Bankruptcy Survival

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ABSTRACT

Of the large, public companies that seek to remain in business through bankruptcy reorganization, only 70 percent succeed. The assets of the other 30 percent are absorbed into other businesses. Success is important both because it is efficient and because it preserves jobs, communities, supplier and customer relationships, and tax revenues. This Article reports the findings of the first comprehensive study of the variables that determine whether a business will succeed or fail.

Eleven conditions best predict companies' survival prospects. First, a company that even hints in the press release announcing its bankruptcy that it intends to sell its business is highly likely to fail. Second, reorganizations assigned to more experienced judges are more likely to succeed. Third, companies headquartered in isolated geographical areas are more likely to fail. Fourth, companies that report greater shareholder equity are more likely to fail. Fifth, companies with routinely appointed creditors' committees are more likely to fail. Sixth, companies with debtor-in-possession (DIP) loans are more likely to succeed. Seventh, companies that prepackage or prenegotiate their plans are more likely to succeed. Eighth, companies that file in periods of low interest rates are more likely to succeed. Ninth, larger companies are more likely to succeed. Tenth, manufacturers are more likely to succeed. Eleventh, companies with positive pre-filing operating income are more likely to succeed.

System participants may be able to improve survival rates by shifting cases to more experienced judges and perhaps also by paying greater attention to the decisions to appoint creditors' committees, to prenegotiate plans, to obtain DIP loans, and to publicly seek alliances.

AUTHORS

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INTRODUCTION

In cases involving large, public companies, bankruptcy courts can be analogized to hospital emergency rooms.[1] Companies arrive sick and receive treatment. Some survive, meaning that they continue in business. Others die, meaning that they cease doing business, their employees lose their jobs, and their assets are liquidated or merged into other companies. These emergency room visits are high risk for the companies. The average case duration is sixteen months. During that brief period, 30 percent of the companies fail.

The legislative history of the Bankruptcy Code clearly indicates that the intended goals of the U.S. bankruptcy system are to save companies and preserve jobs:

> The purpose of a business reorganization case, unlike a liquidation case, is to restructure a business's finances so that it may continue to operate, provide its employees with jobs, pay its creditors, and produce a return for its stockholders. . . . It is more economically efficient to reorganize than to liquidate, because it preserves jobs and assets.[2]

Some scholars argue instead that bankruptcy courts should consider only the interests of creditors and shareholders. Adherents to the creditors' bargain theory[3] of bankruptcy maintain that if liquidation will return more to the creditors and shareholders[4] than reorganization, companies should be liquidated[5]—even if the liquidation eliminates jobs.[6] In limiting their concern to the interests of creditors

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1.   *E.g.*, Elizabeth Warren & Jay Lawrence Westbrook, *The Success of Chapter 11: A Challenge to the Critics*, 107 MICH. L. REV. 603, 606 (2009) ("Because the Chapter 11 hospital is explicitly designed to deal with both ailing patients and corpses, the business failure rate can be understood better if the two kinds of cases are separated.").

2.   H.R. REP. NO. 95-595, at 220 (1977), *reprinted in* 1977 U.S.C.C.A.N. 5963, 6179.

3.   Lynn M. LoPucki, *A Team Production Theory of Bankruptcy Reorganization*, 57 VAND. L. REV. 741, 744–49 (2004) (summarizing the creditors' bargain theory).

4.   *E.g.*, THOMAS H. JACKSON, THE LOGIC AND LIMITS OF BANKRUPTCY LAW 32–33 (1986) (postulating that managers and employees "have no rights that need to be accounted for in [bankruptcy]").

5.   As Professor Alan Schwartz put it:
> [A] conflict exists between the goals of job preservation and maximizing the bankruptcy monetary return only with regard to firms whose liquidation values exceed their reorganization values. To find that liquidation value exceeds going-concern value, however, is to find that the firm's physical assets are best redeployed in other uses.

Alan Schwartz, *A Contract Theory Approach to Business Bankruptcy*, 107 YALE L.J. 1807, 1818 (1998).

6.   *E.g.*, Douglas G. Baird, *Bankruptcy's Uncontested Axioms*, 108 YALE L.J. 573, 580 (1998) ("The paradigmatic firm is a restaurant in a large city. When the restaurant closes, workers lose their jobs, but they can find work elsewhere. A new restaurant or another firm can move into the space, and life goes on.").

and shareholders, those scholars ignore the massive economic and social costs that company failure imposes on employees, suppliers, customers, and communities.[7]

As one of us has explained elsewhere, in the context of large, public companies, the creditors' actual bargain includes the interests of all stakeholders.[8] That is, in order to induce employees, managers, suppliers, customers, taxing authorities, communities, and others to deal with the company, the creditors and shareholders have authorized a largely independent board of directors to consider and protect the interests of all these constituencies. A key element of that contract is that the company will be eligible to file bankruptcy. Creditors and shareholders have invested knowing—and implicitly agreeing—that the bankruptcy courts will protect the investments of stakeholders. We believe that if all stakeholders' interests are taken into account, survival is virtually always economically preferable to liquidation whenever survival is achievable.[9]

Earlier research has explored the relationships between business survival and a variety of case or company characteristics.[10] Our model, however, is the first data-driven[11] comprehensive model of those relationships. We had two goals in developing it. The first was to identify system changes that would improve the survival rate. We have identified at least one good prospect for achieving such an improvement. As the system currently operates, the courts

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7. *See* Elizabeth Warren, *Bankruptcy Policymaking in an Imperfect World*, 92 MICH. L. REV. 336, 355 (1993) ("Business closings affect employees who will lose jobs, taxing authorities that will lose ratable property, suppliers that will lose customers, nearby property owners who will lose beneficial neighbors, and current customers who must go elsewhere.").

8. LoPucki, *supra* note 3, at 749–52 (explaining the team production theory of reorganization).

9. We recognize that survival may not be optimal from the perspectives of various priority levels of creditors and shareholders. Some or all may find economic advantage in liquidation or merger and so regard these outcomes as successes. These perspectives notwithstanding, we have chosen to predict and explain success defined as business survival.

10. Vicki L. Bogan & Chad M. Sandler, *Are Firms on the Right Page With Chapter 11? An Analysis of Firm Choices That Contribute to Post-Bankruptcy Survival*, 19 APPLIED ECON. LETTERS 609 (2012) (testing seven independent variables, including some not available until after the case is concluded, with survival); Sandeep Dahiya et al., *Debtor-in-Possession Financing and Bankruptcy Resolution: Empirical Evidence*, 69 J. FIN. ECON. 259 (2003) (testing survival and debtor-in-possession (DIP) lending); Diane K. Denis & Kimberly J. Rodgers, *Chapter 11: Duration, Outcome, and Post-Reorganization Performance*, 42 J. FIN. & QUANTITATIVE ANALYSIS 101 (2007) (testing twelve independent variables, including some not available until after the case is concluded, with survival); Maria Carapeto, Does Debtor-in-Possession Financing Add Value? (July 25, 2014) (unpublished manuscript) (on file with authors) (testing survival and DIP lending); Michael Lemmon et al., Survival of the Fittest? Financial and Economic Distress and Restructuring Outcomes in Chapter 11 (Aug. 2009) (unpublished manuscript) (on file with authors), *available at* http://ssrn.com/abstract=1325562 (testing nine independent variables, including some not available until after the case is concluded, with survival).

11. By data-driven, we mean that we selected variables for inclusion in the model based on the variables' performances in the model. We did not follow the usual practice of selecting and retaining variables based on prior research or our prior beliefs.

assign cases to judges randomly. Our data suggest that if the courts instead assigned large, public company cases based on the judges' experience in presiding over such cases, the survival rate would be higher. The biggest gains would be among the riskiest companies. Assignment based on judicial experience could change some predicted survival rates from under 30 percent to more than 50 percent.[12]

The study's second goal was to develop an easily applied method for accurately calculating, at the time a bankruptcy case is filed, the probability that the company will survive to the end of the bankruptcy case. Accurately predicting survival is important for two reasons.

First, the parties involved must make decisions during the case, and many of those decisions are based on predictions regarding survival. For example, managers, employees, suppliers, and customers must decide whether to continue in their relationships with the debtor during the case. Debtor-in-possession (DIP) lenders must decide whether to advance funds and, if so, on what terms. Judges must decide whether to lift the automatic stay and permit the repossession of collateral,[13] whether to approve DIP lending, and whether to approve applications for professional fees. Creditors and shareholders must decide how much to demand in settlement of their claims, and debtors decide how much to offer. Investors must decide whether to buy and sell claims or interests and, if so, at what prices. Potential acquirers of the debtor's business must decide whether and how much to bid. With accurate and timely predictions, each of these parties can make better decisions.

Second, bankruptcy decision making is a self-reinforcing process. If the parties involved believe that the debtor will fail and act accordingly, their decisions may cause an otherwise viable debtor to fail. Similarly, overly optimistic predictions may enable nonviable debtors to survive in the short run while consuming value that could otherwise have been distributed to creditors through liquidation. Thus, accurately predicting debtors' probabilities of success may improve the rate of success and minimize creditors' losses in cases that fail.

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12.   *See infra* Figure 3.
13.   One of the standards the courts must apply is "a reasonable possibility of a successful reorganization within a reasonable time." United Sav. Ass'n of Texas v. Timbers of Inwood Forest Assocs., 484 U.S. 365, 376 (1988) (quoting *In re* Timbers of Inwood Forest Assocs., 808 F.2d 363, 370–71 (5th Cir. 1987)). That standard is roughly equivalent to whether the debtor will survive.

FIGURE 1. Probability the Firms Studied Would Survive Bankruptcy
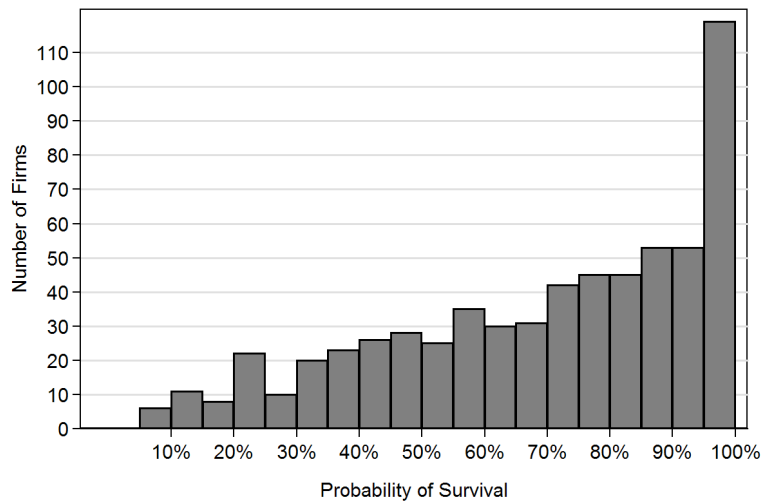
The differences in companies' survival prospects as they enter bankruptcy are largely invisible, but they are not subtle. Figure 1 shows the probabilities that the firms we studied would survive bankruptcy, calculated using our best regression model. If future cases are like the cases we studied, their survival-probability distributions will approximate that shown in Figure 1. Because the range of survival probabilities is wide, the range of appropriate precautions for those dependent on the companies is also wide.

Even without a regression model, some differences in companies' prospects would be apparent. But others would not. At the commencement of each studied case, the debtor was in business with the publicly avowed intention of remaining so. Only those privy to inside information could have had any real sense of their likelihoods of survival. But with the application of the regression formula, outsiders can know where the particular company they are dealing with stands on a survival-probability spectrum ranging from less than 10 percent to more than 95 percent.

This study is based on data from the UCLA-LoPucki Bankruptcy Research Database (BRD).[14] The BRD consists of more than two hundred usable fields of data on each of the more than one thousand large, public company bankruptcies filed in the U.S. Bankruptcy Courts since 1979. All of the data

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14.   UCLA-LoPucki Bankruptcy Research Database, http://lopucki.law.ucla.edu (last visited Mar. 27, 2015).

analyzed in this study are included in the BRD. As a result, any part of this study can easily be updated or replicated from the BRD.

We chose bankruptcy survival as the variable we sought to predict and ultimately to control. We considered as potential survival predictors only variables whose values would be available at or shortly after a bankruptcy filing and that plausibly might explain survival. Through regression analysis, we tested more than seventy such variables. We identified the eleven that are concurrently statistically significantly correlated with bankruptcy survival. The result is a regression model that predicts bankruptcy survival. Table 1 defines bankruptcy survival (hereinafter BANKRUPTCYSURVIVAL when reference is to the variable) and the eleven independent variables. Summary statistics and correlation tables can be found in Appendix A.

TABLE 1. Variables Qualifying for Inclusion in Our Best Regression Model[15]

Variables	Definitions
BANKRUPTCYSURVIVAL (Emerge)	The debtor continued in business indefinitely after disposition of the bankruptcy case, whether by plan confirmation, 363 sale, or otherwise.
1. SALEINTENDED (SaleIntended)	At the time of filing, the debtor publicly indicated an intention to sell the business.
2. PRIMERATE (Prime1YearBefFile)	The prime rate of interest one year before filing.
3. PRENEGOTIATION (Prepackaged)	This variable is 2 for a prepackaged case, 1 for a prenegotiated case, and 0 for a case that is neither.
4. EQUITYBEFORE (AssetsBefore; LiabBefore)	The ratio of the debtor's equity before bankruptcy to the debtor's assets before bankruptcy, as reported on the debtor's last annual report before bankruptcy.
5. MANUFACTURER (SICDivision)	The debtor reported its Standard Industrial Classification code as Division D: Manufacturing.
6. MILESTOLOCALCOURT (HqToHqCtCity)	The distance in miles from the debtor's headquarters city to the local bankruptcy court.
7. CREDITORSCOMMITTEE (CommCred; DateCommCred)	Whether the U.S. Trustee appointed a creditors' committee in the first twenty-four days of the case.
8. EBITPOSITIVE (EbitBefore)	The debtor's earnings before interest and taxes (operating profit) in the last year before bankruptcy is greater than zero.
9. JUDGEEXPERIENCE (JudgeDisposition)	The log of the number of large, public company bankruptcies in which the judge signed the disposition order before signing the disposition order in this case.
10. COMPANYSIZE (AssetsCurrDollar)	The debtor's size, measured as the log of the debtor's total assets in current dollars, as reported on the debtor's last annual report before bankruptcy.
11. DIPLOAN (DipLoanRes)	Whether the court approved DIP borrowing outside the ordinary course of business.

Because the company and case characteristics reflected in these predictive variables exist before survival manifests, any of these characteristics may cause survival. Alternatively, other characteristics may cause both the value of the predictive variable and survival. As those other characteristics vary, so do the

15. UCLA-LoPucki Bankruptcy Research Database (BRD) source variables' names appear in parentheses beneath the variable names used in this Article.

predictive variable and survival, leaving the false impression that the predictive variable is causing survival. After considering that possibility, we ultimately conclude that EQUITYBEFORE is not causal, but that the other ten variables may be in whole or in part causal.

Part I of this Article presents and explains our regression model and the dependent variable in that model, BANKRUPTCYSURVIVAL. Part II discusses each of the eleven independent variables and presents our conclusions regarding the causal role each may play in bankruptcy survival and our bases for those conclusions. Part III presents a new "five decision" model of reorganization. The five decisions are to announce intended sales, to make DIP loans, to prenegotiate plans, to forum shop, and to appoint creditors' committees. Part IV concludes that large, public companies will survive bankruptcy more often if their cases are assigned to more experienced judges and if the parties to the cases focus greater attention on five key decisions in the bankruptcy process.

I.   THE SURVIVAL REGRESSION

Multiple regression is a method for determining the directions and magnitudes of the correlations between several independent variables and one dependent variable. We ran a series of logistic regressions[16] in order to determine the combination of independent variables that best predicts company survival. Because we sought to predict survival rather than merely explain it, we limited our consideration to variables whose values are publicly available at or shortly after a bankruptcy filing.

A.   The Data Set

Our study is based on the BRD data set. From that data set, we excluded cases that remained pending when our study closed on August 16, 2014, cases of financial institutions,[17] cases filed before 1994, and cases in which the debtor did not operate a business at the time of filing or did not intend at that time to continue the business indefinitely. We excluded the bankruptcies of financial institutions because many financial institutions that report assets of sufficient size to qualify for inclusion in the BRD are in fact small businesses with few

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16.   Logistic regression is a multivariate statistical technique used to estimate the probability of a binary outcome (for example, failure or success).

17.   Financial institutions are companies that reported their Standard Industrial Code (SIC) division as "H: Finance, Insurance, and Real Estate."

employees.[18] We excluded cases filed before January 1, 1994 because the BRD does not contain the crucial SALEINTENDED variable for cases filed before that date.

B.   The Survival Concept

BANKRUPTCYSURVIVAL is the dependent variable in our regression analysis. We define BANKRUPTCYSURVIVAL as continuation—with the intent to continue indefinitely—of the debtor's business operations after the debtor emerges from bankruptcy.[19] A business that is acquired during the bankruptcy case is classified as surviving if it operates separately from its acquirer after emerging from bankruptcy,[20] but not if its operations are merged into those of the acquirer.[21] Survival may be by confirmation of the company's Chapter 11 plan or by entry of an order approving a sale of the company as a going concern before confirmation.

It is more difficult to define the concept of bankruptcy survival, however, than the foregoing discussion might suggest. Companies may undergo tumultuous changes during bankruptcy. They may shrink in size, be split into multiple businesses, sell their businesses to new owners, discharge their managers, change their names, and fundamentally change the nature of their businesses. One or more businesses may survive after a bankruptcy, but it may nevertheless be difficult to say whether that survivor is the bankrupt company, a company that acquired the bankrupt company, or a company that acquired elements of the

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18.   Researchers commonly exclude financial institutions from studies of bankruptcy cases. *See, e.g.*, Dahiya et al., *supra* note 10, at 264 ("We exclude the financial services firms such as depository institutions, insurance companies, nonbanking financial firms, and real estate firms (SIC codes between 6000 and 6999).").

19.   A company does not survive bankruptcy if the company made a decision to cease operations before the end of the bankruptcy case, even if the company continued to operate after bankruptcy for the purpose of orderly liquidation. Lynn M. LoPucki, Protocols for the UCLA-LoPucki Bankruptcy Research Database 17 (May 8, 2014) (unpublished manuscript) (on file with authors) [hereinafter BRD Protocols] ("A company does not emerge if the company continues to operate only for the purpose of liquidation.").

20.   *Id.* ("A company emerges even if it is acquired by another company at [or before] confirmation, and even if the acquiror contributes capital or credit enhancements to the company, provided that the acquiror operates the company as a separate business.").

21.   *Id.* ("But no company emerges if the assets are integrated into an existing business of the acquiror or merger partner, during bankruptcy or pursuant to the plan, unless the merger partner is small in relation to the company."). Merger is not necessarily a bad result. But of the companies that are sold under section 363 or at plan confirmation, the stronger companies—those that enter bankruptcy with higher operating income—are significantly less likely to be merged out of existence. Lynn M. LoPucki & Joseph W. Doherty, Bankruptcy Survival—Log 24 (Nov. 16, 2014) (on file with authors).

bankrupt company. The BRD's solution to this problem is to regard the company as the web of relationships among the company's employees and the relationships of those employees with outsiders and firm assets.[22] Following the BRD protocols, if the structure of those relationships survives and remains distinguishable from the company's owner, we regard the company as surviving.[23]

Two examples may help to clarify. After filing its bankruptcy case, General Motors Corporation sold and transferred the valuable portions of its business, including its managers and employees, to a new corporation formed to purchase them.[24] The name General Motors Corporation was included in the assets sold to and adopted by the new corporation.[25] The selling entity remained in bankruptcy, operated no business, and changed its name to Motors Liquidation Company.[26] Although some might argue that the entity referred to as General Motors Corporation before bankruptcy failed by selling its assets, changing its name, and not emerging from bankruptcy with a going business, the BRD classifies General Motors Corporation as surviving bankruptcy. Sale of the web of relationships constituting the company was sale of the company.

As a second example, chain-store retailers often sell stores during bankruptcy. The buyers may continue to operate the stores in the same locations, with some or all of the same employees, but as part of the buyers' businesses and under the buyers' names. Even when the employment structure within each store continues to exist, the employment structure that made the retailer a large, public company may not. If the chain-store retailer sells all of its stores and discharges the employees who coordinated the stores as a chain, the BRD classifies the business as not surviving, even if the buyer hires the employees of each individual store. If the chain-store retailer retains and continues to operate multiple stores, the BRD classifies the company as surviving, even though the company's business may be much smaller.

Although any set of rules for classifying companies as surviving or not surviving bankruptcy would be debatable at the margins, classification presents no

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22. Lynn M. LoPucki, *The Nature of the Bankrupt Firm: A Response to Baird and Rasmussen's* The End of Bankruptcy, 56 STAN. L. REV. 645, 671 (2003) ("Baird and Rasmussen's view of the bankrupt firm as merely an asset-owning entity misses the firm's essence. Coase's view of the bankrupt firm as a relationship among people captures it.").

23. BRD Protocols, *supra* note 19, at x (defining the "firm" as "the web of employment relationships that made the debtor a firm").

24. Disclosure Statement for Debtors' Amended Joint Chapter 11 Plan at 16–17, *In re* Motors Liquidation Co., No. 09-50026 (Bankr. S.D.N.Y. Dec. 8, 2010), ECF 8023.

25. *Id.*

26. *Id.*

difficulty in the vast majority of cases. We doubt that any particular classification rule would affect a sufficient number of cases to affect any of our findings.

C.   Regression Methodology

Our dependent variable, BANKRUPTCYSURVIVAL, is binary. That is, the company survives or it does not. Accordingly, we used logistic regression to estimate our model of the correlates of BANKRUPTCYSURVIVAL.

To take full advantage of the wealth of data contained in the BRD, we employed what Edward Leamer described as "the data dependent process of selecting a statistical model."[27] That is, we selected or constructed about seventy variables that we thought could conceivably predict survival.[28] We tested them in hundreds of combinations to determine the combination that would best predict BANKRUPTCYSURVIVAL.

The alternative to the multiple testing process we employed is for researchers to hypothesize the set of variables they believe will best explain bankruptcy survival, test only those variables, and report models containing both the significant and the insignificant variables in those models (single-hypothesis testing). All five prior studies of bankruptcy survival ostensibly followed the single-hypothesis testing approach.[29]

Multiple testing has several advantages over single-hypothesis testing. First, multiple testing is a relatively objective process in which the data largely determine the results. In single-hypothesis testing, the researchers' prior beliefs determine what variables are included in the regression and so in part determine the results. Second, by testing many variables, multiple testing reduces the risk of omitting the most important ones from the model. Single-hypothesis testing can often reach misleading results by finding and reporting relationships that would not survive the inclusion in the model of independent variables that more strongly predict the dependent variable. Third, at least in the instant situation in which the data set is a universe, multiple testing advances knowledge more quickly. Over time, a succession of single-hypothesis researchers can test

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27.   EDWARD E. LEAMER, SPECIFICATION SEARCHES: AD HOC INFERENCE WITH NONEXPERIMENTAL DATA 1 (1978) ("'Data mining,' 'fishing,' 'grubbing,' 'number crunching.' These are the value-laden terms we use to disparage each other's empirical work with the linear regression model. A less provocative description would be 'specification searching,' and a catch-all definition is 'the data-dependent process of selecting a statistical model.'").

28.   Conscious of the multiple testing problems inherent in any specification search, we used the procedure described by Schweder and Spjotvoll to evaluate the bivariate relations of these variables with the dependent variable. T. Schweder & E. Spjotvoll, *Plots of P-Values to Evaluate Many Tests Simultaneously*, 69 BIOMETRIKA 493 (1982).

29.   *See* sources cited *supra* note 10.

any or all of the relationships a multiple-testing researcher can. Ultimately, the aggregate of researchers using either method will reach the same conclusions. But the multiple-testing researcher reaches the conclusion more quickly by conducting all of the tests as part of a single study.

The treatment of industry variables in the bankruptcy survival literature illustrates the advantages of multiple testing. Because retailers frequently obtain DIP loans, in a study of DIP lending's effect on survival, Dahiya and his coauthors controlled for whether the company's Standard Industrial Classification (SIC) division was retail.[30] Because electric, gas, and sanitary services companies constituted more than 5 percent of their sample, in another study of bankruptcy survival, Bogan and Sandler controlled for whether the company's SIC division was electric, gas, and sanitary services.[31] Neither variable was statistically significant.

Because every variable included in a multiple regression automatically operates as a control for every other variable included, these irrelevant industry variables almost certainly changed the significance levels of the other variables in the models. The change may have rendered a previously insignificant variable significant, or vice versa. Thus by including those irrelevant variables in their regressions, those researchers may have altered their principal findings. In our study, we tested all of the SIC divisions, finding that only manufacturing was significant. Accordingly, we included only manufacturing in our best model.

An often-asserted disadvantage of multiple testing is that multiple testers will discover and report relationships in the data that exist merely by chance, leading to spurious conclusions (false discovery).[32] For example, if one runs 100 tests on random data, one would expect the results of one of the tests to be significant at the 1 percent level.

The possibility of false discovery does exist in the context of this study.[33] But the possibility is of less importance because this study is of the entire population of large, public company bankruptcies. The spurious relationships that exist in the entire population by chance can be discovered by single-hypothesis testers and multiple testers alike. Neither have the option of drawing another sample to see if the putative relationship persists. In other

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30.   Dahiya et al., *supra* note 10, at 272.
31.   Bogan & Sandler, *supra* note 10, at 612 n.7.
32.   Yoav Benjamini & Yosef Hochberg, *Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing*, 57 J. Royal Stat. Soc'y 289, 289–300 (1995).
33.   Using the procedure proposed by Schweder and Spjotvoll, *supra* note 28, we found that the proportion of extreme p values in our finding was sharply higher than the proportion expected from a random data set. We conclude that few of the extreme p values in our findings resulted by chance.

words, when studying an entire population, we run the risk of false discovery because there is no way to avoid that risk.

Throughout this paper, we report the levels of significance for various statistical tests. These p values or significance levels indicate the probability that a relationship as strong as that reported would have arisen in the data by chance. We refer to relationships with p values less than .05 (significance at the 5 percent level) as statistically significant and p values less that .10 (significance at the 10 percent level) as marginally statistically significant.

We considered only models in which all of the variables were statistically significant at a 10 percent or lower level. We considered a model to be better if it contained more variables and generated a higher pseudo R-squared.[34] By fixing these rules in advance, we limited our ability to alter our findings through our variable selection. Thus, we think our model is as close to objective as one can get in the slippery world of multivariate statistics.

D.   The Bivariate Relationships

A relationship between the dependent variable and a single independent variable, without controlling for other variables, is referred to as bivariate. Bivariate relationships are important because they are directly observable without the sometimes-distorting lens of statistics. Multivariate analysis may demonstrate that an apparent relationship between two variables does not exist when controlling for a third variable. But by acknowledging the easily observable bivariate relationships, bivariate analysis helps to link the results from multivariate analysis to observable reality.

TABLE 2. BANKRUPTCYSURVIVAL Rates for Companies in the Categories Listed

Companies	Total companies	Number surviving	Number failing	Survival rate	Significance level
All	635	445	190	70%	p<.001
Intending to sell	135	56	79	41%	p<.001
Creditors' committee appointed	496	324	172	65%	p<.001
DIP loan approved	461	336	125	73%	p=.009
Positive EBIT before filing	320	244	76	76%	p<.001
Manufacturers	242	187	55	77%	p=.002
Significance levels are calculated using Chi-squares.					

34.   A pseudo R-squared is a measure of how well the combination of variables in a particular regression explains the success or failure of outcomes in the dependent variable. It is useful for comparing different regression models when the data are identical (that is, when the dependent variable and the number of observations are the same in both models).

Table 2 shows the bivariate relationships between BANKRUPTCYSURVIVAL and the dichotomous independent variables in our regression model. The 41 percent survival rate for companies signaling their intention to sell and the 65 percent survival rate for companies for whom the U.S. Trustee appointed creditors' committees were each significantly below the 70 percent survival rate for all companies. The 77 percent survival rate for manufacturers, the 76 percent survival rate for companies with positive EBIT (operating income) before bankruptcy, and the 73 percent survival rate for companies with DIP loans were each significantly above the 70 percent survival rate for all companies.

Table 3 shows the mean values for the surviving companies in column (2) and the mean values for the failing companies in column (3) for each of the six continuous variables in our model. Column (4) expresses the magnitude of the difference between those means in concrete terms. Column (5) provides the significance level of the bivariate correlation between the variable and BANKRUPTCYSURVIVAL.

TABLE 3. Bivariate Relationships of Continuous Variables
to BANKRUPTCYSURVIVAL

(1) VARIABLE	(2) Survivor mean	(3) Failure mean	(4) Magnitude of difference in means Survivors:	(5) Significance level of correlation with BANKRUPTCY-SURVIVAL
PRIMERATE	6.42%	7.26%	paid .84% lower rate	$p < .001$
PRENEGOTIATION	0.59	0.12	were about five times more likely to prenegotiate plans	$p < .001$
EQUITYBEFORE	-14% of assets	14% of assets	had 28% less equity	$p < .001$
MILESTOLOCALCOURT	4.4 miles	6.5 miles	were 32% closer to the court	$p = .005$
JUDGEEXPERIENCE	6.6 cases	4.5 cases	had judges with 44% more experience	$p = .001$
COMPANYSIZE	$1059 million	$862 million	had 22% higher total assets	$p = .024$
Definitions of the variables are contained in Table 1, *supra*.				

Together, Tables 2 and 3 show that all of the eleven variables in our regression model are statistically significantly correlated with BANKRUPTCYSURVIVAL when not controlling for other variables. As we discuss below, each of the eleven variables remains statistically significantly correlated with BANKRUPTCYSURVIVAL when controlling for the other ten variables.

E.   Regression Results

As described in Subpart I.C., we tested about seventy variables in numerous combinations and selected the combinations that best predicted survival in our data. We concluded that Models (1), (3), and (4) on Table 4 predict BANKRUPTCYSURVIVAL equally well. In all three models, all eleven independent variables are at least marginally statistically significant. With one immaterial exception[35] for Model (3), no other variable would be at least marginally statistically significant and generate a higher pseudo R-squared after removing all other variables that are not at least marginally statistically significant.[36]

DENY is a variable indicating that the debtor filed in Delaware or the Manhattan Division of the Southern District of New York. Those two courts are the principal destinations for forum shopping by large, public companies.[37] DENY is significantly directly correlated with BANKRUPTCYSURVIVAL (p=.001). Companies that file in Delaware and New York are significantly more likely to survive.

Model (2) shows the effect of adding DENY to Model (1). After this addition, neither DENY nor JUDGEEXPERIENCE is statistically significant. The reason is that the judges in Delaware and New York are highly experienced in large, public company bankruptcy. As a result, JUDGEEXPERIENCE and DENY

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35.   The exception is that substitution of liabilities before bankruptcy for assets before bankruptcy makes a very slight improvement in Model (3). We did not substitute liabilities for assets because the gain was negligible and substitution would have rendered our models less comparable to each other and to the literature. All prior research used assets before bankruptcy. See the articles cited in note 10, *supra*.

36.   To verify this conclusion, we created a Stata do file that runs each of the more than seventy variables we considered to be plausible predictors of BANKRUPTCYSURVIVAL both in Models (1) and (3) of Table 4. The do file either adds each of these variables to our best model one at a time or substitutes them for similar variables in our best model one at a time, or does both, as is appropriate for the particular variable. With the single exception mentioned above, our best model outperformed the models thus created.

37.   Venue (By City), UCLA-LOPUCKI BANKR. RES. DATABASE, http://lopucki.law.ucla.edu/design_a_study.asp (last visited Mar. 27, 2015).

are highly correlated (p<.001). DENY explains 36 percent of the case-to-case var-
iance in JUDGEEXPERIENCE.[38] Neither DENY nor JUDGEEXPERIENCE is sta-
tistically significant in the model because, to a large degree, both explain the same
case-to-case variance.

TABLE 4. The BANKRUPTCYSURVIVAL Regression

VARIABLES	(1) Survival	(2) Survival	(3) Survival	(4) Survival
SALEINTENDED	-1.25***	-1.26***	-1.25***	-1.24***
	(0.25)	(0.25)	(0.25)	(0.25)
EBITPOSITIVE	0.45*	0.46*	0.47*	0.45*
	(0.22)	(0.22)	(0.22)	(0.22)
EQUITYBEFORE	-1.19***	-1.17***	-1.18***	-1.21***
	(0.35)	(0.35)	(0.34)	(0.35)
MANUFACTURING	0.77**	0.77**	0.77**	0.75**
	(0.24)	(0.24)	(0.24)	(0.24)
PRIMERATE	-0.20***	-0.21***	-0.21***	-0.20***
	(0.05)	(0.05)	(0.05)	(0.05)
MILESTOLOCALCOURT (log)	-0.17*	-0.18*	-0.18**	-0.17*
	(0.07)	(0.07)	(0.07)	(0.07)
PRENEGOTIATED	1.02***	0.99***	0.98***	1.01***
	(0.26)	(0.27)	(0.27)	(0.26)
DIPLOAN	0.53*	0.51*	0.53*	0.54*
	(0.25)	(0.25)	(0.25)	(0.25)
CREDITORSCOMMITTEE	-1.01**	-1.02**	-1.02**	-1.04**
	(0.36)	(0.36)	(0.36)	(0.36)
SIZE (log of assets)	0.21*	0.20+	0.19+	0.21*
	(0.11)	(0.11)	(0.11)	(0.11)
JUDGEEXPERIENCE (log)	0.17*	0.09		
	(0.09)	(0.11)		
DENY		0.32	0.46*	
		(0.28)	(0.22)	
JUDGEEXPERIENCE6				0.48*
				(0.22)
Constant	0.87	0.98	1.09	0.94
	(0.90)	(0.91)	(0.90)	(0.90)
Observations	604	604	604	604
Pseudo R-Square	0.258	0.260	0.259	0.260

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

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38.   We ran an ordinary least squares regression with JUDGEEXPERIENCE as the dependent variable
       and DENY as the sole independent variable.

Model (3) shows the effect of substituting DENY for JUDGEEXPERIENCE in Model (1). Model (3) performs very slightly better than Model (1) in that the fit of the model to the data (the pseudo R-squared) is very slightly better.

JUDGEEXPERIENCE6 is a dichotomous variable that indicates whether the presiding judge on the case had presided over at least six prior cases. Model (4) shows the effect of substituting this variable for DENY or JUDGEEXPERIENCE. The model performs very slightly better than Models (1) or (3).

The improvement from using DENY or JUDGEEXPERIENCE6 in the model instead of JUDGEEXPERIENCE is so slight that the models are, for all practical purposes, the same. Figure 2 compares the distribution of Delaware and New York cases with the distribution of cases in other cities (Other Court cases) across nine levels of judicial experience. The comparison shows that high-experience judges preside over most Delaware and New York cases, while low-experience judges preside over most Other Court cases. The strong correlation between judicial experience and jurisdiction makes it difficult to distinguish their effects on BANKRUPTCYSURVIVAL.

FIGURE 2. Judicial Experience by Jurisdiction
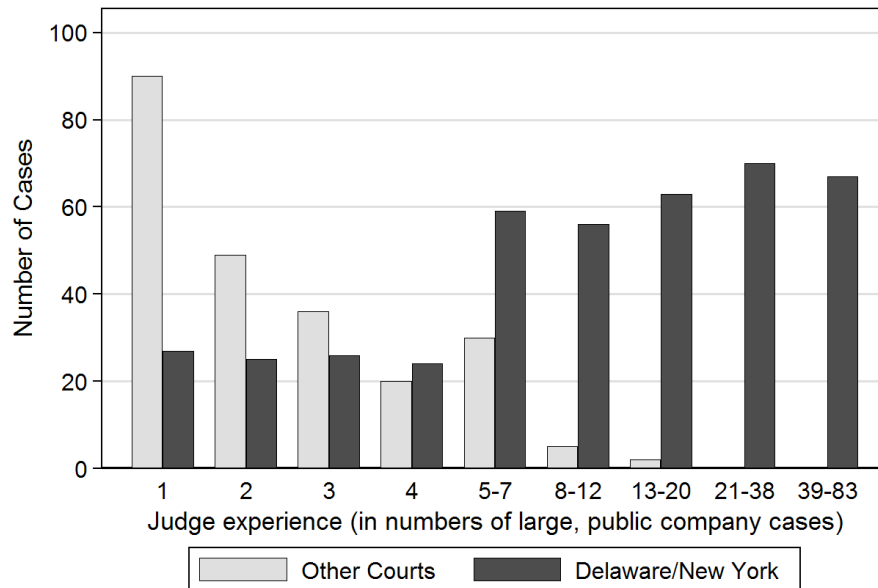
To make the distinction, we tested the correlation between JUDGE-EXPERIENCE and BANKRUPTCYSURVIVAL in each set of jurisdictions separately. We found that JUDGEEXPERIENCE was positively correlated with success in both jurisdictional groups (DENY and not DENY), but that the correlation was not statistically significant in either.[39] We conclude that JUDGE-EXPERIENCE explains BANKRUPTCYSURVIVAL equally as well as DENY does. It follows that increasing the level of judicial experience is a plausible means for increasing success rates in large, public company bankruptcies.

Although Models (1), (3), and (4) are substantially equivalent in explanatory power, we consider Model (1) to be the best model for the purpose of presentation in this Article.[40] The selection is largely arbitrary, but not to choose a best model would have resulted in overwhelming complexity in the presentation of our findings.

F.   Survival Prediction

As previously explained, we seek to predict survival because we believe that accurate prediction will have positive effects on the bankruptcy process. To assure that our model would be genuinely predictive, we included in it only variables whose values would be available at or shortly after the commencement of the case. Of the eleven variables in the model, the values of eight are fixed and publicly available at the moment of the filing of the petition.

Three of the eleven variables—SALEINTENDED, DIPLOAN, and CREDITORSCOMMITTEE—become publicly available shortly after filing. The press release that reveals SALEINTENDED is usually filed on the petition date; an SEC rule requires that it be filed within four days of that date.[41] Debtors usually file applications for approval of their DIP loans on the first day of the case, and the median time to a final order is thirty-one days.[42] More than 50

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39.   The significance levels are p=.343 in the Delaware and New York cases, and p=.111 in the Other Court cases.

40.   We chose Model (1) over Model (3) because JUDGEEXPERIENCE has broader theoretical application than DENY and will be understandable to a wider audience. That is, judicial experience is a factor in many kinds of cases in courts throughout the world. Filing in the Delaware and New York bankruptcy courts is a factor only in big-case bankruptcy.

41.   Additional Form 8-K Disclosure Requirements and Acceleration of Filing Date, 69 Fed. Reg. 15,594, 15,619 (Mar. 25, 2004) (four-business-day deadline); *id.* at 15,620 (obligation to report bankruptcy).

42.   LoPucki & Doherty, *supra* note 21, at 11.

percent of creditors' committee appointments occur during the second week of the case, and 93 percent occur in the first twenty-four days of the case.

To make the model's predictions easily and publicly available, we have posted and intend to continually update a Bankruptcy Survival Calculator on the BRD website.[43] By entering the relevant data regarding a real or hypothetical case, the user can generate the probability of the company's survival. If the user does not know the values of all of the variables, the user can enter the known values and receive the best prediction based on those values and the most recent BRD data.

II.   THE SURVIVAL PREDICTORS

This Part considers each of the eleven independent variables in our regression model. We provide the reasons for our belief that each is (or is not) a cause of BANKRUPTCYSURVIVAL. For the ten variables that we believe are causal, we describe the mechanisms by which we believe they operate.

A.   Intention to Sell the Business

SEC regulations require public companies filing bankruptcy to disclose their filings on form 8-K.[44] Even if the companies are no longer public at the time they file, and so are not required to file the 8-K, the media will quickly discover the bankruptcy. To control the resulting publicity, nearly all of the companies in our study issued press releases shortly after filing. In those releases, some sought to explain how they intended to address their situations.

SALEINTENDED is a dichotomous variable that records whether the debtor indicated in its 8-K or press release that the debtor intended to sell its business. If the debtor suggested the possibility of sale, we coded the case as "yes." Cases so coded included cases in which the debtor merely indicated an interest in selling or that it was searching for a partner. They also included cases in which the debtor had found a buyer and even entered into a contract to sell.

This study is the first to discover, or even theorize, the predictive power of debtors' stated intention to sell. SALEINTENDED is the strongest single predictor of failure during bankruptcy. Only 56 of the 135 companies that indicated an intention to sell (41 percent) survived. By contrast, 385 of the 495 companies that did not indicate an intention to sell (78 percent) survived.

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43.   *The LoPucki–Doherty Bankruptcy Survival Calculator: Prediction*, UCLA-LOPUCKI BANKR. RES. DATABASE, http://lopucki.law.ucla.edu/survival-calculator.htm (last visited Mar. 27, 2015).

44.   See *supra* note 41 and accompanying text.

Announcements of intention to sell are good predictors of actual sales. Of the 135 companies that indicated an intention to sell, 101 (75 percent) actually sold their businesses in section 363 sales[45] or in sales at plan confirmation. But failure to announce an intention to sell is not a good predictor of non-sale. Of the 433 companies that did not state an intention to sell, 189 (44 percent) actually sold their businesses in section 363 sales or in sales at plan confirmation. Thus, 65 percent of sales were by companies that had not stated an intention to sell. We speculate that companies tend to avoid stating an intention to sell because it signals weakness to the market. Weaker companies tend to state an intention to sell because some of them desperately need buyers.

Signaling weakness to the market also signals weakness to employees, suppliers, and customers. Some may defect, making survival more difficult. Nevertheless, we think the announcement of an intention to sell predicts BANKRUPTCYSURVIVAL primarily because it discloses weakness that had already reduced the company's likelihood of survival before the announcement of the intention to sell. Our control variables had not captured that weakness entirely, so it was reflected only in the SALEINTENDED variable.

B.   Judicial Experience

JUDGEEXPERIENCE is the number of BRD cases the judge in the instant case presided over before presiding over the instant case. As defined here, a judge presides over a case if the judge signs the order disposing of the case. While theoretically a judge might sign the order confirming the plan or dismissing or converting the case without doing much else in the case, in practice that seldom occurs. In most cases, the same judge presides over a case from start to finish.

Without controlling for other variables, JUDGEEXPERIENCE is strongly correlated with BANKRUPTCYSURVIVAL (p=.001). After controlling for other variables, it remains significantly correlated with BANKRUPTCYSURVIVAL in the best model (p=.050) and significantly correlated in a wide variety of other models.

Judicial experience has long been widely recognized as having a positive effect on litigation,[46] including bankruptcy litigation.[47] Ours, however, is the first

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45.   A section 363 sale is a sale of the debtor's business during the bankruptcy case, but not pursuant to a reorganization plan. BRD Protocols, *supra* note 19 (definition of Sale363).

46.   *E.g.*, Stephen J. Choi, Mitu Gulati & Eric A. Posner, *How Well Do Measures of Judicial Ability Predict Judicial Performance?: A Case Study Using Securities Class Actions*, 33 INT'L REV. L. & ECON. 37 (2013) (comparing judicial experience to other criteria for predicting judicial performance).

47.   *E.g.*, Lynn M. LoPucki & William C. Whitford, *Venue Choice and Forum Shopping in the Bankruptcy Reorganization of Large, Publicly Held Companies*, 1991 WIS. L. REV. 11, 30 ("Another

study to present empirical evidence that judicial experience has a systematic effect on business survival in bankruptcy.

We also compiled and tested a second measure of judicial experience, JUDGEEXPERIENCETIME. That variable is the length of time that the judge in the instant case served as a bankruptcy judge before deciding the case. JUDGEEXPERIENCETIME was not significantly correlated with BANKRUPTCYSURVIVAL directly (p=.500), in the best model (p=.423), or in any other model we tested. We found no evidence that duration of experience as a bankruptcy judge has any effect on BANKRUPTCYSURVIVAL.

Figure 3 compares the bankruptcy survival rates for sale-intended cases with sale-not-intended cases, for eight levels of judicial experience. As previously discussed, the survival rates for the sale-not-intended cases are generally much higher, but survival rates for both intention categories increase with judicial experience. The survival rates increase more dramatically in the SALEINTENDED cases, in which the risks of failure are greater.

FIGURE 3. **Rates of Company Survival to Disposition, by the Judge's Large, Public Company Case Experience, by the Debtor's Intention at Filing to Sell the Business**

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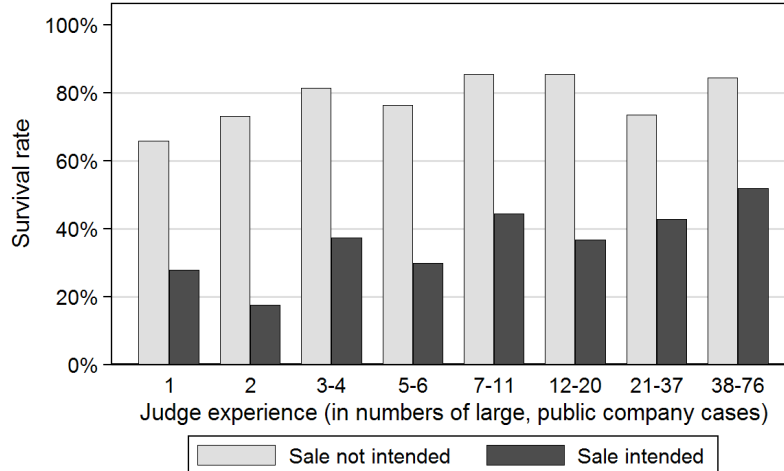
reason cited by interviewees for the continuing flow of bankruptcy cases to New York is the New York courts' considerable experience in handling the reorganizations of large, publicly held companies.").

We hypothesized that more experienced judges might increase the likelihood of survival by forcing companies' Chief Executive Officers (CEOs) out more or less frequently. But we found no difference in judicial experience between the cases in which CEOs in office at filing were replaced and those in which they were not. Further research is needed to discover the mechanisms by which judicial experience affects BANKRUPTCYSURVIVAL.

C.   Distance to the Local Bankruptcy Court

MILESTOLOCALCOURT is the distance from the debtor's headquarters to the bankruptcy court that serves the area in which the headquarters are located. MILESTOLOCALCOURT has a strong inverse correlation with BANKRUPTCYSURVIVAL directly (p=.005), in the best model (p=.013), and in substantially all of the many models we tested.

We are the first to discover this odd relationship. To appreciate its oddity, realize that it is a measure of the distance to the local court, even though 454 of the 635 cases studied (71 percent) did not file in the local court. We tested a variable, MILESTOFORUM, that is the distance to the court in which the debtor actually filed its case and found no relationship between that variable and BANKRUTPCYSURVIVAL directly (p=.399) or in the best model (p=.248). We can imagine no way in which the distance from a company's headquarters to a court the company does not use could cause the company to succeed or fail.

Instead, we think that MILESTOLOCALCOURT functions as a proxy for another variable: the debtor's geographical isolation. Bankruptcy courts meet at about two hundred locations throughout the United States. These locations are selected with at least two considerations in mind. The first is to provide a court within a reasonable distance of any U.S. resident. The second is to locate the court in a population center. A company whose headquarters are not near any of the 200 court locations is probably geographically isolated.

Armed with this hypothesis, we were able to find two studies linking geographical location with company survival. Stefan Buehler, Christian Kaiser, and Franz Jaeger found that "[business] bankruptcy rates tend to be lower in the central municipalities" of Swiss cantons.[48] In explaining their finding, they noted that:

> There is a broad consensus that, on average, firms and workers in large and dense urban environments are more productive. The urban economics and geography literature discusses three different

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48.   Stefan Buehler, Christian Kaiser & Franz Jaeger, *The Geographic Determinants of Bankruptcy: Evidence From Switzerland*, 39 SMALL BUS. ECON. 231, 233 (2012).

> types of externalities that may explain this productivity difference. First, firms in agglomerations may benefit from within-industry *localization externalities* arising from labor market interactions, knowledge spillovers, and specialized inputs. Second, agglomerations may generate so-called *Jacobs' externalities* relating to the benefits of having a high level of industrial diversity in an agglomeration. Third, firms may benefit from *urbanization externalities* which capture the advantages of operating in a large city, such as having access to large markets, modern infrastructure, and highly educated employees.[49]

Similarly, Georgios Fotopoulos and Helen Louri found that "[f]irms located in [the] greater Athens [area] seem to face increased chance for survival when compared with firms located in the rest of Greece . . . ."[50]   But while Fotopoulos and Louri studied principally small firms and refer to "the strong tendency of manufacturing firms to locate in urban centers,"[51] the manufacturing firms in our study were large and significantly more likely to locate away from the bankruptcy court cities. We are the first to report a correlation between isolation and survival for large public companies generally.

HEADQUARTERSCITYSIZE is the log of the population of the debtor's headquarters city. HEADQUARTERSCITYSIZE is significantly correlated with BANKRUPTCYSURVIVAL if this variable is expressed as a number (p=.022) and if this variable is expressed as the headquarters city's percentage of the U.S. population at the time of the case (p=.048).[52] The larger the city in which the debtor's headquarters are located, the greater the likelihood the debtor will survive bankruptcy. When HEADQUARTERSCITYSIZE (expressed as a number) is substituted for MILESTOCOURT in our best model, HEADQUARTERSCITYSIZE is marginally statistically significantly correlated with BANKRUPTCYSURVIVAL (p=.074) and all of the other variables in the model remain at least marginally statistically significant. The correlation between HEADQUARTERSCITYSIZE and MILESTOCOURT is high (r=-.73). That both are significantly correlated with BANKRUPTCYSURVIVAL gives us greater confidence that the relationship between isolation and failure is not a false discovery.

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49.   *Id.* at 234–35 (citations omitted).
50.   Georgios Fotopoulos & Helen Louri, *Location and Survival of New Entry*, 14 SMALL BUS. ECON. 311, 312 (2000).
51.   *Id.* at 314.
52.   The latter expression takes into account the fact that as the U.S. population grew over the twenty years covered by this study, the populations of cities grew as well. That the former measure is more highly correlated with BANKRUPTCYSURVIVAL than the latter suggests that the absolute size of the city is more important to survival than the size relative to the sizes of other cities.

We conclude that problems resulting from geographical isolation probably contributed to failure among the companies we studied. Those problems might include difficulty in recruiting executives or employees or reduced access to information about industry trends resulting from reduced contact with others working in the industry.

Companies large enough to be included in this study are seldom located only in a single place. We estimate that about 93 percent of the companies in our study owned property in more than one state.[53] Most operated in several states. We consider it more likely that factors associated with the rural location of the companies' headquarters—such as managerial recruitment—rather than factors associated with the location of the companies' operations, are responsible for depressing the geographically isolated companies' survival rates.

D.   Plan Prenegotiation

Some debtors negotiate their reorganization plans with creditors before filing bankruptcy. Although definitions vary, three levels of prenegotiation are commonly recognized: prepackaged, prenegotiated, or free fall. Under the BRD protocols, a case is prepackaged if, before bankruptcy, the debtor drafted a plan, circulated it to creditors, and obtained sufficient acceptances to entitle the debtor to plan confirmation.[54] A case is prenegotiated if, before bankruptcy, the debtor drafted at least a term sheet for a plan and obtained the consent of at least one major creditor constituency to those terms. A case is free fall if the case is neither prepackaged nor prenegotiated.[55] The resulting variable is continuous with a value of 2 for a prepackaged case, 1 for a prenegotiated case, and 0 for a free fall case.

Columns (1) through (4) of Table 5 show the relationship between PRENEGOTIATION and BANKRUPTCYSURVIVAL. None of the debtors filing prepackaged cases failed during those cases. Fifteen percent of the debtors filing prenegotiated cases failed, and 40 percent of the debtors filing free fall cases failed. Thus, the BANKRUPTCYSURVIVAL rate varies sharply by PRENE-

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53.   UCLA-LoPucki Bankruptcy Research Database (2006) (on file with authors) (showing 23 of 322 debtors (7%) as having property in only one state).

54.   Cases are not prepackaged merely because the debtor has agreed, before bankruptcy, to sell its business to a third party.

55.   The frequent use of the term "free fall" by bankruptcy professionals communicates an awareness of the greater danger involved in these cases. *E.g.*, Dennis A. Meloro et al., *The Fast and Laborious: Chapter 11 Case Trends*, AM. BANKR. INST. J., Mar. 2014, at 52, 53 ("[T]oday's pool of 'free fall' debtors includes the cases with the thorniest and most complex restructuring issues.").

GOTIATION level. Other researchers have noted that prenegotiation is positively correlated with bankruptcy survival.[56]

TABLE 5. Prenegotiation by Bankruptcy Survival and Case Duration

(1) Type	(2) Failed	(3) Survived	(4) Total	(5) Mean days in bankruptcy	(6) Total days in bankruptcy	(7) Failures per 10,000 days
Free fall	167 (40%)	251 (60%)	418 (100%)	638	266,880	6.3
Prenegotiated	23 (15%)	128 (85%)	151 (100%)	240	36,240	6.4
Prepackaged	0 (0%)	66 (100%)	66 (100%)	68	4488	0
Total	190 (30%)	445 (70%)	635 (100%)		307,608	6.2
Chi-square p <.001						

Comparison of the success rates for the three kinds of cases with the duration of the three kinds of cases (columns (3) and (5) of Table 5) reveals a strongly negative correlation. Success rates are lowest in the longest kinds of cases. That raises the possibility that mere passage of time rather than prenegotiation accounts for the differences in failure rates. To investigate, we calculated the numbers of failures per 10,000 days in bankruptcy for each kind of case. Those rates appear in column (7) of Table 5.

The failure rate for prepackaged cases—zero in 4,488 days of exposure to bankruptcy—is marginally statistically significantly smaller (p=.093) than the failure rates for prenegotiated and free fall cases. We think the absence of failure in the prepackaged cases results from a selection effect. Companies likely know that failure is imminent for some period of time before failure occurs. If failure is imminent, a company will probably not file its prepackaged case. As a result, companies that are planning prepackaged cases may fail, but they do not fail during their bankruptcy cases.

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56.   Carapeto, *supra* note 10, at 50 (reporting a positive correlation between "Pre-pack" and successful reorganization, but not indicating whether any of the variables in the regression were statistically significant); Dahiya et al., *supra* note 10, at 270 (excluding prepackaged cases from the sample because prepackaging "generally ensures that such firms will emerge from the reorganization process and do so fairly quickly").

The difference in free fall and prenegotiated survival rates is almost perfectly offset by the difference in free fall and prenegotiated case durations. This results in survival rates per 10,000 days in bankruptcy that are nearly identical for the two kinds of cases. Alone, that result suggests that the differences in case durations explain the differences in BANKRUPTCYSURVIVAL. In fact they do not.

CASEDURATION is a variable that measures the length of a bankruptcy case in days from filing to plan confirmation, conversion to chapter 7, or dismissal. We excluded CASEDURATION from our regression model because it cannot be observed until the end of the case. But if CASEDURATION is added to our model, it is inversely correlated with BANKRUPTCYSURVIVAL and not quite marginally statistically significant (p=.104). PRENEGOTIATION remains positively correlated with BANKRUPTCYSURVIVAL and statistically significant (p=.013). Thus PRENEGOTIATION has a statistically significant effect on BANKRUPTCYSURVIVAL even when controlling for the length of the bankruptcy case. We conclude that PRENEGOTIATION and CASEDURATION are not mere substitutes for one another. Instead, they affect BANKRUPTCYSURVIVAL in different ways.

We think PRENEGOTIATION affects BANKRUPTCYSURVIVAL through two mechanisms. First, if a company has a high probability of survival, the interests of the creditors and the company (that is, the managers) are more likely to be aligned. Both will tend to prefer that the company continue in business. But if a company has a low probability of survival, the interests of the creditors and the company are probably in conflict. Creditors may prefer a quick failure, before unprofitable operations consume the remaining assets.[57] Debtors have nothing to gain from a quick failure, and so may want to continue the business in the hope of an improbable turnaround. Because debtor and creditor interests are aligned in high-probability-of-survival cases, debtors and creditors are more likely to reach agreement. Because debtor and creditor interests are in conflict in low-probability-of-survival cases, debtors and creditors are less likely to reach agreement. Thus, the inherent strength of the business causes both PRENEGOTIATION and BANKRUPTCYSURVIVAL.

Second, successful prenegotiation with one major constituency before filing signals to other constituencies—including the debtor's employees, suppliers, and customers—that the debtor's business is likely to survive. Those constituencies become more willing to continue dealing with the debtor during bank-

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57.   *See, e.g.*, *In re* ATP Oil & Gas Corp., No. 12-36187 (Bankr. S.D. Tex. Feb. 10, 2013) (emergency motion for an order to convert), 2013 WL 9792582 [hereinafter ATP Motion to Convert].

ruptcy, increasing the likelihood that the debtor will survive. Through this mechanism, PRENEGOTIATION may in part cause BANKRUPTCYSURVIVAL.

E.   Creditors' Committees

CREDITORSCOMMITTEE is a dichotomous variable that is positive if the U.S. Trustee appointed a creditors' committee during the first twenty-four days of the bankruptcy case. We chose twenty-four days because that limit was near the beginning of the case yet included 93 percent of all creditors' committee initial appointments in the data set. CREDITORSCOMMITTEE was strongly and inversely correlated with BANKRUPTCYSURVIVAL directly (p<.001) and in the best model (p=.005). Companies are less likely to survive bankruptcy if creditors' committees are appointed early in their cases.

Our finding is similar to one by Michelle Harner and Jamie Marincic. In a study that included both large and small companies, they found that companies are more likely to confirm a liquidation plan[58] and have plan objections from third parties[59] if a creditors' committee is appointed.

The U.S. Trustee is less likely to appoint committees in prepackaged and prenegotiated cases. For example, Table 5 shows that the proportion of early appointments differs sharply by the prenegotiation level of the case. Early appointments occurred in 92 percent of free fall cases, 73 percent of prenegotiated cases, and only 5 percent of prepackaged cases in our data set. (Ultimately, committees were appointed in 98 percent of free fall cases, 79 percent of prenegotiated cases, and 9 percent of prepackaged cases.)

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58.   Michelle M. Harner & Jamie Marincic, *Committee Capture? An Empirical Analysis of the Role of Creditors' Committees in Business Reorganizations*, 64 VAND. L. REV. 749, 794 (2011) ("[Unsecured creditors' committee] cases are significantly more likely than [noncommittee] cases to resolve through a liquidation, rather than reorganization, of the debtor.").

59.   *Id.* at 782 ("[Unsecured creditors' committee] cases are significantly more likely than [noncommittee] cases (p=.008) to have noncommittee plan objections.").

TABLE 6. Early Creditors' Committee Appointments by Prenegotiation Level

	No early appointment	Early appointment	Total
Free fall	33 (8%)	384 (92%)	417 (100%)
Prenegotiated	41 (27%)	109 (73%)	150 (100%)
Prepackaged	63 (95%)	3 (5%)	66 (100%)
Total	137 (22%)	496 (78%)	633 (100%)
"Early appointment" is appointment of a creditors' committee within the first 24 days of the bankruptcy case.			

It is highly unlikely, however, that the lack of committee appointments causes prepackaged or prenegotiated case filers to survive. Causation more likely runs in the opposite direction. Prepackaged and prenegotiated case filers have been able to reach agreement with their creditors because they are more likely to survive. Because they have those agreements and their cases will be short, both the creditors and the U.S. Trustee see less need for the appointment of creditors' committees.

Although prepackaging and prenegotiation explain a large part of the correlation between CREDITORSCOMMITTEE and BANKRUPTCYSURVIVAL, they also leave a large part unexplained. The correlation between CREDITORSCOMMITTEE and BANKRUPTCYSURVIVAL remains statistically significant after controlling for PRENEGOTIATION in our best model.

U.S. Trustees may decline to appoint creditors' committees in cases with few unsecured creditors or cases in which the estate lacks funds to enable a committee to operate effectively.[60] But we can think of no reason why those classes of cases would be disproportionately successful. As a result, we find the negative correlation between creditors' committee appointment and bankruptcy survival puzzling.

One lawyer suggested to us that creditors' committee resistance to debtors' efforts to reorganize may in fact cause some companies to fail. Some committees do seek to convert cases to chapter 7 while their debtors continue to operate

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60.   *E.g.*, Kenneth N. Klee & K. John Shaffer, *Creditors' Committees Under Chapter 11 of the Bankruptcy Code*, 44 S.C. L. REV. 995, 1003–04 (1993) (providing these two examples).

businesses.[61]   But on a search of 533 dockets of cases within this study, we found that only 16 (3 percent) contained motions by official creditors' committees to convert cases to chapter 7. Motions to convert are only one of several forms that committees may use to force liquidations. Committees may also move to dismiss, oppose plans, propose liquidation plans, seek stay lifts, and resist reorganization in other ways. But we still find it difficult to believe that creditors' committee opposition to reorganization is strong enough to cause the observed difference in survival rates for companies with and without committees.[62] Yet we have no better explanation for the inverse correlation between CREDITORSCOMMITTEE and BANKRUPTCYSURVIVAL.

F.   Interest Rates

This study is the first to document the existence of a relationship between interest rates and bankruptcy survival. PRIMERATE is the prime rate of interest one year before the bankruptcy petition date.   The prime rate of interest is "the rate at which banks will lend money to their most-favored customers."[63] The rates charged to other borrowers are often set at the prime rate plus some risk differential.[64] Thus, the prime rate is a measure of prevailing interest rates in the U.S. economy.

We chose the rate one year before bankruptcy for inclusion in our model because that was the prime rate most closely correlated with BANK-RUPTCYSURVIVAL (p <.001) in the best model. The prime rate two years before filing was also closely correlated with BANKRUPTCYSURVIVAL in the best model (p=.010), as was the prime rate at filing (p=.017). We conclude that companies are more likely to survive bankruptcy during periods when interest rates are low.[65]

The prevailing rates of interest may affect bankruptcy survival in at least two ways. First, they may determine the interest rates debtors pay on DIP

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61.   *E.g.*, ATP Motion to Convert, *supra* note 57.

62.   *But see* Michelle M. Harner & Jamie Marincic, *Behind Closed Doors: The Influence of Creditors in Business Reorganizations*, 34 SEATTLE U. L. REV. 1155, 1170 (2011) (reporting a survey in which 62.3% of bankruptcy professionals and 35% of committee members said creditors were exerting greater influence in Chapter 11 cases than five years before the survey).

63.   Christine L. Noller, *Tax Implications of ASC Joint Ventures*, HEALTH LAW., Apr. 2013, at 24, 37 n.47.

64.   Till v. SCS Credit Corp., 541 U.S. 465, 465 (2004) ("This 'prime-plus' or 'formula rate' was reached by augmenting the national prime rate of 8 [percent] to account for the nonpayment risk posed by borrowers in petitioners' financial position.").

65.   We also tested whether survival was dependent on a change in interest rates during the period from two years to one year before filing, and from two years to the filing date. Neither of these was significant (p>.2) in the best model, so we did not include them in the regressions.

lending, exit financing, and oversecured debt.[66] Some debtors will fail during bankruptcy because they cannot afford the higher rates. Second, by raising the cost of cash, high interest rates may limit the cash available to debtors in the prebankruptcy period. That shortage may cause damage to the debtor's business that is no longer reversible at the time of bankruptcy.

G. Operating Income Before Filing

Two measures of operating income are in common use. EBIT is the revenues of the business less expenses other than interest and taxes. EBITDA is the revenues less expenses other than interest, taxes, depreciation, and amortization. Scholars generally regard operating income as the best measure of a business's economic distress and regard economic distress as the proper criteria for determining which businesses should fail in bankruptcy.[67]

Michael Lemmon, Yung-Yu Ma, and Elizabeth Tashjian found a positive correlation between debtors' prepetition EBITDA-to-assets ratios[68] (asset-normalized EBITDA) and bankruptcy survival.[69] Although we found a positive correlation between debtors' asset-normalized EBITDA and BANKRUPTCYSURVIVAL in bivariate testing (p=.003), normalized EBITDA was not statistically significant when added to our best model (p=.928) or when substituted for EBITPOSITIVE in that model. (p=.819).

We include EBITPOSITIVE, a dummy variable that is positive when the debtors' EBIT is positive, in our best model. EBITPOSITIVE is significantly correlated with BANKRUPTCYSURVIVAL directly (p=.001) and in our best model (p=.038).

We think two factors explain why EBITPOSITIVE is a stronger predictor of BANKRUPTCYSURVIVAL than asset-normalized EBITDA. First, EBIT includes depreciation and amortization, making it a more accurate measure of the expenses that a debtor must cover to survive. Bankruptcy eliminates debt and the accompanying interest, but it does nothing to eliminate depreciation and the accompanying need for asset replacement. Second, what matters most to survival

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66. 11 U.S.C. § 506(b) (2012) (providing for the allowance of interest on claims to the extent that the value of collateral exceeds the amounts of the claims).

67. Kenneth Ayotte & David A. Skeel, Jr., *An Efficiency-Based Explanation for Current Corporate Reorganization Practice*, 73 U. CHI. L. REV. 425, 438 n.32 (2006) ("A firm in economic distress is not viable and should be shut down.").

68. Lemmon et al., *supra* note 10 (defining bankruptcy survival in a manner indistinguishable from BANKRUPTCYSURVIVAL).

69. *See also* David D. Dawley et al., *Do Size and Diversification Type Matter? An Examination of Post–Bankruptcy Outcomes*, 15 J. MANAGERIAL ISSUES 413 (2003) (using EBIT as an independent variable and returning to performance parity with the debtor's industry as the dependent variable).

is whether EBIT reaches the minimum level necessary for the firm to survive. The amount by which EBIT exceeds or falls short of that minimum is less important. Although EBITPOSITIVE is not a perfect measure of that minimum, it is close enough to produce good results in the model.

EBIT's effect on bankruptcy survival is direct. Operating losses may be cause for conversion to Chapter 7 liquidation.[70] In addition the debtor must have positive EBIT sufficient to cover its postbankruptcy debt service in order to achieve long-term viability. If the debtor's plan is incapable of achieving that level of EBIT, the plan is not feasible and the law requires that the court refuse to confirm it.[71]

H.   DIP Loans

A DIP loan is a loan made to the debtor-in-possession during the bankruptcy case. To qualify as a DIP loan under the BRD protocol the debtor must receive new money and the advance must be outside the ordinary course of business.

Two earlier studies have shown that companies that obtain DIP loans are more likely to survive than companies that do not.[72] Our findings are consistent with theirs. Of 461 companies that received DIP loans, 336 (73 percent) survived. Of 169 companies that did not receive DIP loans, 105 (62 percent) survived. The difference is statistically significant (p=.009). DIPLOAN is also significantly correlated with BANKRUPTCYSURVIVAL in our best model (p=.034). DIP loans probably enable companies to survive by providing cash to pay the expenses of continued operations, thus making them more likely to survive than companies of equal strength that did not receive DIP loans.

Dahiya and his coauthors attributed their findings to their claim that DIP lenders play a "screening role in which they are able to identify distressed firms that are strong and likely to emerge quickly, as well as a monitoring role in which the DIP lenders help firms to emerge quickly."[73] In their screening role,

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70.   11 U.S.C. § 1112(4)(A) (defining "cause" for conversion or dismissal to include "substantial or continuing loss to or diminution of the estate and the absence of a reasonable likelihood of rehabilitation").

71.   11 U.S.C. § 1129(a)(11) (2012) (requiring, as a condition of confirmation, that "[c]onfirmation of the plan is not likely to be followed by the liquidation, or the need for further financial reorganization, of the debtor").

72.   Dahiya et al., *supra* note 10, at 259 ("DIP financed firms are more likely to emerge from Chapter 11 than non-DIP financed firms."); Carapeto, *supra* note 10, at 2 ("I find that when firms did not obtain DIP financing they are more likely to be liquidated . . . .").

73.   *Id.* at 261.

DIP lenders "signal[] to other stakeholders and potential stakeholders the quality of the borrower."[74]

Our data provide only modest support for the claim that DIP lenders perform this screening role. Debtors are more likely to receive DIP loans if they have more employees ($p<.001$), are in retailing ($p=.002$) or manufacturing ($p<.001$), or if their cases are longer in duration ($p=.010$). Controlling for those four variables, companies with positive operating income measured by EBITDA were marginally more likely to receive DIP loans ($p=.09$), but companies with positive operating income measured by EBIT were not ($p=.17$). From those findings we conclude that DIP lenders were more likely to lend to economically stronger debtors, thus correctly signaling strength, but the association is not a strong one.

Dahiya and his coauthors also found that cases with DIP loans were of significantly shorter duration than cases without DIP loans.[75] We found the opposite. Cases with DIP loans were significantly longer in duration than cases without DIP loans ($p=<001$). Dahiya and his coauthors excluded prepackaged cases,[76] controlled for five statistically insignificant variables,[77] limited consideration to the cases of surviving companies,[78] and studied cases filed in the period 1988–97.[79] After excluding prepackaged cases, controlling for three of the five variables,[80] limiting consideration to the cases of surviving companies, and limiting consideration to the cases filed in the period 1988–97, we found that cases with DIP loans were shorter, but not significantly so ($p<.267$). Because our sample was only 40 cases, we consider our finding to be a confirmation of Dahiya. We conclude that cases with DIP loans used to be shorter, but have recently become longer.

This change in the length of DIP loan cases suggests an important change in the relationship between DIP lending and survival. DIP lending may function less as a screen—signaling which companies are strongest—and more as a prop—providing funds that enable companies to survive somewhat irrespective of their strength.

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74.   George G. Triantis & Ronald J. Daniels, *The Role of Debt in Interactive Corporate Governance*, 83 CALIF. L. REV. 1073, 1078 (1995).

75.   Dahiya et al., *supra* note 10, at 275.

76.   *Id.*

77.   *Id.* (controlling for total assets before filing, leverage, retail, current assets to total assets ratio, and a complex index labeled DIPLAMDA).

78.   *Id.* ("The sample does not include filings resulting in liquidation, substantial asset sales, or conversion to Chapter 7.").

79.   *Id.* at 266.

80.   We did not control for the current assets to total assets ratio or DIPLAMDA because the necessary data are not readily available for many of the cases in our study and because we doubt those variables' probity.

While we agree with Dahiya and his coauthors that DIP lenders to some extent perform a screening role, the direct effect of DIP lending on BANKRUPTCYSURVIVAL may not be entirely benign. Because DIP lenders' new advances typically have priority in the debtor's assets over all prepetition claims, DIP lenders may bear no risk on their loans. In that circumstance, they have no reason to concern themselves with the debtor's viability and are not likely to provide useful signals.

The proportion of debtors receiving DIP loans after filing in Delaware and New York was higher than the proportion receiving DIP loans after filing in other courts. Delaware and New York filers received DIP loans in 302 of 401 cases (75 percent). Other court filers received DIP loans in 159 of 229 cases (69 percent). The difference was not statistically significant (p=.244).

The correlation between DIPLOAN and BANKRUPTCYSURVIVAL is weak in Delaware and New York, but strong in other courts.[81] In Delaware and New York, 227 of 302 debtors with DIP loans (76 percent) survived as compared with 73 of 99 debtors without DIP loans (74 percent). The difference is not statistically significant (p=.776). In the other courts, 109 of 159 debtors with DIP loans (77 percent) survived as compared with 32 of 70 debtors without DIP loans (46 percent). The difference is statistically significant (p=.001).

Three explanations for the difference in the effect of DIP loans on outcomes between courts seem plausible. First, stronger debtors may be shopping to Delaware and New York, so that those in need of DIP loans are strong enough to qualify for them.[82] Second, DIP loans may be more readily available in Delaware and New York, leaving only those without need of DIP loans without DIP loans.[83] Third, DIP lenders may be requiring some borrowers to shop to Delaware or New York as a condition of the loan.[84] The first two conditions would tend to promote both higher survival rates in Delaware and New York and more similar outcomes in Delaware and New York for debtors with and without DIP loans. The third condition would tend to promote the higher survival rates but not the more similar outcomes in Delaware and New York.

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81.   *See infra* Table 6.
82.   *See supra* Part I.E.
83.   *See infra* Table 6.
84.   Bobby Guy, *Choosing a Venue in Chapter 11 Cases: A Practical View*, MORRISON ANDERSON (Jan. 18, 2011), http://www.morrisanderson.com/company-news/entry/choosing-a-venue-in-chapter-11-cases-a-practical-view ("Because the DIP lender holds the cash, it generally makes the rules about where to file the case. Many are the cases that were prepared for one venue, only to be changed at the last minute to accommodate a newfound DIP lender's demands.").

TABLE 7. Bankruptcy Survival by the Presence of DIPLOAN and by Court

	Delaware and New York			Other Courts		
	Failure	Survival	Total	Failure	Survival	Total
No DIP Loan	26 (26%)	73 (24%)	99 (25%)	38 (43%)	32 (23%)	70 (31%)
DIP Loan	75 (74%)	227 (76%)	302 (75%)	50 (57%)	109 (77%)	159 (69%)
Total	101 (100%)	300 (100%)	401 (100%)	88 (100%)	141 (100%)	229 (100%)
The difference in survival rates is significant in Other Courts (p=.001) but not in Delaware and New York (p=.776). Prepackaged cases are excluded from these figures.						

I.   Equity Before Filing

Equity, as used here, means the debtor's total assets minus the debtor's total liabilities, as shown on the debtor's balance sheet. EQUITYBEFORE is the ratio of the debtor's equity before bankruptcy to the debtor's assets before bankruptcy. This variable is also sometimes referred to as "leverage before bankruptcy."

Although 60 percent of the debtors in our study reported positive EQUITYBEFORE, probably few actually had assets worth more than their liabilities before bankruptcy. The total distributions to secured creditors, unsecured creditors, and equity (the debtors' actual total assets) exceeded the claims of secured creditors and unsecured creditors (the debtors' actual total liabilities), in only 4 of the 81 study cases for which distribution data are presently available (5 percent). At least three factors combine to cause this large difference between reported and realized equities. The first is the use of book values that have not been adjusted to reflect the companies' financial difficulties. The second is puffing as the companies struggle to survive. The third is the continuing declines in values from losses incurred during the bankruptcy case.

EQUITYBEFORE is negatively correlated with BANKRUPTCYSURVIVAL both directly (p<.001) and in the best model (p=.001). The greater the debtor's EQUITYBEFORE, the less likely the debtor is to survive bankruptcy. The finding is counterintuitive because equity is generally regarded as a measure of financial health, not financial weakness.

This inverse relationship between prefiling equity and company survival has been documented by other scholars.[85] Perhaps because those scholars conceptualized the relationship as a positive correlation between leverage—the ratio of debts to assets—and survival, most have not viewed it as paradoxical or sought to explain it.[86]

The lack of a significant correlation between high leverage and BANKRUPTCYSURVIVAL would have been easy to explain. The bankruptcy discharge cuts both high and low debts to the same level,[87] so the amount of that debt should have no effect on survival. What is difficult to explain is why debtors with high leverage are significantly more likely to survive.

A financially distressed debtor is one that owes excessive debt; an economically distressed debtor is one whose operating expenses are too high in relation to its operating income.[88] Some argue that because bankruptcy is triggered by aggregate distress, severely financially distressed debtors will tend to file with modest economic distress while severely economically distressed debtors will tend to file with modest financial distress.[89] Because bankruptcy is effective against financial distress but not against economic distress,[90] the financially distressed group tends to survive while the economically distressed group tends to fail. The survivors are the group that entered bankruptcy with higher leverage, and thus lower EQUITYBEFORE.[91] The explanation is at least facially coherent.

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85.   *E.g.*, Dahiya et al., *supra* note 10, at 271 ("Leverage shows up as positive and marginally significant in our regression . . . ."); Denis & Rodgers, *supra* note 10, at 113 ("[F]irms that have greater liability ratios before filing Chapter 11 are more likely to reorganize than to liquidate or be acquired."); Lemmon et al., *supra* note 10, at 43–44 (finding the relationship between leverage and survival statistically significant at the 1% level).

86.   *E.g.*, Dahiya et al., *supra* note 10, at 271 (mentioning the relationship but not providing any explanation).

87.   Lynn M. LoPucki, *Common Sense Consumer Bankruptcy*, 71 AM. BANKR. L.J. 461, 470 (1997) ("The more debtors owe, the more they can discharge.").

88.   Robert K. Rasmussen & Randall S. Thomas, *Timing Matters: Promoting Forum Shopping by Insolvent Corporations*, 94 NW. U. L. REV. 1357, 1387 n.143 (2000) (referring to "the now standard distinction between financial distress—inability to pay debts—and economic distress—inability of revenues to cover costs").

89.   *E.g.*, Denis & Rodgers, *supra* note 10, at 113 ("To the extent that higher leverage leads firms to become bankrupt more quickly, firms with higher pre-bankruptcy leverage may be less economically distressed and, therefore, more likely to be able to reorganize and emerge than lower leverage firms . . . .").

90.   Baird, *supra* note 6, at 582 (1998) ("If a firm is in economic distress (but not financial distress), it does not belong in bankruptcy. If a firm is in economic distress but is properly in bankruptcy because of financial distress, there is still no justification to intervene for reasons unrelated to financial distress.").

91.   Lemmon et al., *supra* note 10, at 15 ("[W]e expect that firms entering Chapter 11 primarily because of financial distress will be more likely to reorganize and emerge, and that firms entering Chapter 11 primarily due to economic distress will be more likely to have their assets redeployed via liquidation or acquisition.").

Our data confirm parts of this putative explanation. EQUITYBEFORE is the most direct measure of financial distress. By discharging debt, bankruptcy provides an effective remedy against financial distress. As shown in Table 7, 104 of 209 debtors for whom data are available before and after bankruptcy (50 percent) reported negative EQUITYBEFORE (insolvency) on their last annual report before bankruptcy. Only 21 of those 209 debtors (10 percent) still reported negative EQUITYBEFORE on their first annual report after emergence. If financial distress is defined as reporting insolvency, 83 of 209 surviving debtors (40 percent) recovered from their financial distress during bankruptcy. Those 83 are 80 percent of the 104 debtors reporting prebankruptcy insolvency.

TABLE 8. Change From Insolvency to Solvency During Bankruptcy (From Before Filing to After Emergence)

	Before filing	After emergence	Net difference
Insolvent	104 (50%)	21 (10%)	83 (40%)
Solvent	105 (50%)	188 (90%)	-83 (-40%)
Total Cases	209 (100%)	209 (100%)	0 (0%)
Figures include only surviving firms Chi-square, p<.001			

By contrast, bankruptcy provides only indirect and highly ineffective remedies for economic distress. First, bankruptcy stays creditor collection efforts during the pendency of the bankruptcy cases. That provides the debtor with time to make changes in the business that might improve operating income. Second, bankruptcy enables debtors to borrow money during their cases by allowing debtors to grant new lenders priority over prepetition creditors. Debtors can use the new money to replenish the firm's working capital and to finance changes in the business. Third, the bankruptcy process tends to force changes in management,[92] which may facilitate changes in company policies that had been depressing operating income.

Our data confirm the ineffectiveness of bankruptcy in dealing with economic distress. Operating income (EBIT) is the most direct measure of

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92.   Lynn M. LoPucki & William C. Whitford, *Corporate Governance in the Bankruptcy Reorganization of Large, Publicly Held Companies*, 141 U. PA. L. REV. 669, 723–37 (1993) (reporting high levels of CEO turnover).

economic distress. As shown in Table 8, 84 of 182 debtors for whom data are available (46 percent) reported negative EBIT on their last annual report before bankruptcy. Seventy-six of those debtors (42 percent) still reported negative EBIT on their first annual report after emergence. If economic distress is defined as having negative EBIT, only 8 of 84 surviving debtors (10 percent) recovered from their economic distress during bankruptcy.

TABLE 9. Change From Negative to Positive EBIT During Bankruptcy (From Before Filing to After Emergence)

	Before filing	After emergence	Net difference
Negative EBIT	84 (46%)	76 (42%)	8 (4%)
Positive EBIT	98 (54%)	106 (58%)	-8 (-4%)
Total cases	182 (100%)	182 (100%)	0 (0%)
Figures include only surviving firms Chi-square, p=.398			

For financial distress to explain the inverse relationship between EQUITYBEFORE and BANKRUPTCYSURVIVAL, debtors with more financial distress must have less economic distress. If so, one would expect to find an inverse relationship between EQUITYBEFORE and EBITPOSITIVE.[93]

To the contrary, we found that EQUITYBEFORE was not significantly correlated with our measure of economic distress, EBITPOSITIVE (p=.916), or with either of two other measures of economic distress.[94] Thus, bankruptcy's greater effectiveness against financial distress cannot alone explain the inverse relationship between EQUITYBEFORE and BANKRUPTCYSURVIVAL.

Michael Jensen has offered an alternative explanation. Jensen theorizes that highly leveraged firms are less likely to liquidate in bankruptcy because the

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93.   For example, Denis and Rodgers state:
         To the extent that higher leverage leads firms to become bankrupt more quickly,
         firms with higher pre-bankruptcy leverage may be less economically distressed and,
         therefore, likely to be able to reorganize and emerge than lower leverage firms
         that may have funded years of operating losses without the discipline of debt pay-
         ments before finally being forced to file bankruptcy.
       Denis & Rodgers, *supra* note 10, at 113.
94.   The other measures are EBIT before bankruptcy (p=.315) and EBIT before bankruptcy as a
       percentage of assets before bankruptcy (p=.916).

high leverage triggers their bankruptcies while their going concern values are still much higher than their liquidation values.[95] Further research is needed to verify or disprove Jensen's explanation.

J.   Manufacturer

MANUFACTURER is a dichotomous variable that indicates whether the debtor's principal SIC division immediately before bankruptcy was "manufacturing." Of the 635 debtors studied, 242 (38 percent) were manufacturers.

Manufacturers that file bankruptcy are more likely to survive. The survival rate for manufacturers was 77 percent (187 of 242), as compared with 66 percent (258 of 393) for debtors in other classifications. The difference is statistically significant (p=.002). MANUFACTURER is also statistically significant in our best model (p=.001).

The disproportionate ability of manufacturing firms to survive bankruptcy has previously been reported.[96]

> Manufacturing firms tended to be larger than other firms, and their
> size may have contributed to their ability to survive. One of the bank-
> ruptcy judges commented that manufacturing firms are often engaged
> in diverse projects and can sever the least profitable in financial crisis.
> One of the attorneys interviewed suggested that manufacturing firms
> are dependent on fewer outsiders as suppliers of materials or credit, or
> as purchasers of its products.[97]

K.   Company Size

COMPANYSIZE is the log of the total assets of the company, stated in millions of current dollars. We chose assets over two other measures of size because assets slightly outperformed them in our best model.[98] A third measure of size, liabilities, performed equally as well as assets. We chose assets over

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95.   *E.g.*, Michael C. Jensen, *Eclipse of the Public Corporation*, 1989 HARV. BUS. REV. 61, 72–73 (providing an example in which the bankruptcy of a high leverage firm is triggered before firm value falls below liquidation value, but the bankruptcy of a low leverage firm is not).

96.   Lynn M. LoPucki, *The Debtor in Full Control—Systems Failure Under Chapter 11 of the Bankruptcy Code?*, 57 AM. BANKR. L.J. 99, 108 (1983) ("Manufacturers were successful in eight of fourteen resolved cases (57%); all other types of businesses were successful in only three of twenty six cases (12%), making the success rate for manufacturers almost five times the success rate for other businesses.").

97.   *Id.*

98.   Those measures were (1) the number of persons the debtor employed before bankruptcy and (2) a variable that took several measures of size into account.

liabilities because prior bankruptcy survival research has used and reported on assets.[99] That research found positive and significant correlations between bankruptcy survival and company size, measured by assets.[100]

COMPANYSIZE is positively correlated with BANKRUPTCYSURVIVAL directly (p=.025) and in our best model (p=.048). Others have previously found stronger correlations between assets and survival, but they did so in models that included fewer variables.[101]

We think the mechanism by which this variable affects survival is that large companies are typically engaged in a wider diversity of activities. Thus, they have more options for change that will still meet our definition of survival.

L.   Non-Qualifying Variables

We tested numerous variables that did not qualify for inclusion in the model. A few are worthy of mention.

We tested whether the debtor's lead law firm's experience in BRD cases (DIPATTORNEYEXPERIENCE) was correlated with BANKRUPTCYSURVIVAL. We found that it was statistically significantly directly correlated (p<.001). Companies with experienced lead law firms are more likely to survive. But DIPATTORNEYEXPERIENCE was not statistically significantly correlated with BANKRUPTCYSURVIVAL when controlling for the eleven variables in our best model (p=.594). We conclude that the experience of the debtor's lead law firm is a predictor of bankruptcy survival, but not as strong a predictor as the other variables in our best model.

In bivariate testing, we found a marginally statistically significant, positive correlation between BANKRUPTCYSURVIVAL and the length of time the CEO who was serving on the date of filing had been in that position (CEOEXPERIENCE) (p=.076). Companies with longer-serving CEOs were more likely to survive. CEOEXPERIENCE was not, however, statistically significant when added to our best model (p=.381).

We also tested the relationship between changes in U.S. gross domestic product (GDP) before bankruptcy and BANKRUPTCYSURVIVAL. Two measures were significant in bivariate testing. First, companies that filed during a recession year were significantly more likely to survive (p=.023). Second,

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99.   *See* sources cited *supra* note 10.

100.   Dahiya et al., *supra* note 10, at 272 (assets significant at the 1% level); Denis & Rodgers, *supra* note 10, at 112 ("The coefficient on firm size is positive and significant at the 10% level when reorganization is compared to . . . acquisition and liquidation combined."); Lemmon et al., *supra* note 10, at 43–44 (assets significant at the 1% level).

101.   Dahiya et al., *supra* note 10, at 269 (significant at the 1% level).

companies were less likely to survive to the extent that GDP increased in the second year before their filing (p=.002). We think both these effects have a single explanation. Companies that file while the economy is good tend to be weaker than those that file while the economy is bad. Neither of these GDP variables was significant when added to our best model.

Finally, scholars assume that secured creditors favor liquidation.[102] If so, one might expect that secured debt would be correlated with firm failure.[103] Contrary to that expectation, Mark Jenkins and David Smith report a positive correlation between bankruptcy survival and the secured debt coverage ratio (defined as the ratio of secured claims to total distribution to creditors and equity).[104] The higher a company's secured debt coverage ratio, the more likely the company will survive.

From BRD data, we were able to calculate the secured debt coverage ratio for 81 of the cases in our study. That ratio was inversely correlated with BANKRUPTCYSURVIVAL and not statistically significant (p=.496). Our finding is inconsistent with Jenkins and Smith's.

Jenkins and Smith report an additional conclusion, which is supported by our data. They report "a statistically significant increase in liquidation frequencies when [the secured debt coverage ratio] is close to one . . . ."[105] The gist of their explanation for this phenomenon is that when the amount of the secured debt clearly exceeds the value of the business, the secured creditor is in control and has the incentive to make the right continuation decision. When the amount of the secured debt is clearly less than the value of the business, the junior creditors are in control and have the incentive to make the right continuation decision. But when the amount of the secured debt is approximately equal to the value of the business, the secured creditor bears the risks of continued

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102. *E.g.*, Kenneth M. Ayotte & Edward R. Morrison, *Creditor Control and Conflict in Chapter 11*, 1 J. LEGAL ANALYSIS 511, 514 (2009) ("Oversecured creditors will prefer an immediate resolution."); Ran Barniv et al., *Predicting Bankruptcy Resolution*, 29 J. BUS. FIN. & ACCT. 497, 508 (2002) ("[A] secured-debt claimant would tend to promote liquidation.").

103. Lack of an accurate measure of secured debt has hampered research. For example, Compustat provides a secured debt variable, but that variable often drops precipitously right before bankruptcy. It does so because Compustat moves secured debt into current liabilities upon default. *See, e.g.*, Dahiya et al., *supra* note 10, at 267 n.9 ("[I]n some instances of default, Compustat records the long-term debt as zero and treats the long-term debt as current liabilities."); Lemmon et al., *supra* note 10, at 7 (referring to "data errors that can arise from reclassifications of long-term debt in the 10K filings and in Compustat").

104. Mark Jenkins & David C. Smith, Creditor Conflict and the Efficiency of Corporate Reorganization 18 (May 2014) (unpublished manuscript), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2444700 ("[T]he probability of reorganization appears to be positively related to secured debt asset coverage over the range of $\ln(U_i^*/S)$ in our sample.").

105. *Id.* at 18.

operation while the junior creditors claim the benefits. In this situation, se-cured creditors force inefficient liquidations.[106]

FIGURE 4. Bankruptcy Survival Rate by Secured Debt Coverage
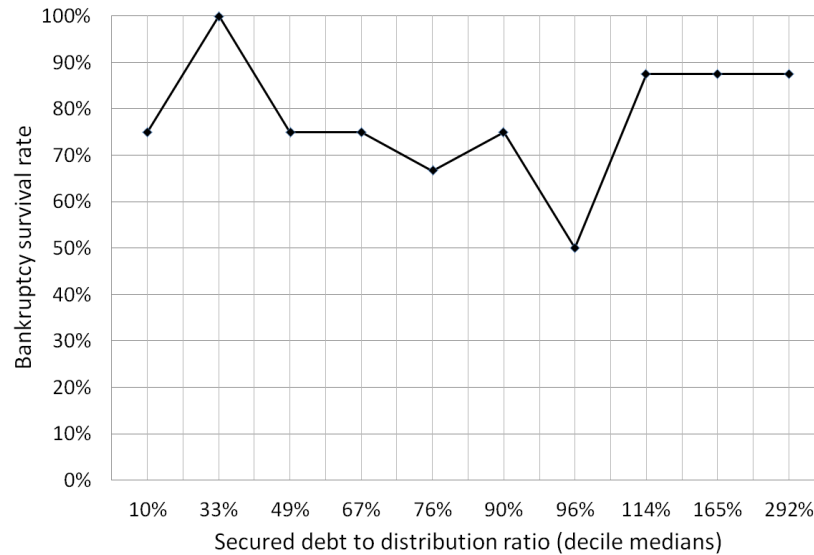
As shown in Figure 4, our data are consistent with Jenkins and Smith's finding. The dip in survival rate that appears in their data when the coverage ratio is approximately 100 percent also appears in our data. If Jenkins and Smith are correct, these dips represent additional business failures caused by se-cured debt and excessive legal deference to secured creditors' interests.

III.   A FIVE-DECISION MODEL OF BANKRUPTCY SURVIVAL

Figure 5 is a path model of bankruptcy survival. The arrows represent the paths of hypothesized causal effects of variables on other variables. Our statisti-cal analyses indicate that all of the arrows in this diagram (except that from Random draw to JUDGEEXPERIENCE) represent statistically significant or marginally statistically significant correlations.[107] We hypothesize that causa-

106. *Id.* at 3.
107. Lynn M. LoPucki & Joseph W. Doherty, Stata do File (Nov. 16, 2014) (unpublished manuscript) (on file with authors) (specifying the regressions).

tion runs in the directions of the arrows, except that the relationship of
EQUITYBEFORE to BANKRUPTCYSURVIVAL is not causal at all.

FIGURE 5. Correlations With Bankruptcy Survival

Note. Large and small caps denote variables. Arrows between variables
indicate significant or marginally significant correlations and probable
directions of causation. Shaded areas indicate decisions that affect the
likelihood of survival.   A significant path from SHOP to DIPLOAN is not shown.
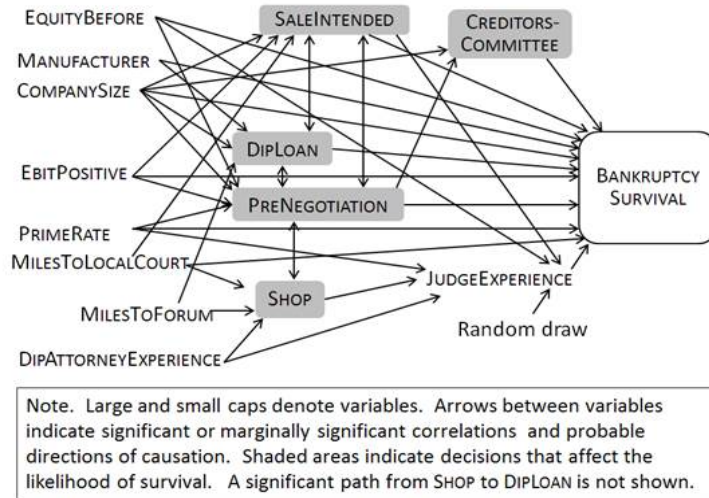
The shaded variable names identify the model's five decisions. Each
decision is made shortly before, or early in, the bankruptcy process. Several
actors participate. CREDITORSCOMMITTEE is the U.S. Trustee's decision
to appoint a creditor's committee. SALEINTENDED is a decision by the
company to issue a press release indicating an intention to sell the company.
DIPLOAN is the confluence of a decision by the debtor to seek a DIP loan, a
decision by a creditor to provide the DIP loan, and a decision by the court to
approve the DIP loan. PRENEGOTIATION is a decision by the debtor to ne-
gotiate with creditors before filing the case and a decision by some credi-
tors to reach agreement with the debtor. SHOP is a decision formally
made by the debtor to file the case in a court other than the local court.[108]

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108. During the period from January 1, 2005 through December 31, 2014 about 82% of shops
      have been to New York or Delaware. This statistic can be calculated using the Run-a-
      Study feature of the BRD. *Run-a-Study*, UCLA-LOPUCKI BANKR. RES. DATABASE,
      http://lopucki.law.ucla.edu/design_a_study.asp?ShowStudies=Flexible (last visited Mar. 27,
      2015).   To reproduce the 82% statistic, go to the Custom Studies page of Run-a-
      Study. Click "choose years" and move the slides to "2005" and "2014." Click OK. Click
      "choose shop status" and check the "Forum Shop" box. Click OK. Click the radio button
      for "Forum Shopping." Click the "Run Study" button. Scroll to the first table, which
      reports 224 forum shops during the study period. Scroll to the top of the page. Click on
      "Modify Study to retain the prior selections. Click "choose cities" beside "Venue by city"
      and check the boxes for "DE Wilmington and "NY SD New York."   Click OK.   Click the

Attorneys, DIP lenders, and courts acting in earlier cases may influence that decision.[109]

The arrows show that the effect of any single variable on BANKRUPTCY-SURVIVAL can be direct, indirect, or both. For example, EBITPOSITIVE has a direct effect on BANKRUPTCYSURVIVAL. It has indirect effects on BANK-RUPTCYSURVIVAL through its direct effects on SALEINTENDED and PRENEGOTIATION. The total effect of EBITPOSITIVE on BANKRUPTCY-SURVIVAL is the sum of its direct and indirect effects.

DIPATTORNEYEXPERIENCE has no direct effect on BANKRUPTCY-SURVIVAL.[110] But DIPATTORNEYEXPERIENCE affects JUDGEEXPERIENCE both directly and indirectly through its effect on SHOP. Experienced attorneys are more likely to forum shop and so to bring their cases before more experienced judges. The tradition of randomly assigning cases within a panel of judges acts as a limit on the attorneys' efforts.

Each of the five decisions is in part merely a response to upstream conditions. But in each there may be opportunities to innovate in ways that will alter the effects of the upstream variables on BANKRUPTCYSURVIVAL. Thus, the model demonstrates that BANKRUPTCYSURVIVAL is not merely a function of the strength of the debtor's business. Prepetition and immediate postpetition decisions in part determine whether debtors will survive.

CONCLUSION

This Article is the culmination of a long and extensive data-collection project designed to discover the determinants of success in the bankruptcy reorganizations of large, public companies. It presents the first comprehensive model for predicting which businesses will survive bankruptcy. The variables that directly predict success are (1) sale intended, (2) judicial experience, (3) plan pre-negotiation, (4) positive operating income, (5) proximity to the local bankruptcy court, (6) asset size, (7) leverage, (8) a low prime rate of interest, (9) that the debtor is a manufacturer, (10) the existence of a DIP loan, and (11) the lack of a creditors' committee.

The relationship between JUDGEEXPERIENCE and BANKRUPTCYSUR-VIVAL is probably the most important discovery to result from this study.

"Run Study" button. Scroll to the first table, which reports 184 forum shops to Delaware and New York during the study period. 184/224 = 82%.

109. *See* LYNN M. LOPUCKI, COURTING FAILURE: HOW COMPETITION FOR BIG CASES IS CORRUPTING THE BANKRUPTCY COURTS 138–39 (2005) (describing the involvement of these three groups in forum shopping).

110. *See supra* Part II.L.

Our finding suggests that bankruptcy system participants can increase the likelihood of the debtor company's survival simply by shifting cases to more experienced judges.

Our findings also suggest that greater attention by system participants to five decisions may have the potential to increase the survival rate. The first is the choice of a bankruptcy court, because that choice can increase the likelihood of having an experienced judge, which in turn may increase the likelihood of survival. The second and third are the decisions of debtors and creditors to prepackage or prenegotiate plans and obtain DIP loan approval. Prenegotiations and DIP loans increase the likelihood of survival. The fourth is the debtor's decision to announce an intention to sell the business. Such an announcement may be necessary, but it may also increase an already high risk of failure. The last is the U.S. Trustee's decision to appoint a creditors' committee. Appointment of a committee increases the risk of failure. Through greater attention to these decisions, system participants may be able to increase the bankruptcy survival rate.

Efforts to improve the bankruptcy survival rate must take into account the fact that mere survival is not success. Debtors may survive bankruptcy only to fail shortly thereafter. But bankruptcy survival may have value even in that worst-case scenario. It enables the business to continue for some period of time. During that period, employees have work, the company's suppliers have a customer, and the company's customers are able to receive its products and services. Everyone has time to adjust to the changing situation.

APPENDIX

TABLE A1. Pearson r correlations of variables used in the regression model.
*p<.05

		1	2	3	4	5	6	7	8	9	10	11
1	Survival	1										
2	SaleIntended	-.33*	1									
3	EbitPositive	.14*	-.14*	1								
4	EquityBefore	-.21*	.09*	.00	1							
5	Manufacturing	.12*	.02	.14*	-.04	1						
6	PrimeRate	-.19*	.03	-.04	.02	-.05	1					
7	MilesToLocalCourt (log)	-.13*	.09*	.00	.04	.10*	.01	1				
8	PreNegotiated	.31*	-.25*	.08	-.20*	-.01	-.19*	-.01	1			
9	DipLoan	.10*	-.06	.11*	.06	.16*	-.01	.03	-.09*	1		
10	CreditorsCommittee	-.20*	.13*	-.02	.08*	.10*	.06	.04	-.60*	.12*	1	
11	Size (log of assets)	.09*	-.14*	.03	.09*	-.06	-.00	-.07	-.11*	.08*	.17*	1
12	JudgeExperience (log)	.13*	.05	.02	-.16*	.04	-.11*	-.04	.10*	.09*	-.03	.00

Table A2. Summary statistics of variables used in the regression analysis

Variable	N	Mean	SD	Min	Max
Survival	635	0.7	0.46	0	1
SaleIntended	630	0.21	0.41	0	1
EbitPositive	632	0.51	0.5	0	1
EquityBefore	635	-0.06	0.62	-6.57	0.9
Manufacturing	635	0.38	0.49	0	1
PrimeRate	635	6.67	2.08	3.25	9.5
MilesToLocalCourt (log)	620	1.59	1.58	0	4.9
PreNegotiated	635	0.45	0.68	0	2
DipLoan	630	0.73	0.44	0	1
CreditorsCommittee	633	0.78	0.41	0	1
Size (log of assets)	635	6.9	1.05	5.49	11.83
JudgeExperience (log)	633	1.77	1.29	0	4.43