Default Correlation Among Non-Financial Corporate Affiliates

KENNETH M. EMERY AND RICHARD CANTOR

KENNETH M. EMERY
is a vice president and senior credit officer at Moody's Investors Service in New York City.
kenneth.emery@moodys.com

RICHARD CANTOR
is a managing director at Moody's Investors Service in New York City.

Absent highly effective intra-family reciprocal support mechanisms, such as guarantees or other types of support agreements, default experience across corporate affiliates may vary and affect the relative riskiness of their debt obligations. In this study, we analyze Moody's database of non-financial defaults of all rated issuers since 1999 and address several questions about "selective" and "group" defaulters.

"Selective defaulters" refers to those multiple-entity families wherein at least one rated entity defaults *and* at least one other rated entity in the family avoids default. "Group defaulters" refers to those multiple-entity families wherein all of the rated affiliates in the family default. As a result, each defaulting family is either a "selective defaulter" or it is a "group defaulter." This article examines:

- How often do selective defaults occur?
- Which family characteristics help predict the incidence of selective defaults?
- How well do rating differentials across affiliates anticipate selective defaults?

In most instances, all affiliates do indeed default together; however, in 20% of the cases, we find that at least one affiliate avoids default. The frequency of selective default varies substantially by rating quality prior to default. It is highly unlikely (only 13% of the time) among speculative-grade defaulting families, but relatively common (58% of the time) among firms rated investment-grade within three years prior to default.

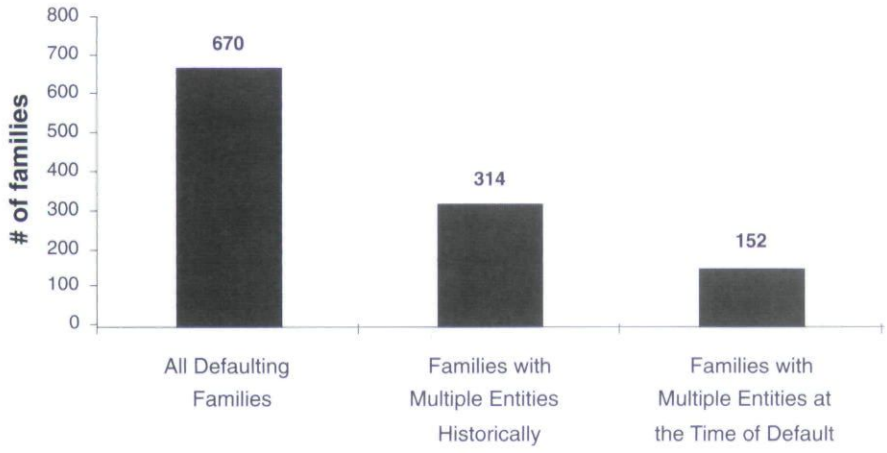
The likelihood of selective default is, of course, determined by each firm's unique circumstances. Our objective, however, is to uncover firm characteristics that are systematically related to the incidence of selective default. We are particularly interested in variables that might help analysts anticipate selective default and should therefore be reflected in rating differentials. We find that incidence of selective defaults is systematically related to a firm's industry, the number of its affiliates, the extent of its international activities, and its regulatory status.[1] Additionally, corporations that are utilities or operate in the media industry were disproportionately represented among the entities that experienced selective defaults.

The majority of the speculative-grade selective default cases (63%) entailed defaults at the parent company, while the operating companies avoid default. The remaining cases of speculative-grade selective defaults entail default at the operating company level, usually a "ring-fenced" subsidiary, while the parent company and other affiliates avoid default.

We also investigate whether the type of initial default event affects the incidence of selective defaults. In particular, we find that if an affiliate enters into default by filing for bankruptcy—rather than by missing a debt service payment or executing a distressed exchange—it is more likely that all of its affiliates will also

EXHIBIT 1

Frequency of Multiple Rated Entities Within Defaulting Corporate Families



default. This finding is intuitive and important; however, it does not help us identify in advance which companies are more likely to experience selective default unless we can anticipate which companies are more likely to file for bankruptcy.

Other factors may also likely influence the incidence of selective default, but they may be less amenable to statistical analysis. In particular, it is extremely difficult to compile a database that systematically characterizes intra-family cross guarantees and support arrangements. For the purposes of this study, we were only able to identify the presence or absence of explicit bond guarantees from one affiliate to another within the family; however, we were unable to systematically track the direction of the guarantees and the presence of cross default clauses in bank loan agreements. In fact, we did not find any statistically significant relationship between the presence of bond guarantees and the incidence of selective default. However, this finding is likely due to the limitations of our dataset.

Importantly, rating differentials within corporate families are also found to be wider on average for families with selective default, indicating that Moody's ratings incorporate differences in default risk across families' affiliates. Indeed, multivariate regression analysis indicates that rating differentials within corporate families one year prior to default provide the most explanatory power, relative to other family characteristics, for explaining the likelihood of selective default.

FAMILY STRUCTURE AT DEFAULT DATABASE

To examine the incidence of selective default, we use Moody's data documenting family structure of rated entities at the time of default. The database contains 670 non-financial corporate families, including 1,741 rated entities, defaulting between January 1999 and December 2004. Of these 670 families, 36 were investment-grade or fallen angel defaulters (defined as having an investment-grade entity within three years of default).

Of the 670 families, 314 (47%) had more than one rated entity at some point in their ratings history. However, only 152 (23%) families had more than one rated entity at the time of default (*see Exhibit 1*).[2] Approximately 87% of the families were domiciled in North America, with the remaining 13% evenly divided between Europe and the rest of the world.[3]

Investment-grade defaulters were more likely than speculative-grade defaulters to have multiple rated entities at default—26 of the 36 (72%) for investment-grade families compared to only 126 of 634 (20%) for speculative-grade families.

SELECTIVE DEFAULTS

Investment-Grade Defaulters

Of the 152 families with more than one rated entity at default, 26 had investment-grade ratings within three years of default. Exhibit 2 lists the 16 cases of investment-grade selective defaults, and Exhibit 3 presents the 11 cases of group investment-grade defaults.[4,5] The information in Exhibit 2 includes the ultimate parent of the family, a key defaulter, a key non-defaulter, the initial default date, the family's industry, and a indicator whether the selective default involved an international affiliate.

For example, Enron Corporation is listed as a selective default because its regulated utility (Portland General and Electric) avoided default while the other rated entities in the family defaulted.[6] In contrast, WorldCom is a group investment-grade default because all of its rated affiliates defaulted.

EXHIBIT 2

Investment-Grade Selective Defaults (at least one entity rated investment grade within three years of default)

Ultimate Parent Name	Key Defaulter	Key Non-Defaulter	Date	Industry	International Affiliates
EDISON INTERNATIONAL	SOUTHERN CALIFORNIA EDISON	EDISON INTERNATIONAL	1/16/2001	Utilities	X*
PG&E CORPORATION	PACIFIC GAS AND ELECTRIC	PG&E NATIONAL ENERGY GROUP	11/15/2002	Utilities	X*
ENRON CORP.	ENRON CORP.	PORTLAND GENERAL & ELECTRIC	12/2/2001	Utilities	X*
TXU CORP.	TXU EUROPE LTD	TXU CORP.	10/15/2002	Utilities	X
LAIDLAW INC.	GREYHOUND	LAIDLAW INC.	5/15/2000	Transportation	X
QWEST COMMUNICATIONS INTL.	QWEST CAPITAL FUNDING	QWEST COMMUNICATIONS INTL.	12/23/2002	Telecom	X*
BCE INC.	TELEGLOBE	BCE INC.	5/15/2002	Telecom	
AT&T	AT&T CANADA INC.	AT&T	9/11/2002	Telecom	X
KPN	KPNQWEST	KPN and QWEST	5/23/2002	Telecom	X
VERIZON	GENUITY INC.	VERIZON	7/25/2002	Telecom	X*
AES CORPORATION	ELECTRO PAULO (BRAZIL)	AES CORPORATION	12/16/2002	Utilities	X
AES CORPORATION	AES DRAX ENERGY LIMITED (UK)	AES CORPORATION	2/28/2003	Utilities	X
XCEL ENERGY	NRG ENERGY, INC. (OLD)	XCEL	12/15/2002	Utilities	
SOLUTIA INC.	SOLUTIA INC.	SOLUTIA EUROPE	12/17/2003	Industrial	X
BAA	DUTY FREE INTERNATIONAL	BAA	1/15/2002	Transportation	X
NEWMONT MINING CORPORATION	NEWMONT YANDAL (AUSTRALIA)	NEWMONT MINING CORPORATION	7/4/2003	Industrial	X

X denotes the family had an international affiliate but that the defaulting entities' domiciles were the same as the parent's domicile.*

Speculative-Grade Defaulters

Of the 152 families with more than one rated entity at default, 126 are speculative-grade defaulters. Of these 126, Exhibit 4 lists the 16 cases of selective defaults. For example, Nextel Communications is a selective default because Nextel International defaulted but the parent did not. A list of the 110 speculative-grade defaulting families that did not experience selective defaults is available upon request from the authors (i.e., group defaults).

CHARACTERISTICS OF SELECTIVE DEFAULTS

As indicated in Exhibit 5, 20% of all families experienced selective defaults, and selective defaults were much more likely among investment-grade families (15 out of 26 families or 58%) than among speculative-grade families (16 out of 126 families or 13%).

Effects of Industry and International Activities

Exhibit 6 shows the industry composition of selective defaults and multiple-entity families at default, revealing that selective defaults are disproportionately represented in the media and utilities industries relative to their overall share of multi-entity defaulting families. Interestingly, all utilities selective defaults are investment-grade defaulters, while all media selective defaults are speculative-grade defaulters. Exhibit 6 also shows that selective defaults are underrepresented among traditional high-yield sectors such as industrials, consumer goods, hotel/gaming, and energy.

While not represented disproportionately relative to their share of multi-entity families, more than 30% of selective defaults are in the telecom industry.[7] All five investment-grade telecom selective defaulters had large relatively regulated businesses, while the speculative-grade telecom selective defaulters were in the relatively less regulated industries of the telecom sector.

Focusing on the data in Exhibit 2, we see that investment-grade selective defaults were particularly concentrated among companies that were in regulated industries and had international operations. Indeed, Exhibit 7 illustrates that 60% (9 of 15) of investment-grade families with selective default had regulated telecom or utilities affiliates that had local monopoly

EXHIBIT 3

Investment-Grade Selective Defaults (at least one entity rated investment grade within three years of default)

Ultimate Parent Name	Date	Industry	International Affiliates
NORTHWESTERN CORPORATION	9/15/2003	Utilities	
GLOBAL CROSSING HOLDINGS LTD.	1/27/2002	Telecom	X
WORLDCOM, INC.	7/21/2002	Telecom	
KMART CORPORATION	1/22/2002	Retail	X
PETROLEUM GEO-SERVICES ASA	12/30/2002	Energy	
HARNISHFEGER (JOY GLOBAL)	6/7/1999	Industrial	
MIRANT CORPORATION	7/15/2003	Utilities	X
SEMI-TECH CORPORATION	9/13/1999	Consumer	X
OWENS CORNING	10/5/2000	Industrial	X
ARMSTRONG WORLD INDUSTRIES	12/6/2000	Industrial	
UAL CORPORATION	12/9/2002	Transportation	

power, while only 9% (1 of 11) of investment-grade group defaulters were similarly regulated.[8] Exhibit 7 also shows that this positive relationship between regulated affiliates and likelihood of selective default is confined to investment-grade defaulters, as there were no speculative-grade defaulters with regulated utilities or telecom affiliates.

Exhibit 8 shows the positive relationship between presence of international affiliates and likelihood of selective default. Again, the relationship is mainly confined to investment-grade defaulters as approximately 87% of investment-grade selective defaulters had international affiliates versus 46% for group defaulters. For speculative-grade families, 19% of selective defaulters had international affiliates versus 17% for group defaulters.

Effect of Family Size

Investment-grade defaulting families with selective default tended to have more affiliates. Exhibit 9 shows that the median number of rated entities at default for investment-grade differential defaulters was 13, compared to 6 for group defaulters. In contrast, for speculative-grade defaulting families, the median number of rated entities was 2 for both selective and group defaulters.

Default Scenarios for Instances of Selective Default Among Speculative-Grade Firms

Among speculative-grade defaulting families, the occurrences of selective default included two default scenarios:

- Ten of the 16 (63%) speculative-grade selective defaults involved a default at the parent company and non-default(s) at the operating subsidiaries;[9]
- Six of 16 (38%) speculative-grade selective defaults involved a default at an operating subsidiary whose credit risks were usually intentionally isolated ("ring-fenced") from the family's other entities.[10]

Effects of Bankruptcy Filings

Furthermore, defaulting families that avoided bankruptcy were more likely to incur selective default, especially for speculative-grade families. Exhibit 10 shows that 4 of 16 (25%) speculative grade selective defaults resulted in bankruptcy, while 69 of 110 (63%) speculative-grade group defaults resulted in bankruptcy. Similarly, for investment-grade families, 7 of 16 (44%) selective defaults resulted in bankruptcy, while 10 of 11 (91%) group defaults resulted in bankruptcy.

Effects of Intra-Family Debt Guarantees

Given the limitations of our dataset, we were unable to directly assess the effects of cross guarantees (or their absence) on the likelihood of differential defaults. We were able to identify the presence or absence of some form of intra-family bond guaranty, but we could not always assess the direction of those guarantees or many of the likely relevant bank loan covenants. Based on this data, we find the presence of guaranteed debt in a family is not a strong indicator of the likelihood of selective default, especially for investment-grade defaulters.[11] However, for

EXHIBIT 4
Speculative-Grade Selective Defaults

Ultimate Parent Name	Key Defaulter	Key Non-Defaulter	Date	Industry	International Affiliates
DOBSON COMMUNICATIONS CORP.	AMERICAN CELLULAR CORP.	DOBSON COMMUNICATIONS CORP.	7/15/2003	Telecom	
ALAMOSA (DELAWARE), INC.	ALAMOSA (DELAWARE), INC.	ALAMOSA HOLDINGS LLC	11/11/2003	Telecom	
US UNWIRED INC.	IWO HOLDINGS	US UNWIRED INC.	6/4/2003	Telecom	
SPECTRASITE, INC.	SPECTRASITE, INC.	SPECTRASITE COMMUNICATIONS	8/21/2002	Telecom	
NEXTEL COMMUNICATIONS, INC.	NEXTEL INTERNATIONAL	NEXTEL COMMUNICATIONS, INC.	2/1/2002	Telecom	X
WHX CORPORATION	WHEELING PITTSBURGH STEEL	WHX CORPORATION	11/15/2000	Industrial	
J. CREW GROUP, INC.	J. CREW GROUP, INC.	J. CREW OPERATING CORP.	4/9/2003	Consumer	
NUTRITIONAL SOURCING CORP.	NUTRITIONAL SOURCING CORP.	PUEBLO INTERNATIONAL INC.	9/28/2000	Retail	X
WAXMAN INDUSTRIES, INC.	WAXMAN INDUSTRIES, INC.	WAXMAN USA INC.	6/1/2000	Industrial	
PENN NATIONAL GAMING	HOLLYWOOD SHREVEPORT	PENN NATIONAL GAMING	8/1/2003	Gaming	
HUNTSMAN LLC	HUNTSMAN LLC	HUNTSMAN INTERNATIONAL LLC	11/30/2001	Industrial	
AZTECA HOLDINGS, S.A. DE C.V.	AZTECA HOLDINGS, S.A. DE C.V.	TV AZTECA S.A.	7/14/2003	Media	
LE GROUPE VIDEOTRON, LTEE	OPTEL, INC.	LE GROUPE VIDEOTRON, LTEE	10/28/1999	Media	X
TELEWEST COMMUNICATIONS PLC	TELEWEST COMMUNICATIONS PLC	TELEWEST NETWORKS LTD	9/30/2002	Media	
BENEDEK COMMUNICATIONS CORP.	BENEDEK COMMUNICATIONS CORP.	BENEDEK BROADCASTING	11/7/2001	Media	
AMERICAN LAWYER MEDIA HOLDINGS	AMERICAN LAWYER MEDIA HOLDINGS	AMERICAN LAWYER MEDIA INC.	2/27/2003	Media	

speculative-grade families, the direction of the results is as expected—104 out of 110 (95%) group defaulters had some backed or guaranteed debt(s) in the family at the time of default, while only 12 of 16 (75%) selective defaulters had backed or guaranteed debt(s). This pattern was not, however, evident among investment-grade families, where 13 of 15 (87%) selective defaulters had debt guaranteed by an affiliate, compared to 6 of 11 (55%) for group defaulters.

Moody's Ratings as Predictors of Selective Defaults

Moody's ratings are intended to reflect differences in expected loss across firms, so instances of selective default should be anticipated by rating differentials across affiliates.

Exhibit 11 presents median rating gaps between the highest rated entities and the lowest rated entities one year prior to default for selective and group defaults.[12] For group defaulters, there was typically no rating differential across affiliates—the median rating gap was zero.

For selective defaulters, the median rating gap was between four and five rating notches, over eight notches for investment-grade families and two notches for speculative-grade families. The presence of sizable rating gaps across entities within selective defaulting families is consistent with the view that Moody's ratings distinguish among differences in default risk across families' rated entities.

REGRESSION ANALYSIS

In the previous section, we documented the bivariate relationships between family characteristics and the likelihood of selective default. In this section, we use multivariate regression analysis to shed light on the relative power of specific family characteristics in explaining the likelihood of selective default. Specifically, we employ probit regressions using our sample of 152 multiple-entity families where the dependent variable equals one if the family was a selective defaulter and equals zero if the family was a group defaulter.

Exhibit 12 shows the regression results across eight different model specifications using five possible explanatory variables. Three of the explanatory variables are dummy variables for whether a family has a regulated affiliate with local monopoly power, whether it has a foreign affiliate, and whether it was an investment-grade

EXHIBIT 5

Probability of Selective Default (% of multi-entity families)

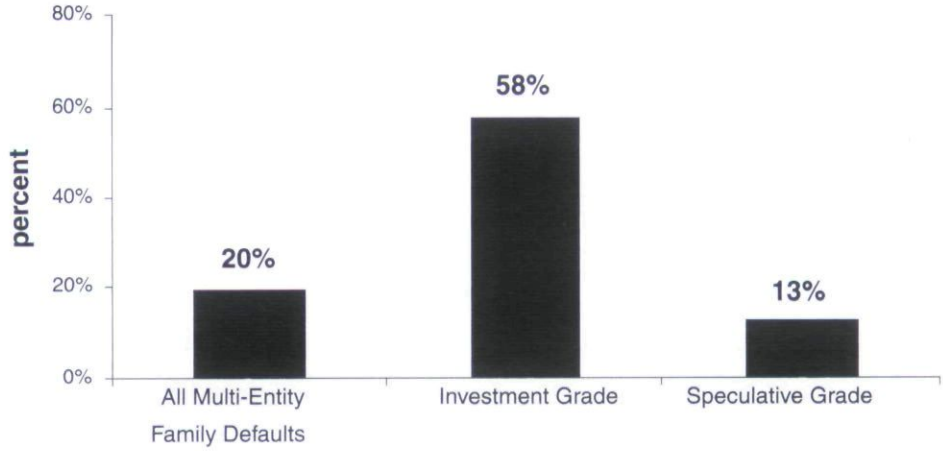


EXHIBIT 6

Selective Defaults by Broad Industry

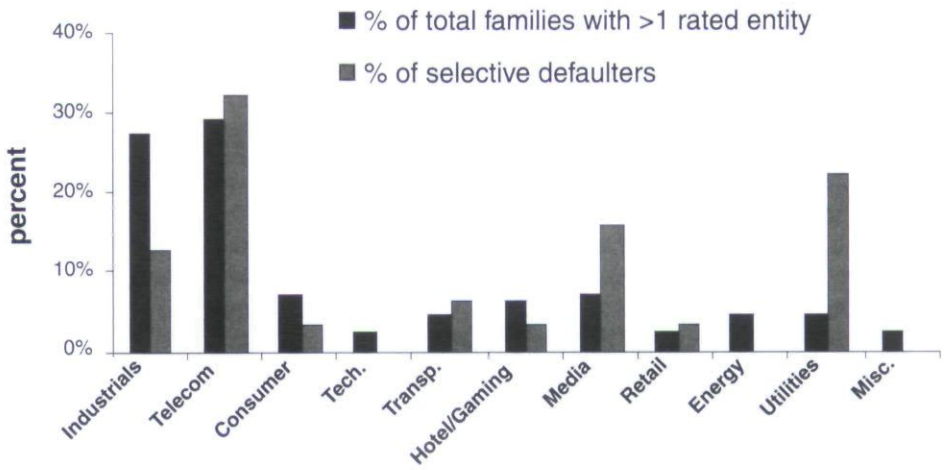


EXHIBIT 7

Presence of Regulated Affiliates

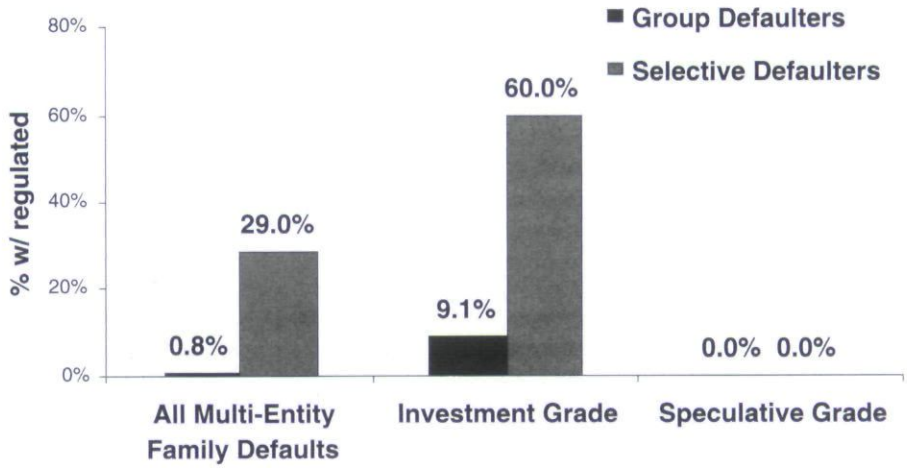


EXHIBIT 8

Presence of International Affiliates

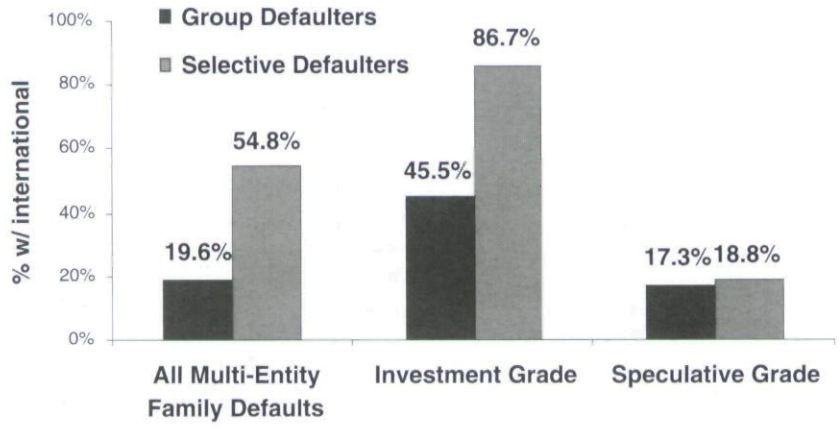


EXHIBIT 9

Median Number of Rated Entities at Default

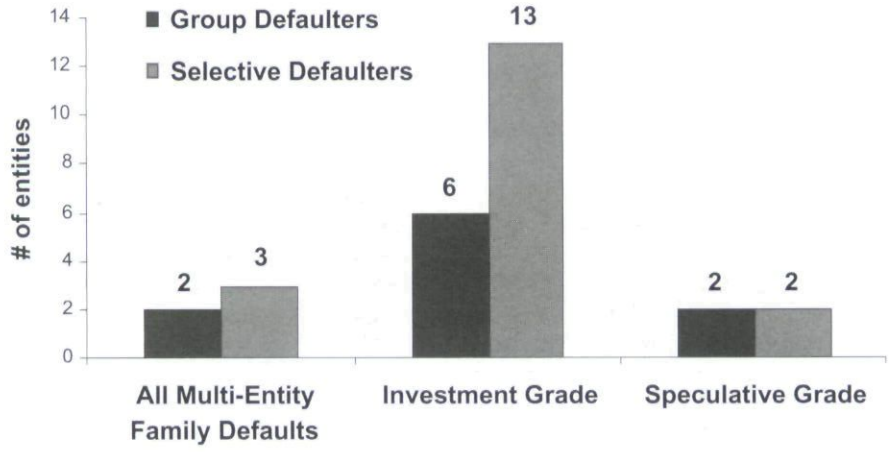


EXHIBIT 10

Families Incurring Bankruptcy

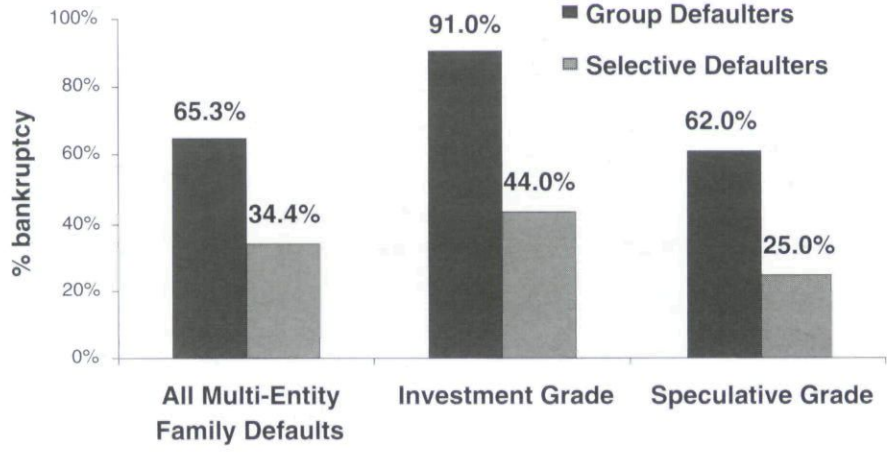


EXHIBIT 11

Median "Within Family" Senior Unsecured Rating Differentials Prior to Default

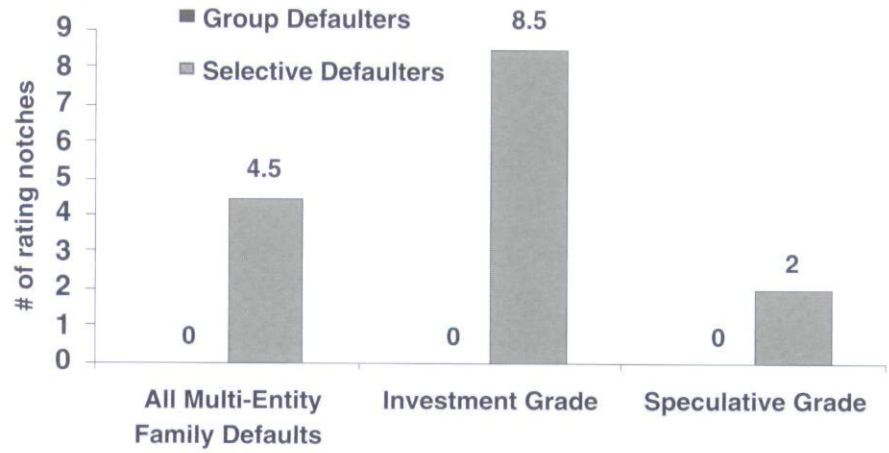


EXHIBIT 12

Probit Regression Results (sample: 152 non-financial corporate families; p-value in parentheses)

	Models							
	1	2	3	4	5	6	7	8
Variables:								
Intercept	-1.02	-1.29	-1.04	-1.15	-1.54	-1.24	-1.26	-1.58
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Regulated Affiliates	2.24					1.79	1.33	1.99
	(<.0001)					(.011)	(.077)	(.073)
Number of Affiliates		0.11				0.04	0.03	0.002
		(.001)				(.351)	(.450)	(.974)
International Affiliates			0.63			0.40	0.20	-0.12
			(.013)			(.177)	(.527)	(.762)
Investment-Grade Ratings				1.30			0.65	-0.20
				(.001)			(.094)	(.715)
Rating Gaps Across Affiliates					0.23			0.23
					(<.0001)			(<.0001)
P-Value of the Regression	(<.0001)	(<.0001)	(.063)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
R^2	.13	.11	.04	.13	.25	.16	.17	.29

defaulter. The two other explanatory variables are the number of rated affiliates in the family and the rating gap differential between the lowest and highest rated affiliates in the family one year prior to default.

Models 1-5 in Exhibit 12 are bivariate regressions and illustrate the explanatory power of the five explanatory variables in isolation.[13] For each of the models, Exhibit 12 shows the coefficient estimates and, in parentheses, the probability the estimated coefficient is equal to zero, or the p-value.[14] The p-value for the regressions as a whole and the explanatory power of each model, as given by the R^2, are shown in the last two rows for each model.[15] The results indicate that the coefficient estimates on all five explanatory variables, with the exception of the foreign affiliate dummy variable, are statistically significant and have the expected sign. Additionally, with the exception of the foreign affiliate regression, the regressions themselves are also significant. The rating gap regression

provides the most explanatory power with an R^2 of 0.25, followed by the regulated affiliate regression with an R^2 of 0.13.

Model 6 includes the regulated and foreign affiliate dummy variables, as well as the variable for the number of rated affiliates. Of the five explanatory variables we consider, these three represent the information set an analyst would have without reference to ratings. In this model, the results in Exhibit 12 indicate that only the regulated affiliate dummy is statistically significant and the model's R^2 is 0.16.

Model 7 adds to model 6 by including the dummy variable for whether the family is an investment-grade defaulter. The inclusion of the additional variable does not raise the explanatory power of the regression materially. The coefficient on the investment-grade dummy is itself only marginally significant. Moreover, the presence of the investment-grade dummy in the probit causes the regulated dummy to become only marginally significant (90% confidence level). Evidently, the regulated and investment-grade dummy variables are positively correlated and contain similar information about the likelihood of selective default.

Model 8 builds on model 7 by also including the rating gap across a family's affiliates one year prior to default. By including the rating gap, the R^2 jumps to 0.29 and the estimated coefficient on the rating gap is significant at the 99% confidence level. In this model, the coefficient on the regulated dummy remains only marginally significant, and the coefficient on the investment-grade dummy becomes insignificant and has the wrong sign.

Taken together, the regression results indicate the rating gap one year prior to default contains the most information content of the variables we examined. Indeed, model 5 which includes only the rating gap has an R^2 equal to 0.25, which increases to only 0.29 in model 8 when the other four explanatory variables are added to the regression. And the only other explanatory variable with marginal statistical significance in model 8 is the regulated affiliate dummy variable.

One interpretation of these results is that Moody's analysts, in conducting their fundamental analysis, consider information not captured by the easy-to-measure family characteristics that we have examined in this study.

CONCLUSIONS

Imperfect default correlation across family affiliates is important for investment managers and risk managers. This is the case because they need to anticipate default correlation in order to evaluate the diversification benefits of investing across affiliates and to assess the relative value of debt securities issued by different corporate entities. In this article we examined default correlation of affiliates within corporate families.

Based on an analysis of the 152 non-financial corporate families with multiple rated entities at the time of their defaults between 1999 and 2004, we found that the likelihood that at least one entity avoided default was only 20%. However, the likelihood that at least one entity avoided default was much higher for families with investment-grade ratings within three years of default (58%) than for speculative-grade firms (13%).

Characteristics that increased the likelihood that at least one affiliate avoided default included: the presence of international affiliates, the presence of regulated affiliates with local monopoly power, the presence of a media and utility industry affiliate, and a large number of affiliates in the family.

Prior to default, rating differentials within corporate families were wider on average in those instances in which some affiliates managed to avoid default than in those cases where all family members defaulted, indicating that Moody's ratings distinguish among differences in default risk across families' rated entities. Indeed, our regression results indicate that the rating gap one year prior to default contains the most information content of the variables we examined. In fact, once the information content of the rating gap was considered, the additional information content provided by the other explanatory variables was only marginal. One interpretation of this result is that Moody's analysts, in conducting their fundamental analysis, consider information not captured by the easy-to-measure family characteristics that we examined in this study.

While this article specifically addressed default correlation within corporate families, it suggests a number of related topics for future research. These include examining relative loss severities across family affiliates, further examination of intra-family guarantees, as well as additional research on the performance of credit ratings in distinguishing among credit risks across family affiliates.

ENDNOTES

[1]Among financial companies, where reputation and refunding risks are important, the legal names assigned to particular entities are thought to play a significant role in the likelihood

of default. However, for our sample of non-financial companies, we did not find that shared legal names among affiliates provided any predictive content for the likelihood of selective default.

[2]Corporate family structure thus tends to consolidate as credit quality declines on the way to default.

[3]Consequently, the results in this comment are mainly pertinent for U.S. non-financial corporates.

[4]Other investment-grade defaulters that had only one rated entity at default are not included in either Exhibit 2 or Exhibit 3. These include British Energy, W.R. Grace, Burlington Industries, Polaroid, HealthSouth, Covanta Energy, Marconi, Getronics N.V., USG Corp., and Fruit of the Loom.

[5]While there were only 26 defaulting investment-grade families, there was a total of 27 potential instances of selective default because the AES Corporation experienced two distinct default events.

[6]In several instances, the definition of family is loose in the sense that the parent did not have a majority ownership interest in the subsidiary. For example, AT&T did not have a majority ownership interest in AT&T Canada and Verizon did not have a majority ownership interest in Genuity.

[7]Interestingly, telecom families comprise approximately 17% of all non-financial corporates defaulting during the period 1999-2004, but comprise almost 30% of defaulting entities with more than one rated entity at the time of default.

[8]Our definition of "regulated affiliates" is confined to telecom affiliates with local access lines and utilities affiliates serving residences and businesses subject to regulated pricing.

[9]These families included Alamosa, SpectraSite, J. Crew, Nutritional Sourcing, Waxman, Huntsman, Azteca, Telewest, Benedek, and American Lawyer Media. In the case of Huntsman, one operating subsidiary also defaulted.

[10]These families included Dobson, WHX, Nextel, Penn National Gaming, Le Groupe Vidéotron, and US Unwired.

[11]Of course, if all the entities' debts within a family were effectively cross-guaranteed, selective defaults could not occur.

[12]The ratings used in Exhibit 11 are issuers' senior unsecured bond ratings.

[13]We also examined industry dummy variables for families with utilities, media, and industrials affiliates. In a regression specification with all three industry dummies, the only statistically significant variable was the utilities dummy. However, in a specification that included only the utilities and regulated dummies, only the regulated dummy was significant. From these results, we concluded that the information content of the regulated dummy overwhelms the content of the industry dummies.

[14]By convention, a parameter estimate is considered statistically significant if its p-value is less than .05. In other words, with 95% confidence the coefficient is not equal to zero.

[15]The p-value for the overall regression refers to the hypothesis that all of the estimated regression coefficients, including the intercept term, are different from zero.

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