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## Measuring the Quality and Consistency of Corporate Ratings across Regions

### Summary

Some market participants have expressed concern that the ratings of international rating agencies may not appropriately incorporate the unique corporate credit characteristics and institutional features associated with different geographical regions. Such failings could lead to ratings that are poorly ranked ordered within specific regions or ratings that are on average unduly high or low compared to other regions. Moody's, of course, has in place an extensive body of policies and practices to help ensure that local credit market characteristics are appropriately considered in the credit rating process and to promote high-quality ratings across a wide variety of geographical regions. Whether or not we have been successful, however, in achieving high quality, consistent ratings is ultimately an empirical question.

In this *Special Comment*, we describe how a wide variety of performance metrics can be used to assess ratings quality and consistency across regions and to answer the following questions:

- Is the meaning of *rating levels* consistent across regions as measured by loss rates, by credit spreads, and by key financial accounting ratios?
- Is *rating accuracy* similar across regions as measured by rating accuracy ratios and by the correlation between ratings and credit spreads?
- Is *rating stability* similar across regions as measured by rating action rates, large rating actions rates, and rating reversal rates?

The usefulness of these metrics is illustrated in a case study comparison of North American and Continental European ratings. We find that:

- The meaning of ratings appears to be the same in the two regions. Loss rates and credit spreads by rating category are similar across the two regions. Similarity in meaning, however, does not require similarity in determinants. We find that European industrial firm ratings are not as well explained by – and are in fact higher than would be expected from – a simple accounting-ratio-based model estimated primarily on American data.
- Compared to North American ratings, Continental European ratings have proven more accurate, providing a more powerful rank ordering of subsequent default risk, both absolutely and relative to market-based credit measures. In addition, the correlation between ratings and spreads is greater for Continental European ratings than American ratings.
- Continental European ratings and North American ratings exhibit very similar stability properties.

Ratings in Continental Europe and North America, therefore, appear to have generally consistent meanings and stability properties, and European ratings have demonstrated similar – if not stronger – accuracy than have American ratings.

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## Introduction

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Moody's and other international rating agencies have in place an extensive body of policies and practices designed to help ensure the quality and consistency of its ratings across a wide variety of geographical regions.<sup>1</sup> Despite these frameworks, skeptics abound. For example, according to one observer,

“companies and financial institutions on the [European] Continent... criticize [the international rating agencies for failing] ... to take into account the special characteristics in European accounting, disclosure, and management practices.”<sup>2</sup>

Other commentators have adopted an even more strident tone, criticizing international agencies for applying “Anglo-Saxon methodologies” when assigning ratings in non-Anglo-Saxon countries. Typically, such critics do not specify the exact nature of the problem – whether it is that international agencies do a *poor job rank ordering* credits in non-Anglo-Saxon countries or simply *rate them too low*. Both criticisms are potentially legitimate concerns. Moody's, of course, tries to take regional characteristics into account when assigning ratings; however, its success in doing so is ultimately an empirical question.

However, the concern about the use of a single global methodology, rather than locally differentiated methodologies, may be misplaced, at least if one is willing to make a semantic distinction between a rating *methodology* and its *application*. At the broadest conceptual level, we believe that rating agencies should apply the same rating methodology to all corporate borrowers in all regions. Ratings should reflect the relative likelihood that a company will service its debt on a timely basis and the likely severity of loss in the event of default. Ratings should be based on a company's fundamental credit characteristics – as revealed through its financial statements, market position, and forecasted future financial performance – and on the likelihood it would receive financial support in distress from its suppliers, distributors, labor forces, owners, creditors, and government.

Regional distinctions, however, are critically important when applying this global methodology. Local expertise is likely to be quite valuable in rendering judgments about the meaning of financial statements, the macroeconomic and financial environment, and potential sources of support. Moreover, regional bankruptcy regimes may influence the incentives of issuers to service their debts and the incentives of other market participants to provide financial support in times of distress.

Although most rating committees include analysts that reside with the same region as the issuer, Moody's rating committee decisions are at times seen as controversial by local market participants. Occasionally, critics assert that these differences in opinion are systematic, reflecting either a methodological bias or general misunderstanding of the local environment. Moody's values these criticisms and seeks to better understand their nature through ongoing dialogue with local market participants.

The validity of these criticisms, however, cannot generally be determined by analytical discussions alone, just as the accuracy or inaccuracy of any individual rating can never be proven. On the other hand, systematic errors can be uncovered through empirical research.

In the rest of this *Special Comment*, we discuss the wide variety of metrics that can be used to measure ratings quality and consistency across regions, and we apply these metrics to a comparison of corporate ratings in North America and Continental Europe.

## Measuring Quality and Consistency

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When evaluating ratings quality and consistency, Moody's compares three rating system characteristics across regions:

- Is the meaning of *rating levels* consistent across regions as measured by loss rates, credit spreads, and key financial accounting ratios?
- Is *rating accuracy* similar across regions as measured directly by the correlation between ratings and defaults and indirectly by the correlation between ratings and credit spreads?
- Is *rating stability* similar across regions as measured by rating action rates, large rating action rates, and rating reversal rates?

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1. “Promoting Global Consistency for Moody's Ratings,” *Moody's Rating Methodology*, May 2000.

2. Klaus Engelen, “Das Empire Strikes Back,” *The International Economy*, Winter 2004, p 69.

## RATING LEVELS

Are ratings too high in one sector region relative to another? While Moody's does not attach specific cardinal meanings to its corporate rating categories, over long periods of time, expected credit loss rates should be similar across regions for each rating category; otherwise, the meaning of a rating in one region would systematically differ from its meaning in another. Three tools are available for comparing rating levels across regions – realized loss rates by rating category, relationships with credit spreads, and relationships with key financial accounting ratios.

### *Loss Rates*

Perhaps the most natural way to test rating consistency is to compare loss rates by rating category across regions. Loss rates themselves can be decomposed into two components, default rates and loss-given default rates. These statistics represent a key reference point for any study of rating consistency.<sup>3</sup> For many regional comparisons, however, the available data sets on defaults, losses, and rating histories are too small for strong statistical inference, particularly for investment-grade credits. In particular, the presence of large and persistent regional shocks to default rates implies that consistency can be meaningfully tested only if the data sets cover large numbers of firms with rating histories spanning a large number of credit cycles.<sup>4</sup>

As a practical matter, even when default data are plentiful, statistically significant regional differences in realized loss rates can generally be identified only within the speculative-grade-rating categories. As a consequence, the regional consistency of the meaning of investment-grade ratings may be better judged through indirect means – by comparisons to alternative risk measures such as those derived from CDS prices or from accounting ratio-based risk models.

### *Credit Spreads*

Rating consistency can also be indirectly tested through regional comparisons of the relationships between actual credit ratings to credit spreads. Rating inconsistencies might give rise to systematic regional differences in credit spreads by rating category. For example, bond spreads or CDS prices might consistently trade at levels that suggest the market implicitly “rates” issuers within a given rating category higher in one region than in another.

The use of credit spreads for tests of rating consistency across regions depends critically on two rather strong assumptions:

- the market itself evaluates relative credit risk equally well across the two regions, and
- the price of credit risk, as measured by credit spreads, is the same in the two markets

The first assumption may be impossible to test except in the long run with a large dataset on credit spreads and defaults. The second assumption does, however, appear to be valid in the CDS market: Market-It-Partners, the leading vendor of CDS spread data, treats quotes from North American, Continental European, and British dealers on individual names as fully comparable, regardless of the quotes' currency denominations, when calculating composite quotes for individual names.<sup>5</sup>

### *Key Financial Ratios*

One can also indirectly test rating consistency by comparing the relationship between ratings and key financial ratios across regions. Rating inconsistencies might give rise to systematic differences in these relationships. For example,

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3. Prior research along these lines has generally concluded that Moody's U.S. and non-U.S. ratings imply similarly levels of default risk:

- “Controlling for year of issue and rating...we do not find significant differences in default rates between US and [non-US] firms.” See, John Ammer and Frank Packer, “How Consistent Are Credit Ratings?: A Geographical and Sector Analysis of Default Risk,” Board of Governors of the Federal Reserve System, International Finance Discussion Papers, # 668, June 2000.)
- “For a given credit rating...the difference between [default rates] for US firms and those domiciled in other countries seems to be insignificant.” See, Arturo Estrella, et. al., “Credit Ratings and Complementary Sources of Credit Information,” Basel Committee on Banking Supervision, Working Paper No. 3, August 2000.

4. For a theoretical and empirical analysis of these issues, see:

- Richard Cantor and Eric Falkenstein, “Testing for Rating Consistency in Annual Default Rates,” *Journal of Fixed Income*, September 200; and
- John Ammer and Frank Packer, “How Consistent Are Credit Ratings?: A Geographical and Sector Analysis of Default Risk,” Board of Governors of the Federal Reserve System, International Finance Discussion Papers, # 668, June 2000.

For additional examples of regional and sector comparisons of default rates, see the following Moody's Special Comments, see:

- “Default and Recovery Rates of Asia-Pacific Corporate Bond Issuers, 1990-2003”, August 2004;
- “Default and Recovery Rates of European Corporate Issuers, 1985-2003,” March 2004;
- “Default Rates of Canadian Corporate Bond Issuers, 1989-2003,” April 2004; and
- “Sovereign Bond Defaults, Rating Transitions, and Recoveries (1985-2002),” February 2003.

5. While CDS quotes a direct method of inferring market-based credit risk opinions, bond spreads can also be useful when there is a need for broader coverage and longer history. In order to make bond market credit spreads – and, hence, bond-implied ratings – comparable across regions, we convert all bond yields to spreads over US Treasuries, adjusting for regional differences in interest swap rates for non-US-dollar-denominated securities. (For more details, go to [www.moodys.com](http://www.moodys.com).) These adjustments appear to be sufficient to align the meanings of bond yields across regions: we find that, for the many companies that issue bonds in multiple regions, their market-implied ratings in one currency are unbiased predictors of their market-implied ratings in other currencies.

within a given rating category, leverage might be systematically higher or interest coverage might be systematically lower in one region compared to another.

Such comparisons implicitly assume similarity across regions in accounting practices and similarity in the qualitative factors that affect credit. Alternatively, systematic differences between ratings and financial ratios may not point to ratings inconsistencies. Rather, such differences may in fact provide evidence that systematic differences in qualitative factors – reflecting regionally distinct accounting practices, bankruptcy law, or levels of implicit government or bank support for borrowers – are being incorporated into the relative ratings assigned in each region.

## ACCURACY

The rank ordering of credit risk implied by ratings should provide powerful explanations of subsequent default experience within each region. Moody's key measures of the accuracy of its rating system are the cumulative accuracy profile (CAP) and its associated accuracy ratio (AR). These metrics measure the ability of ratings to differentiate between issuers that default and those that do not default. They provide simple summary measures of the correlation between ratings and subsequent default experience. They can be measured over any horizon; however, when data is sufficient, long horizons provide more meaningful tests of rating accuracy. For more detail on the derivation and interpretation of CAP plots and ARs, see "The Performance of Moody's Corporate Ratings," *Moody's Special Comment*, April 2003.

Using these metrics, one can compare the accuracy of ratings in different regions. Ratings in regions are more accurate if they demonstrate higher accuracy ratios, particularly over long investment-horizons. Some observed differences in accuracy, however, may reflect differences in the fundamental credit environments – that is, the ease or difficulty of ranking credit risk across regions – rather than differences in the quality of the rating agency's methodologies or understanding of credit risk in different regions. For example, depending on the usefulness of the prevailing accounting in regimes for the analysis of credit risk, it might be easier to rank order credit risks in one region or another.

As a check against the possibility that differences in accuracy reflect differences in credit environment rather than differences in the quality of rating analysis, Moody's regularly compares the performance of its ratings to that of other credit risk measures, particularly ratings inferred from bond market credit spreads.<sup>6</sup> If ratings accuracy metrics were different across regions, but the accuracy metrics of market-based indicators were similar, then it is more likely that the performance differences reflect regional differences in the quality of ratings rather than differences in intrinsic credit environments.

CAP plots and ARs have, however, two important limitations. One, they convey little information about rating accuracy when historical default data are sparse. Two, they have little bearing on the quality of most investment-grade ratings, since investment-grade issuers rarely default over short- and medium-term horizons. For both these reasons, we supplement these metrics with indirect evidence on accuracy based on the correlation of ratings and CDS spreads. A low correlation between ratings and market opinion in one region compared to another might indicate a systematic difference in rating accuracy. That presumes, of course, that the market's rank ordering of risk is essentially right. If the market has it wrong, then ratings should be weakly correlated with market opinions.

## STABILITY

Moody's also intends its ratings to be stable measures of relative credit risk, changing in response to enduring changes in an issuer's credit risk profile. To a large extent, Moody's desire for stable ratings reflects the view that more stable ratings are "better" ratings. Moody's ratings should change when relative credit risk – as measured by fundamental credit analysis – changes. Fundamental credit analysis incorporates an evaluation of franchise value, financial statement analysis, management quality and plausible scenario analysis. Since relative fundamental credit risk generally changes quite slowly, if ratings are highly volatile, they are unlikely to closely track relative fundamental creditworthiness.

The stability of Moody's ratings also facilitates their use in the market. Financial market participants regularly use ratings in security selection and portfolio composition and have imbedded ratings throughout the economy's financial architecture – in portfolio governance, in performance attribution, in the regulation of financial markets and institutions, and in financial contracts and covenants.<sup>7</sup> Rating changes can have substantial economic consequences for a

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6. We rely on bond market data because our CDS data covers fewer firms (very few speculative-grade names) and a much shorter history (since 2003).

7. Because these rating-based governance rules and financial triggers are in place, investors, issuers and financial regulators all generally have a strong preference for stable rating systems. When many market participants employ similar ratings-based triggers or governance rules, rating agencies to some extent end up playing a gatekeeper role in the capital markets. Rating upgrades can at times make it much easier for individual issuers to access large pools of debt capital and rating downgrades can have the opposite effect. The effects of such changes in market access can be difficult to reverse: easier access may lead to increased fixed investment, and more difficult access can lead to downsizing or, in extreme cases, default. In such a context, large and, perhaps transient, rating changes can be very harmful.

wide variety of debt issuers and investors. As a result, Moody's changes ratings only when an issuer's relative fundamental creditworthiness has changed and the change is unlikely to be reversed in a short period of time.

Over long periods of times, ratings should exhibit similar levels of volatility across regions. For large regions, sufficient ratings data are generally available to make direct comparisons of rating stability meaningful. To measure rating stability, Moody's tracks the following volatility metrics, each measured over twelve-month intervals:

- **Rating Action Rate.** The share of issuers that had rating changes within the past year.
- **Large Rating Change Rate.** The share of issuers whose ratings changed within a given year by three or more rating notches. The change may represent a one-time move of three or more notches or it may represent smaller changes that, when added to changes within the past twelve months, add up to three or more notches.
- **Rating Reversal Rate.** The share of rating changes that are reversed, at least in part, within a year.

Differences in these measures from region to region over long periods of time may indicate differences in the quality of ratings in those regions. Comparisons against market-based credit indicators – as a control for potential differences in credit environments – are less useful for measuring relative stability than for measuring relative accuracy, because market-based measures are typically an order of magnitude more volatile than ratings in all credit environments.<sup>8</sup>

## Case Study Comparing North American and Continental European Ratings

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The following sections compare corporate rating levels, accuracy and stability across two large sectors, North America and Continental Europe.<sup>9</sup>

### RATINGS HAVE SIMILAR MEANINGS IN EUROPE AND AMERICA

Two key metrics – loss rates and market-based ratings comparisons – forcefully suggest that ratings assigned to North American and Continental European issuers share similar meanings. Within a given rating category, European industrial firms generally appear to have weaker financial ratios, perhaps reflecting a more positive profile with respect to qualitative factors for European credits.

#### *Loss Rates Are Similar*

Exhibit 1 compares three-year cumulative default rates in Europe and North America over the 1990-2003 period. (Results for longer horizon are not very meaningful for Europe since its speculative-grade market did not develop until the late 1990s.) Overall default rates are higher in America than in Europe because the speculative grade sector is much larger in America. Within individual speculative-grade categories, default rates are remarkably similar across regions. Within investment-grade, the differences in default rates are economically small and statistically indistinguishable. If, for example, there had been just one more Baa defaulter in Europe, the Baa default rates would have been higher in Europe. In Appendix A, we compare cumulative default rates at multiple horizons and demonstrate that observed differences in default rates are not significant across regions through regression analysis.

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8. Nevertheless, there may be circumstances when it may be useful to compare changes in agency rating volatility to changes in market-based credit risk measure volatility. For example, during the Asian Financial Crisis, when agency rating volatility certainly increases, market-based credit measures swung even more widely. For more information, see "White Paper: Moody's Rating Record in the East Asian Financial Crisis," Moody's Special Comment, May 1998.

9. Our conclusions with regard to regional consistency for these two regions are not necessarily indicative of the results that would obtain for other regional comparisons. In particular, a comparison of realized default rates by rating category in Japan and with those of the rest of the world would undoubtedly suggest greater inconsistency since, to date, only one rated issuer has ever defaulted on bonds in Japan.

## Exhibit 1

### Three-Year Cumulative Default Rates: 1990-2003

	Continental Europe	North America
Aaa	0.0%	0.0%
Aa	0.0%	0.0%
A	0.1%	0.2%
Baa	0.8%	1.0%
Ba	7.7%	5.6%
B	23.5%	20.8%
Caa-C	59.2%	44.8%
All Investment-Grade	0.1%	0.5%
All Speculative-Grade	25.7%	16.9%
All Corporates	1.9%	6.8%

Although these results might in and of themselves seem to be conclusive – the evidence from historical default rates do not suggest that ratings are regionally inconsistent – realized default rates could in theory be similar by rating category and yet expected default rates might still be different across regions. This might be the case if ratings were systematically lower relative to credit risk in Europe compared to America, but a macroeconomic shock – the bursting of the new economy bubble, for example – occurred that had a disproportionate effect on Europe because the growth of its speculative-grade sector was concentrated during that period. In the Appendix, we demonstrate that Europe default rates by rating category are statistically indistinguishable from American default rates, even after controlling the macroeconomic environment through annual dummies.

Our analysis of loss rates, however, is not complete. While default rates by rating category appear similar, if differences in loss-given-default rates were systematic across regions, the meaning of the rating levels across regions might still be different. Exhibit 2 indicates that loss-given-default rates have been very similar in the two regions, though slightly higher in Europe, both on a gross aggregate basis and after controlling for the security class of the bond, the industry of the issuer, and the year of the default. (For more information, see the Appendix.)

## Exhibit 2

### Loss-Given-Default Rates on Bonds: 1996-2003

	Continental Europe	North America
Unconditional LGD	68.4%	66.4%
LGD Controlling For:*		
Security Class	70.7%	64.3%
Security Class and Industry	66.7%	62.0%
Security Class, Industry and Year	61.7%	56.5%

\* The impacts of these controls in regression analysis that appears in Appendix B.

Realized loss rates – the product of default rates and LGD rates – by rating category have, therefore, been remarkably similar in North America and Continental Europe. In other studies, we have observed that realized loss rates often differ substantially across sectors because industry- and region-specific shocks vary over time. In those studies, we have argued that one cannot directly infer that ratings in different sectors have different meanings simply because their associated loss rates have been different. Using the same logic, one cannot be certain that ratings in different regions have the same meaning just because they have been associated with similar loss rates. Such similarity can also occur just by chance. We should, therefore, review other metrics to confirm or to challenge our view that ratings have similar meanings in the two regions.

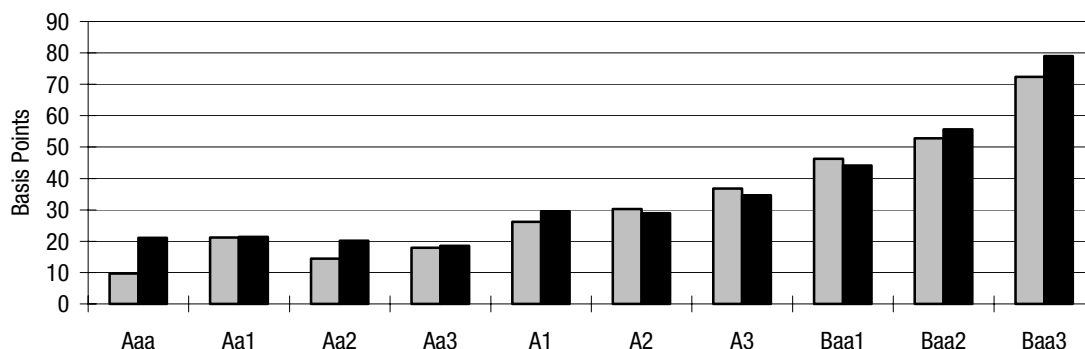
### ***Credit Default Swap Spreads by Rating Category Are Similar in Each Region***

In this section, we show that the credit default swap market supports the view that ratings have consistent meanings across the two regions. In particular, we show that CDS spreads typically associated with each rating category are similar for North American and Continental European names. The meaningfulness of this test of consistency depends, of course, on the assumption that the market appropriately ranks credit risk in both regions.<sup>10</sup>

Exhibit 3 presents the generally similar relationship between median CDS spreads by rating categories for investment-grade European and American issuers. Exhibit 4 presents a regression of CDS spreads against investment-rated rating dummies, revealing the average CDS spread by rating category during the 2003 and 2004.<sup>11</sup> In addition, a series of “adjustment factors” are multiplied against the rating dummies to capture effects that might cause spreads to be proportionally higher or lower depending on the whether the issuer’s rating is under review or has a positive or negative outlook, or if the issuer has a European domicile. As expected, negative (positive) rating reviews and outlooks increase (decrease) CDS spreads by rating category. However, having a European domicile does not have an economically significant effect (only 3%) on CDS spreads and that difference is not at all statistically significant (standard error = 3%).<sup>12</sup>

### Exhibit 3

**Median CDS Spreads for Investment-Grade Issuers**  
Nov 2003 – July 2004



### Exhibit 4

## CDS Spreads Are Similar Within Investment-Grade Rating Categories for Continental European and North America Issuers

Estimation Method: Nonlinear Least Squares

Model:  $CDS\ Spread = [a*Aaa + b*Aa1 + c*Aa2 + d*Aa3 + e*A1 + d*A2 + e*A3 + f*Baa1 + g*Baa2 + h*Baa3] * [1 + i*Reviewdown + j*NegOutlook + k*PosOutlook + l*ReviewUP + k*European\ Domicile]$

Dummy Variable	Estimated Coefficient	Standard Error	Count of Monthly Issuers Per Rating Category	
			European Issuers	American Issuers
Aaa	16.16	3.28	6	13
Aa1	17.57	3.47	7	5
Aa2	18.39	2.68	15	11
Aa3	18.25	1.70	31	20
A1	25.06	1.54	22	34
A2	26.72	1.39	22	54
A3	37.72	1.27	25	73
Baa1	44.75	1.21	22	80
Baa2	56.47	1.20	18	103
Baa3	88.22	1.56	9	89
On Review for Downgrade	0.80	0.05		
Negative Outlook	0.54	0.03		
Positive Outlook	-0.25	0.04		
On Review for Upgrade	-0.28	0.06		
European Domicile	-0.03	0.03		

Omitted dummy: American domicile, stable outlook.

Sample: Month-end composite quotes on 5-year CDS contracts provided by Mark-It Partners with "modified-modified" restructuring clauses, November 2003 - July 2004.

Key Result: estimated coefficient on European dummy is economically and statistically insignificant

10. Our data source on CDS spreads is Mark-It Partners, the leading price vender for the CDS market. Our analysis is based on its “composite” prices, which are formed from multiple bids that are contributed daily by a large number of commercial banks and investment banks. While individual bank quotes are sometimes expressed either in euros or in dollars, Market-It Partners believes there is no systematic currency premium in the CDS market – at least between euros and dollars – and hence quotes a single composite spread for an individual name, which is intended to represent pricing in both currencies.

11. Note that the differences across the estimated spreads for Aa1-, Aa2-, or Aa3-rated issuers are statistically insignificant. This suggests either that the data set on Aa issuers is too small to detect the true underlying pattr, the market does not agree with Moody’s ordering of r risk within that portion of the rating scale or simply that the risk compression within the Aa rating category to distinguish statistically.

12. The evidence that domicile effect is insignificantly different from zero is even stronger than it might at first appears because these standard errors are likely to be underestimated because the use of repeat, monthly observations for individual names. The resulting correlation in errors across observations of the same issuer implies the number of independent observations is considerably fewer than implicitly assumed in the standard error estimation.

### *Relationships with Financial Ratios Suggest Rating Drivers Vary Across Regions*

As mentioned in the introduction, for ratings to be consistent across regions they should share a common conceptual framework – common meanings and common potential drivers – but the application of that framework is likely to be quite different in response to local market circumstances. For example, compared to companies in North America, many more companies in European countries can be expected, when in distress, to benefit from implicit and explicit support from their governments, suppliers, distributors, labor force, owners, and creditors. Therefore, we might expect that some European companies could be rated higher than their American counterparts even if they appear to have the same financial profile. Moreover, if accounting regimes vary in material ways, we should see systematic differences in the relationships between financial ratios and ratings across regions.<sup>13</sup>

Exhibit 5 indicates that the relationship between financial ratios and ratings is, in fact, very different in Continental Europe than in North America. These differences may result from the relatively small sample of European firms or from a very different emphasis in the determinants of American or European ratings. In particular, within each rating category, European firms are typically larger with otherwise weaker financial profiles – leverage, coverage, earnings and margins. The importance of size in Europe may reflect the more durable safety net that may be available to large European firms.

### **Exhibit 5**

#### **Median Financial Ratios by Rating Category: '90-'03**

	<b>Total Revenue (\$ billions)</b>	<b>Return on Assets</b>	<b>Operating Margin</b>	<b>Total Debt / Total Assets</b>	<b>Interest Coverage</b>
<b>North American Industrial Firms</b>					
Aaa	28.8	9.4%	10.9%	24.2%	23.72
Aa	12.5	6.7%	8.4%	27.4%	12.41
A	8.3	4.7%	6.6%	30.5%	9.83
Baa	4.6	2.7%	3.8%	33.3%	6.80
Ba	2.2	1.6%	3.4%	43.4%	5.61
B	1.0	-3.2%	-17.8%	61.5%	2.24
<b>Continental European Industrial Firms</b>					
Aaa	17.09	1.4%	2.2%	30.2%	5.00
Aa	26.05	3.5%	5.4%	24.3%	10.62
A	25.16	3.0%	4.7%	30.1%	7.04
Baa	13.32	0.6%	0.9%	35.6%	13.44
Ba	5.32	-0.7%	1.9%	28.7%	4.76
B	4.19	-2.0%	-16.2%	43.7%	2.74

*Operating Margin = Operating Income / Total Revenue*

*Interest Coverage = Net Income Before Depreciation / Interest Expense*

*Conclusion: Relationship between financial ratios and ratings is less tight in Europe, due either to a different "model" for Europe, more prevalent amount of external support, or simply due to the smaller sample size.*

13. Differences in accounting regimes can often paint very different financial pictures, and many companies provide financial statements based on only one accounting standard. Differences, however, can be large. For example, Euro Disney reported for the period ending September 2003 debt of 864 million euros (\$1 billion) and shareholders equity of 1.1 billion euros (\$1.2 billion) under French accounting standards, while at the same time reporting \$2.5 billion in debt and only \$69 million of shareholders' equity on US GAAP basis. (See "The Overleveraged Disneyland: Will Disney Take Losses in France?," *The Wall Street Journal*, March 26, 2004.)

Exhibit 6 presents a very simply highly stylized model of rating determinants. Using the ordered probit regression technique, one can infer the average relationship between ratings and a standard set of key financial ratios. When a dummy variable is added to the regression, its estimated coefficient is positive and significant, suggesting that European firms are rated somewhat higher than their simple financial ratios alone would suggest, using a model based primarily on American firm ratings and financial variables.

### Exhibit 6

#### Ordered Probits Explaining North American and Continental European Industrial Ratings

	Regression Without European Dummy		Regression With European Dummy	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Total Revenue	0.125	0.004	0.117	0.004
Return on Assets	1.474	0.080	1.513	0.080
Operating Margin	0.009	0.002	0.009	0.002
Total Debt / Total Assets	-2.119	0.042	-2.098	0.042
Interest Coverage	0.026	0.005	0.026	0.005
European Firm Dummy	—	—	0.464	0.040

Sample: 2,111 and 132 unique American and European firms, ratings observed over 1990-2003, implying 11,355 and 676 annual rating observations, respectively.

Note: "positive" effect imply higher ratings

Conclusion: European firms have higher than expected rates based on a simply accounting ratio-based ratings prediction model.

In conclusion, the available evidence suggests that the latent “models” used to rate European and American firms are different.

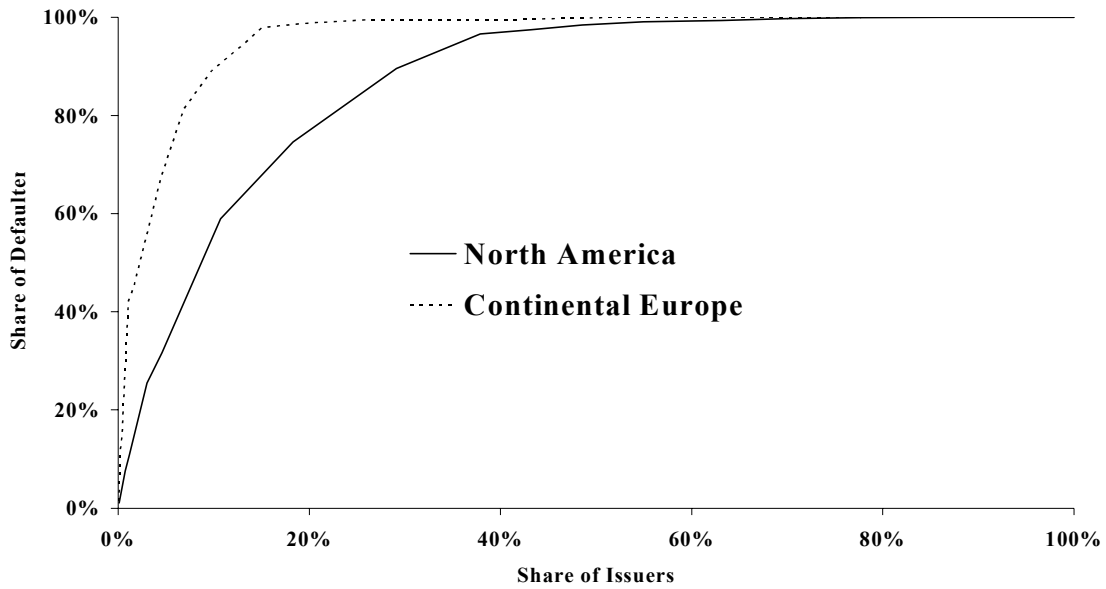
### RATINGS RANK ORDER RISK BETTER IN EUROPE THAN IN NORTH AMERICA

#### *Cumulative Accuracy Profiles Favor European Ratings*

Compared to North American ratings, European ratings have historically been more accurate at predicting relative 1-year and 3-year default risk, as indicated by the cumulative accuracy profiles, which are presented in Exhibits 7 and 8. As indicated, at both the 1-year and the 3-year horizon, virtually all European defaulters – as compared to only 60% to 70% of all American defaulters – carried ratings that were among the 20% lowest rated issuers in the region.

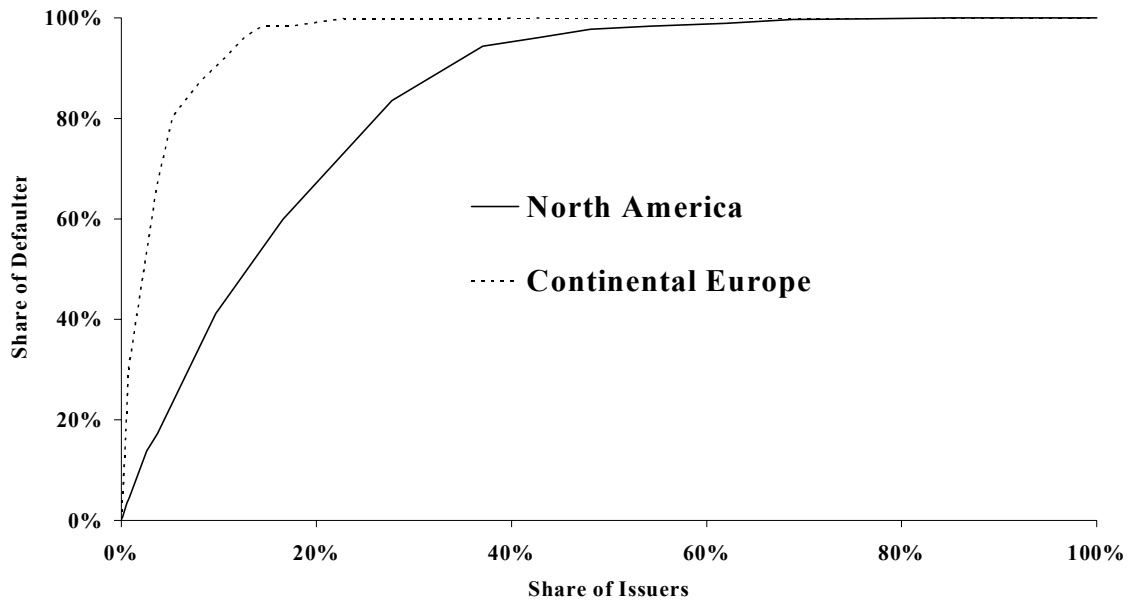
### Exhibit 7

#### 1-Year-Horizon Cumulative Accuracy Profiles: 1990-2003



### Exhibit 8

#### 3-Year-Horizon Cumulative Accuracy Profiles: 1990-2003



### *Accuracy Ratios Are Higher for European Ratings*

Why have European ratings provided more powerful rank orderings of credit risk compared to American ratings? Is it because Moody's analytical practices are better in Europe or because relative risk is simply easier to judge in Europe? The following exhibit presents data which suggests the correct answer may be "some of each."

Exhibit 9 presents the one-year and three-year accuracy ratios (ARs) associated with the cumulative accuracy profiles shown in the prior exhibit. During 1990-2003, the European AR exceeded the American AR by 15.8% and 23.5%, over the one-year and the three-year horizons, respectively. However, a little more than half of these whopping differences appear to reflect a more transparent risk environment in Europe. In particular, during 1999-2003 (when we have bond-implied rating information available), Moody's one-year and three-year accuracy ratio gap relative to bond-implied ratings was 6.0% and 11.8% higher in Europe than in America, respectively.

#### **Exhibit 9**

#### **Accuracy Ratios for Continental European and North American Ratings: Absolute and Relative to Bond-Implied Ratings**

	Continental Europe	North America	Difference
<b>Accuracy Ratios (ARs): 1990-2003</b>			
1-Year Horizon	91.7%	75.9%	15.8%
3-Year Horizon	92.0%	68.5%	23.5%
<b>Moody's AR less Bond-Implied AR: 1999-2003</b>			
1-Year Horizon	-4.10%	-10.10%	6.0%
3-Year Horizon	6.70%	-5.10%	11.8%

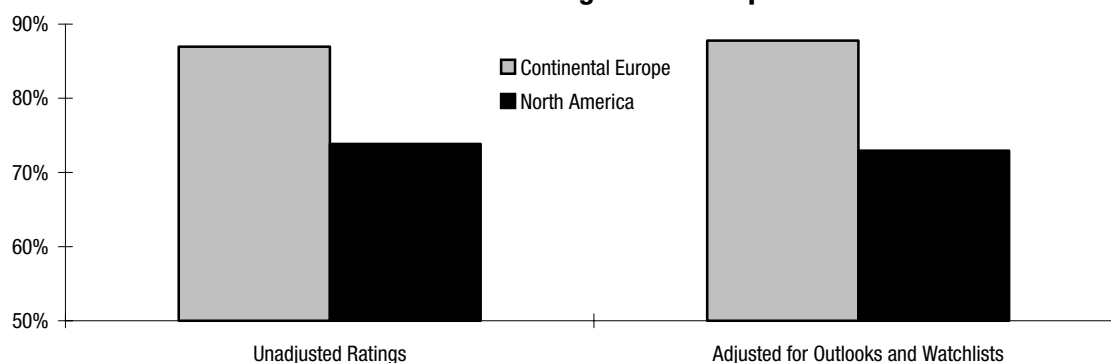
### *Correlations between Ratings and Credit Default Swap Spreads Are Also Higher in Europe*

Exhibit 10 compares the rank order correlation between investment-grade ratings and CDS spreads for European and for American names. The dataset is the same as that underlying Exhibits 3 and 4. Correlations are calculated for each month-end, from Nov 2003 to July 2004, and then averaged across those nine months. European ratings are more correlated with spreads than American ratings, 87% vs. 74%, respectively.

These calculations do not take into account, however, the impact that rating Outlooks and Watchlist designations are likely to have on spreads. As shown in previous research, issuers with positive (negative) outlooks on average default at a similar rate as issuers rated one alpha-numeric-notch higher (lower) with stable outlooks, and those on positive (negative) rating review tend to default as those rated two notches higher (lower).<sup>14</sup> The impact of such rating adjustments on the correlation is also depicted in Exhibit 10. European ratings remain more strongly correlated with spreads compared to American ratings, 88% vs. 73%, respectively.

#### **Exhibit 10**

#### **Spearman Rank Correlations between Investment-Grade Ratings and CDS Spreads**



### **RATING STABILITY IS SIMILAR ACROSS THE TWO REGIONS**

Moody's manages its rating system with two objectives – rating stability and rating accuracy – because both characteristics enhance the utility of ratings for most investors.<sup>15</sup> Other things being equal, ratings that are more stable are

14. See "Rating Transitions and Defaults Conditional on Watchlist, Outlook and Rating History," Moody's Special Comment, February 2004.

higher quality ratings. In addition, the frequency of rating reversals (rating changes that are reversed within one year) may be a useful indicator of whether or not a rating agency “understands” the drivers on credit risk within a particular region. Exhibit 11 indicates quite clearly that rating stability is quite similar in Europe and North America. If anything, ratings are slightly more stable in Europe, which is consistent with the greater proportion of investment-grade in Europe relative to North America. The higher rating accuracy that we have observed for European issuers, therefore, appears to have been achieved without increasing rating volatility.

### Exhibit 11

#### Rating Volatility Metrics for Continental European and North American Ratings: 1990-2003

	Continental Europe	North America
Rating Action Rates (share of issuers each year)	22.0%	22.9%
Large (3+ notch) Rating Action Rates (share of issuers each year)	5.8%	6.4%
Rating Reversal Rates (share of rating changes each year)	5.7%	5.8%

## Conclusions

To achieve high quality, consistent ratings, agencies need to apply global standards while at the same time being sensitive to regional differences in accounting practices, bankruptcy regimes, competitive environments, and the likelihood of financial support to firms in distress by suppliers, customers, banks, and governments.

There are many ways to test whether ratings in different region have similar meanings and quality. The critical areas of focus are similarity of meaning with respect to loss rates, the accuracy or power of the rating system, and the stability of the rating system. Comparisons to market-implied risk measures are particularly useful, both because they can be used to control for potential differences in credit environments across regions and because they can shed light on the quality of investment-grade ratings, even in the absence of defaults. Having said that, it should be recognized that comparisons to market-based measures implicitly assumes the market “has it right,” which may be a false assumption. It is also instructive to compare the relationship between ratings and key financial ratios across regions, although interpretations of observed differences need to be considered with care.

Our case study comparison of the performance of North American and Continental European ratings has less ambiguous conclusions than can normally be expected for other regional comparisons because both realized loss rates and CDS pricing by rating category were remarkably similar across the two regions. Some interesting findings did, however, emerge which should prompt future research. First, traditional financial strength measures are generally stronger by rating category for American firms than European firms, except for size, perhaps reflecting the benefit of an expected strong support network for European issuers that enter financial distress. Second, rating accuracy has been substantially higher for European ratings, both absolutely and relative to market-implied ratings, compared to American ratings. Moreover, this higher accuracy has been achieved with similar, if not more, rating stability in Europe. In interpreting these conclusions, however, one should keep in mind the inevitable limitations of such a study, which include the size of the datasets, the quality of the data (particularly the credit spread data), and differences in industry composition (which were not controlled for) between to two regions.

15. The importance of rating stability and its interaction with rating accuracy is discussed at length in “The Tradeoff between Rating Accuracy and Stability,” Moody’s Special Comment, September 2004.

## Appendix: Comparing Default Rates and Loss-Given-Default Rates in North America and Europe

In the body of the text, we highlighted the remarkable similarity between three-year cumulative default rates in Continental Europe and North America. In Exhibit A1, we show that default rates are similar at other horizons as well. Default rates are, however, slightly lower for Aa, A and Baa European issuers at the five-year horizon, but the significance of this finding is low because of the small sample size of European issuers with rating histories at least five years long.<sup>16</sup>

Since most of the European defaults occurred during the unusually turbulent 2001-2003 period, we performed additional regression analysis to see if the similarity we observe in default rates is still present after we controlling for the macroeconomic environment through annual dummies. As shown in Exhibit A2, the estimated coefficient on the region is always positive, suggesting that European default rates by rating category are in fact higher than North American default rates. The large standard errors on these estimates, however, indicate that these findings are not significant.<sup>17</sup>

In Exhibit A3, we list the European defaulters that underlie these default rates. In Exhibit A4, we present the regression model of the determinants of loss-given-default that enabled us to compare in Exhibit 2 the average American and European LGD rates, both unconditionally and conditional upon the industry of the defaulting issuers and the years of their defaults.

### Exhibit A1

<b>Cumulative Default Rates Over 1-5 Year Horizons: 1990-2003</b>					
	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Continental Europe</b>					
Aaa	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	0.00%	0.00%	0.00%	0.00%
A	0.06%	0.06%	0.06%	0.06%	0.06%
Baa	0.00%	0.31%	0.75%	1.38%	1.38%
Ba	1.75%	4.24%	7.66%	7.66%	7.66%
B	3.95%	16.81%	23.51%	30.89%	37.03%
Caa-C	29.85%	41.83%	59.16%	61.79%	61.79%
Investment-Grade	0.02%	0.05%	0.09%	0.13%	0.13%
Speculative-Grade	8.10%	17.69%	25.71%	29.48%	31.77%
All Corporates	0.66%	1.36%	1.87%	2.11%	2.21%
<b>North America</b>					
Aaa	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	0.00%	0.00%	0.05%	0.10%
A	0.05%	0.11%	0.22%	0.34%	0.49%
Baa	0.21%	0.62%	1.04%	1.59%	2.16%
Ba	1.25%	3.43%	5.63%	7.68%	9.59%
B	6.29%	13.90%	20.81%	26.77%	32.18%
Caa-C	21.93%	34.68%	44.76%	53.26%	59.74%
Investment-Grade	0.10%	0.27%	0.47%	0.72%	0.98%
Speculative-Grade	5.91%	11.78%	16.92%	21.26%	24.93%
All Corporates	2.41%	4.76%	6.76%	8.41%	9.76%

16. If just a single European issuer (whose rating did migrate during the sample period from Aa through Baa during the sample period) had subsequently defaulted, then the five-year European default rates would have exceeded the American default rates at all non-Aaa investment-grade rating levels.

17. Moreover, we know that these standard errors are biases downward (implying the regional coefficient is certainly not significantly different from zero) both because the "zero-one" indicator variable for default leads to non-normal residuals and the three-year and five-year regressions contain overlapping data, so the observations are not independent

## Exhibit A2

### Regression Model Indicates that Continental European Default Rates Are Indistinguishable from North America Default Rates, Even When Controlling for the Credit Environment with Annual Dummies

**Dependent Variable: Firm Indicator =1 if default; =0 otherwise**

**Estimation Method: Nonlinear Least Squares**

Model: Firm Indicator = [Constant + Rating Dummies] \* [1+Annual Dummies + European Domicile Dummy]

One-Year Default Rates			Three-Year Default Rates			Five-Year Default Rates		
Variable	Coefficient	SE	Variable	Coefficient	SE	Variable	Coefficient	SE
Intercept	0.00	0.00	Intercept	0.00	0.00	Intercept	0.00	0.00
Aaa-Aa	Omitted	Omitted	Aaa-Aa	Omitted	Omitted	Aaa-Aa	Omitted	Omitted
A	0.00	0.00	A	0.00	0.00	A	0.00	0.00
Baa	0.00	0.00	Baa	0.01	0.00	Baa	0.01	0.00
Ba	0.01	0.00	Ba	0.04	0.00	Ba	0.06	0.00
B	0.05	0.00	B	0.15	0.00	B	0.21	0.00
Caa-C	0.17	0.01	Caa-C	0.32	0.01	Caa-C	0.41	0.01
1990	2.14	0.19	1990	0.98	0.07	1990	0.58	0.05
1991	1.56	0.17	1991	0.58	0.07	1991	0.27	0.05
1992	0.56	0.14	1992	0.04	0.07	1992	-0.10	0.06
1993	0.32	0.13	1993	-0.13	0.07	1993	-0.24	0.06
1994	-0.53	0.10	1994	-0.34	0.06	1994	-0.39	0.05
1995	-0.26	0.09	1995	-0.43	0.05	1995	-0.35	0.04
1996	-0.38	0.08	1996	-0.38	0.05	1996	-0.27	0.04
1997	-0.41	0.08	1997	-0.19	0.05	1997	0.04	0.04
1998	-0.14	0.08	1998	0.09	0.05	1998	0.32	0.04
1999	0.16	0.08	1999	0.47	0.04	1999	Omitted	Omitted
2000	0.10	0.07	2000	0.45	0.04			
2001	0.76	0.09	2001	Omitted	Omitted			
2002	0.31	0.08						
2003	Omitted	Omitted						
European Domicile	0.13	0.08	European Domicile	0.09	0.06	European Domicile	-0.04	0.05

## Exhibit A3

### Moody's Rated Defaulters in Continental Europe: 1990-2003

Company Name	Country	Year	Volume
Memorex Telex Corporation	Netherlands	1991	\$1,998
Memorex Telex Corporation	Netherlands	1994	\$1,020
Tatneft Finance plc	Russia	1998	\$300
UNEXIM International Finance B.V.	Russia	1999	\$300
Global Ocean Carriers Limited	Greece	1999	\$126
SBS-Agro Finance B.V.	Russia	1999	\$250
Amer Reefer Co. Limited	Cyprus	2000	\$100
Enterprises Shipholding Corporation	Greece	2001	\$175
Global Telesystems Europe B.V.	Belgium	2001	\$960
Enitel ASA	Norway	2001	\$227
Swiss Air	Switzerland	2001	\$1,493
Netia Holdings II B.V.	Poland	2001	\$368
Brokat Technologies AG	Germany	2001	\$110
Netia Holdings B.V.	Poland	2002	\$488
United Pan-Europe Communications N.V.	Netherlands	2002	\$5,133
Carrier1 International S.A.	Switzerland	2002	\$235
Grapes Communications N.V.	Netherlands	2002	\$177
Northern Offshore ASA	Norway	2002	\$352
KPNQwest N.V.	Netherlands	2002	\$1,418
CompleTel Europe N.V.	France	2002	\$233
SWT Finance B.V.	Netherlands	2002	\$94
VersaTel Telecom International N.V.	Netherlands	2002	\$1,515
Callahan Nordrhein-Westfalen GmbH	Germany	2002	\$1,998
Song Networks	Sweden	2002	\$562
ONO Finance Plc	Spain	2002	\$963
Cybernet Internet Services International Inc.	Germany	2003	\$150
Vantico Group S.A.	Luxembourg	2003	\$272
Cable Satisfaction International, Inc.	Portugal	2003	\$150
Millicom International Cellular S.A.	Luxembourg	2003	\$917
Getronics N.V.	Netherlands	2003	\$572

## Exhibit A4

### Ordinary Least Squares Regressions Explaining Recovery Rates on Defaulted Bonds of North American and Continental European Issuers: 1996-2003

#### Key Finding: European Recovery Rates Are Slightly Lower

	Regressions			
	(1)	(2)	(3)	(4)
<i>Intercept</i>	33.6	35.7	38.0	43.5
	-33.1	-23.9	-23.3	-13.4
<i>Dummy for Europe</i>	-2.0	-6.4	-4.7	-5.2
	(-0.33)	(-1.13)	(-0.85)	(-0.95)
<u><i>Security Class</i></u>				
<i>Senior Secured</i>		13.9	10.0	9.7
		-4.8	-3.4	-3.4
<i>Senior Subordinated</i>		-8.8	-10.5	-9.8
		(-3.85)	(-4.55)	(-4.33)
<i>Subordinated</i>		-10.4	-11.9	-13.4
		(-3.43)	(-3.98)	(-4.56)
<u><i>Industry</i></u>				
<i>Telecom</i>			-13.0	-12.5
			(-4.35)	(-4.26)
<i>Public Utility</i>			23.8	24.5
			-3.6	-3.8
<i>Finance</i>			1.1	-1.3
			-0.3	(-0.28)
<i>Transportation</i>			-4.3	-3.1
			(-0.69)	(-0.51)
<u><i>Year</i></u>				
<i>1996</i>				1.2
				-0.19
<i>1997</i>				14.7
				-2.8
<i>1998</i>				-2.1
				(-0.48)
<i>1999</i>				-2.2
				(-0.58)
<i>2000</i>				-11.6
				(-3.11)
<i>2001</i>				-11.5
				(-3.24)
<i>2002</i>				-4.8
				(-1.29)
<i>R<sup>2</sup></i>	0.0	0.1	0.1	0.2
<i>F Value</i>	0.1	16.9	13.1	10.0

Omitted – Senior Unsecured, Industrial, 2003  
Continental European Obs=25 unique for 20 issuers

## Related Research

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### **Special Comments:**

[Testing For Rating Consistency In Annual Default Rates, February 2001 \(63945\)](#)

[Default and Recovery Rates of Asia-Pacific Corporate Bond Issuers, 1990-2003, August 2004 \(87657\)](#)

[Default and Recovery Rates of European Corporate Issuers, 1985-2003, March 2004 \(81646\)](#)

[Default & Recovery Rates of Canadian Corporate Bond Issuers, 1989-2003, April 2004 \(84404\)](#)

[Sovereign Bond Rating Defaults, Transitions, And Recoveries \(1985-2002\), February 2003 \(77350\)](#)

[Measuring The Performance Of Corporate Bond Ratings, April 2003 \(77916\)](#)

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