfer Law More Predictable*, in HANDBOOK ON BANKRUPTCY (Barry E. Adler ed., 2017), available at <http://ssrn.com/abstract=2775920>.

<sup>25</sup> *Tronox Inc. v. Kerr McGee Corp. (In re Tronox Inc.)*, 503 B.R. 239 (Bankr. S.D.N.Y. 2013).

<sup>26</sup> Douglas G. Baird & Bob Rasmussen, *The End of Bankruptcy*, 55 STAN. L. REV. 751, 758, 785–88, 789 (2002); David Arthur Skeel Jr., *The Nature and Effect of Corporate Voting in Chapter 11 Reorganization Cases*, 78 VA. L. REV. 461–533, 496–98 (1992); Jason Brege, *An Efficiency Model of Section 363 (b) Sales*, 92 VA. L. REV. 1639–85, 1644, 1671 (2006); Harvey R. Miller & Shai Y. Waisman, *Is Chapter 11 Bankruptcy?*, 47 B.C. L. REV. 129, 172–73 (2005); Lynn M. LoPucki & Joseph W. Doherty, *Bankruptcy Fire Sales*, 106 MICH. L. REV. 1 (2007); James J. White, *Bankruptcy Noir*, 106 MICH. L. REV. 691–719, 691–92 (2008)..

<sup>27</sup> *Bank of Am. Nat'l Trust & Sav. Ass'n v. 203 N. LaSalle St. P'ship*, 526 U.S. 434, 456–57 (1999) (“[T]he best way to determine value is exposure to a market,” not through a “determination . . . made by a judge in bankruptcy court.”); Barry E. Adler & Ian Ayres, *A Dilution Mechanism for Valuing Corporations in Bankruptcy*, 111 YALE L.J. 83 (2001).

*LLC v. Campbell Soup Co.* in 2005, affirmed by the Third Circuit in 2007.<sup>28</sup> In *VFB*, Campbell Soup Company spun off underperforming product lines through a leveraged transaction.<sup>29</sup> Campbell received \$500 million in cash, while the new company, Vlasic Foods International (“VFI”), took on debt obligations.<sup>30</sup> About three years later, VFI filed bankruptcy.<sup>31</sup> The court interpreted equity market prices and bond market receptivity as a judgment by the capital markets that VFI was solvent as of the date of the spin-off, and therefore concluded that the spin-off could not be avoided as a fraudulent transfer. The district court attributed differences between the implicit judgment of the market and the opinion of plaintiffs’ experts to the experts’ “hindsight bias.”<sup>32</sup> The Third Circuit went further, questioning the basic worth of expert opinion when market prices are available and trading is open, liquid, and informed.<sup>33</sup> The propriety of using financial market prices in fraudulent transfer analysis was reinforced by Judge Peck of the U.S. Bankruptcy Court for the Southern District of New York in *In re Iridium Operating LLC*.<sup>34</sup>

Recently, the court in *Tronox Inc. v. Kerr McGee Corp.*<sup>35</sup> took a nuanced and skeptical approach to certain market-based defenses, but distinguished *VFB*. The *Tronox* court found that the debtors’ ability to obtain secured credit from a sophisticated counterparty was irrelevant to a solvency determination, because the expected recovery rate for secured creditors is so high that the pricing on secured debt is not sensitive to the risk of default.<sup>36</sup> On the other hand, the *Tronox* court was impressed with the debtor’s ability to raise unsecured debt and equity at the time it was allegedly insolvent.<sup>37</sup> However, the *Tronox* court, distinguishing *VFB*, found that the company failed to disclose certain material liabilities to the market, and that the market’s assessment of the debtor’s prospects was therefore unreliable.<sup>38</sup>

Delaware state courts have also started to consider market-based indicators of solvency, albeit in conjunction with more traditional accounting-based measurements. For example, in deciding that a corporation was likely insolvent, the Delaware Chancery Court in *Products Resources Group* noted that while the corporation could refinance its old debts, the corporation did “not have the credit necessary to borrow at commercially reasonable [interest] rates that [would] enable it to meet its obligations going forward.”<sup>39</sup> Similarly, in *Quadrant Structured Products Co.*, the Delaware Chancery Court cited the Third Circuit’s market-based reasoning in *VFB*; the Delaware Chancery Court found that creditors’ willingness to sell their bonds for far less than face value was evidence of insolvency of the debtor.<sup>40</sup> Influence between bankruptcy law and corporate law runs in both directions; bankruptcy courts frequently consider Delaware’s approach to insolvency

---

<sup>28</sup> No. Civ. A. 02-137, 2005 WL 2234606, at \*22 (D. Del. Sept. 13, 2005), *aff’d*, 482 F.3d 624 (3d Cir. 2007).

<sup>29</sup> *Id.* at 626–27.

<sup>30</sup> *Id.* at 627, 629.

<sup>31</sup> *Id.* at 628.

<sup>32</sup> *Id.* at 629.

<sup>33</sup> *See id.* at 629–30, 633.

<sup>34</sup> *In re Iridium Operating LLC*, 373 B.R. 283 (Bankr. S.D.N.Y. 2007).

<sup>35</sup> *Tronox Inc. v. Kerr McGee Corp. (In re Tronox Inc.)*, 503 B.R. 239 (Bankr. S.D.N.Y. 2013).

<sup>36</sup> *Id.* at 298.

<sup>37</sup> *Id.*

<sup>38</sup> *Id.* at 301-03.

<sup>39</sup> *Prod. Res. Grp., L.L.C. v. NCT Grp., Inc.*, 863 A.2d 772, 784 (Del. Ch. 2004).

<sup>40</sup> *Quadrant Structured Prod. Co. v. Vertin*, 115 A.3d 535, 562 (Del. Ch. 2015).

because creditors often allege breach of fiduciary duties or other state law causes of action in bankruptcy adversary proceedings.<sup>41</sup>

*VFB* and *Iridium* leave important questions unanswered. How should courts decide close cases such as when a debtor's equity price is declining but still positive, when bonds are trading slightly below par, or when the debtor has access to credit but on unfavorable terms? What about cases in which equity prices may reflect volatility and option value instead of adequate capitalization? Or when equity prices cease to be available? How can courts evaluate whether market prices reflect informed analysis or market manipulation? How can courts articulate clear standards that are applicable across time and across debtors?

One leading proposal within the context of adequate capitalization and solvency analysis is that instead of bond or equity prices, courts should look to credit spreads.<sup>42</sup> Credit spreads are the difference between the yield on tradable credit instruments such as corporate bonds and a risk-free rate with a similar term structure.<sup>43</sup> Credit spreads can either be calculated from corporate bond yields or observed directly from the pricing of credit default swaps (CDS).<sup>44</sup> Credit spreads are widely used in financial services to price floating rate debt,<sup>45</sup> to monitor credit risk and determine required collateral,<sup>46</sup> and by financial regulators to inform capitalization requirements.<sup>47</sup>

Credit spreads offer a clear indicator of market actors' expectations about the likelihood of default and the likely losses given default.<sup>48</sup> Because there is a historical record of trades and quotes, these prospective, hindsight-free assessments are available at particular

---

<sup>41</sup> See, e.g., *In re* Buckhead Am. Corp., 178 B.R. 956, 968 (D. Del. 1994); *In re* Oakwood Homes Corp., 340 B.R. 510, 530 (Bankr. D. Del. 2006); *Buckley v. O'Hanlon*, No. 04-955GMS, 2007 WL 956947, at \*7 (D. Del. Mar. 28, 2007). Delaware state courts have also contemplated bankruptcy and commercial law approaches to corporate insolvency or inadequate capitalization. During the last decade, Delaware state courts have grown skeptical of fiduciary duties to creditors in the "zone of insolvency," noting that unlike shareholders, creditors already have protections provided by fraudulent transfer law. *Prod. Res. Grp., L.L.C. v. NCT Grp., Inc.*, 863 A.2d 772, 777, 787 (Del. Ch. 2004); *Trenwick Am. Litig. Tr. v. Ernst & Young, L.L.P.*, 906 A.2d 168, 199 (Del. Ch. 2006) *aff'd sub nom.* *Trenwick Am. Litig. Tr. v. Billett*, 931 A.2d 438 (Del. 2007); *Quadrant Structured Prod. Co. v. Vertin*, No. CV 6990-VCL, 2015 WL 6157759, at \*10–11 (Del. Ch. Oct. 20, 2015), *aff'd*, No. 210, 2016, 2016 WL 6438209 (Del. Oct. 31, 2016).

<sup>42</sup> See Simkovic & Kaminetzky *supra* note 24; Simkovic *supra* note 24.

<sup>43</sup> The risk free rate is typically considered to be close to the yield on treasuries with a similar maturity date or the LIBOR swap rate.

<sup>44</sup> CDS resemble bond insurance.

<sup>45</sup> Serena Ng, *Banks Get Tougher on Credit Line Provisions*, WALL ST. J., May 4, 2009.

<sup>46</sup> Jonathan Di Giambattista, MONITORING COUNTERPARTY RISK POST-LEHMAN (2009), <http://www.risk.net/credit/advertisement/1565171/monitoring-counterparty-risk-post-lehman>; Silvina Aldeco Martinez & Bruce Christie, KEEPING A PULSE ON RISK: USING DAILY CREDIT METRICS TO MONITOR EXPOSURES AND IDENTIFY INVESTMENT OPPORTUNITIES S&P GLOBAL MARKET INTELLIGENCE, CREDIT ANALYTIC SOLUTIONS (2013), <http://www.spcapitaliq-credit.com/keeping-a-pulse-on-risk-using-daily-credit-metrics-to-monitor-exposures-and-identify-investment-opportunities/>; S&P CAPITAL IQ CREDIT ANALYTICS: DELIVERING AN EXTENSIVE VIEW OF CREDIT RISK ACROSS RATED AND UNRATED PRIVATE AND PUBLIC COMPANIES AROUND THE GLOBE (2014), [http://marketintelligence.spglobal.com/documents/products/Credit\\_Analytics\\_v2.pdf](http://marketintelligence.spglobal.com/documents/products/Credit_Analytics_v2.pdf).

<sup>47</sup> BASEL COMMITTEE ON BANKING SUPERVISION, REVIEW OF THE CREDIT VALUATION ADJUSTMENT FRAMEWORK (2015).

<sup>48</sup> Losses given default are 100 percent minus the recovery rate.

points in time that are legally relevant, such as the date of an alleged fraudulent transfer, preference, or breach of fiduciary duty to creditors in the zone of insolvency or during actual insolvency.<sup>49</sup>

With a single assumption about recovery rates—which can be grounded in historic data or backed out from differences in credit spreads at different points in the capital structure—it is possible to reconstruct a daily market estimate of a debtor’s probability of default. This market-based approach is faster, less expensive, and more objective than current approaches.

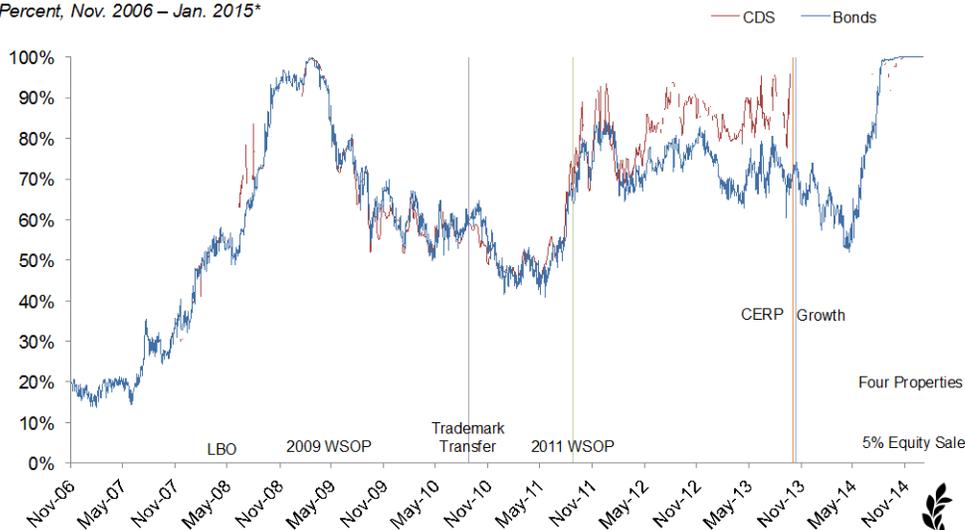
---

<sup>49</sup> The *Credit Lyonnais* case suggested that corporate directors and officers might owe fiduciary duties not only to shareholders, but also to creditors once the corporation approaches insolvency or enters the “zone of insolvency.” *Credit Lyonnais Bank v. Pathe Comm.*, 1991 WL 277613, at 34 (Del. Ch. Dec. 30, 1991). The “zone of insolvency” is not clearly defined, but is generally thought to mean a state of financial distress that occurs prior to and is less severe than actual balance sheet insolvency (i.e., the value of assets falling below the face value of liabilities). As discussed in note 41 above, in recent years Delaware courts have become more skeptical of fiduciary duty to creditors.

An example is provided below using data for Caesars Entertainment Operating Company:

*Figure 4. Caesars Risk-Neutral Market-Implied Probability of Default from CDS and Bond Spreads (Preliminary Analysis)*

Market participants' view of probability of Caesars Entertainment Operating Company default within 5 years, assuming 30% recovery  
Percent, Nov. 2006 – Jan. 2015\*



\* Caesars Entertainment Operating Company filed bankruptcy in January of 2015.

CDS probabilities of default based on 5-year CDS spread from Bloomberg CBIN and 5-year swap rate. Bond probabilities based on spread between yield of CEOC 6 ½ percent 6/1/2016 Senior Unsecured Bullet Bond and U.S. Treasury with similar maturity date. © Michael Simkovic 25



To put this into context, the traditional solvency and adequate capitalization analysis performed by the Examiner in the Caesars Chapter 11 case required months of work and cost the estate millions of dollars.<sup>50</sup> The preliminary market-based analysis above was completed by a law professor and a handful of research assistants in a few days using data that can be purchased for a few thousand dollars.

The traditional analysis performed by the Examiner in Caesars calculated solvency only on a few specific dates—primarily at year-end—filling in gaps by assuming deterioration in financial condition as the bankruptcy date approached.<sup>51</sup> The market-based analysis above indicates capital adequacy on a daily basis based on objective market indicators. It shows capital adequacy at times improving and at times deteriorating rather than monotonically decreasing as the bankruptcy date approached. A more thorough market-based analysis to inform adjudication would likely continue to be faster, more predictable, and much more cost-effective than the traditional approach.

<sup>50</sup> *In re* Caesars Entertainment Operating Company, No. 15-01145 (ABG), (Bankr. N.D. Il. Jan 15, 2015), Alvarez & Marsal Global Forensic Dispute Services, LLC, Applications for Professional Compensation, Doc. Nos.: 1898, 2357, 2588, 2955, 3454, 3477 (approval of over \$17 million in fees and expenses for financial analyses performed on behalf of the Examiner in April 2015 to January 2016.). While it is difficult to isolate solvency and adequate capitalization analyses from other forensic analyses, solvency and adequate capitalization analyses appear to have cost the Estate over one million dollars.

<sup>51</sup> *In re* Caesars Entertainment Operating Company, No. 15-01145 (ABG), (Bankr. N.D. Il. Jan 15, 2015), Final Report of Examiner, Richard J. Davis, March 15, 2016, at 7-8, 139-99.

This pattern suggests that DCF and comparable companies will likely continue to be used in conjunction with market-based methods for years to come.<sup>52</sup>

The transition from DCF and comparable companies toward more purely market-based approaches could be facilitated through the development of a library of precedents showing rough equivalences across methods. In subsequent research, I seek to develop such a library by mapping cases that were decided using traditional approaches to solvency analysis onto the credit spreads at the time of the challenged transactions. This will indicate the spreads under which courts routinely find a debtor to be solvent, routinely find a debtor to be insolvent, and the spreads over which there is some disagreement and potential inconsistency.

*Conclusion:*

Financial analyses such as valuation, solvency and capital adequacy play a crucial role in bankruptcy. Over the course of the 20<sup>th</sup> century, methods of financial analysis in bankruptcy have shifted from earnings multiples to discounted cash flow and recently to market-based approaches such as auctions, market pricing of equity and unsecured debt, and credit spreads. Each shift in bankruptcy court practice followed shifts in financial services industry practice and developments in academic finance.

Bankruptcy courts shifted gradually, often several decades after the financial community. Newer methods encountered resistance and skepticism, and older methods continued to be used by courts in conjunction with newer methods for many years. Approaches to corporate solvency analysis used in bankruptcy courts and Delaware state courts appear to have mutually influenced each other.

Courts have already become more sophisticated in their approach to interpreting market signals. For example, courts have recognized that secured credit is less sensitive to default risk than unsecured credit, that access to credit on unfavorable terms could still signal insolvency or inadequate capitalization, and that until critical information is made available to public market participants, market prices may not reflect that information. In the future, we are likely to see continued, gradual growth in acceptance and use of market-based solvency measures and valuation methods as litigants, experts, and the judiciary learn more about these methods' advantages in terms of accuracy, objectivity, and cost and judges learn how to police experts to ensure that the methods are used fairly and appropriately.

Judges will play a crucial role, insisting that litigants and experts at least present market-based information alongside traditional measures whenever market-based information is available. As market-based measures occupy an ever more prominent position in expert reports, legal briefs, and judicial opinions, older methods will decline in relative importance, but are unlikely to disappear completely. Academic studies can help accelerate this transition by explaining newer approaches and outlining best practices for implementing market-based analyses. Guidelines should be rooted in empirical finance and in existing case law mapping the contours of insolvency. The quest for a more objective and accurate approach to financial analysis continues, with bankruptcy judges

---

<sup>52</sup> *In re American Classic Voyages*, 384 B.R. 62 (D. Del. 2008) (declining to mandate a market-based approach where the bankruptcy court had decided solvency based on DCF).

honorably ceding some of their own discretion to help make the law more consistent, fair, and predictable.