

The Information Content of Value Line Convertible Bond Rankings

A good job only in identifying poor convertible debt performance.

Craig M. Lewis, Richard J. Rogalski, and James K. Seward

The *Value Line Investment Survey* is a weekly investment advisory service that uses publicly available information and analyst judgment to provide common stock performance recommendations. Value Line sorts its universe of common stocks into five groups on the basis of expected future relative performance. Securities that are given a rank of 1 are considered undervalued, while rank 5 securities are considered overvalued.

Performance studies by Black [1973], Holloway [1981], Copeland and Mayers [1982], Sticzel [1985], and Peterson [1987, 1995] evaluate Value Line common stock recommendations and show that they are capable of generating excess returns for investors. This anomalous finding has been described as the "Value Line enigma."¹

Value Line also provides performance recommendations for two other classes of financial securities. Option recommendations are published in *Value Line Options*; convertible debt and warrant recommendations are published in *Value Line Options*; convertible debt and warrant recommendations are published in *Value Line Convertibles*.² Broughton and Chance [1993] study the *Value Line Options* recommendations and document significant excess returns on call options in the period immediately following the publication date. This finding suggests that Value Line appears to provide superior performance forecasting for securities other than common stock.

An examination of Value Line's recommendations for convertible debt is a natural extension of previous research that allows us to focus on Value Line's

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EMPIRICAL METHODOLOGY

Sample Selection Procedure

The *Value Line Convertibles* service is published forty-eight times a year on the first four Mondays of each month, like other *Value Line* publications.³ It also is similar to other *Value Line* publications in that it has two sections: the convertible strategist section and the convertible evaluation section. The convertible strategist section discusses possible trading strategies and provides analysis of specific bonds. The convertible evaluation section provides detailed information for every bond in the *Value Line* universe including both the common stock and the convertible bond rankings.

The ranking data for this study are hand-collected from the *Value Line Convertibles* publication for the period covering February 21, 1977, through August 3, 1992. We obtain the complete ranking history for each convertible bond in the *Value Line* universe at thirteen-week intervals. This sampling procedure generates ranking observations at fifty-nine different thirteen-week intervals over the sampling period. We then use the complete ranking history file to identify changes in a convertible bond ranking at each thirteen-week interval.⁴

Descriptive Analysis of Convertible Bond Ranking Changes

Exhibit 1 presents the rankings for the convertible bonds in our sample. The total number of convertible bond ranking changes is 5,478. Most of the convertible bonds have convertible bond and common stock rankings of 3. The distribution of convertible bond rankings tends to be slightly skewed toward timely (lower) rankings, while the distribution of common stock rankings tends to be slightly skewed toward less timely (higher) rankings. This suggests that, on average, *Value Line* expects convertible debt to be a better investment than the issuer's underlying common stock in the period subsequent to the convertible ranking changes. Exhibit 1 also demonstrates that the *Value Line* common stock and convertible bond rankings are not perfectly correlated.⁵

Since a convertible bond can be viewed as a dynamically traded portfolio that has long positions in a straight bond and the underlying common stock, one might anticipate reversion toward a ranking of 3 if the *Value Line* rankings simply exploit the informa-

ability to forecast factors not included in its common stock recommendations, such as the direction of future interest rate movements, expected changes in credit risk, and the volatility of the underlying asset.

We examine the predictive content of the recommendations from the *Value Line Convertibles* publication. While other studies focus only on *Value Line's* ability to identify mispriced securities, our study explores two issues:

1. Can *Value Line Convertibles* identify mispriced securities?
2. Does *Value Line Convertibles* provide investors with information beyond that already included in the common stock recommendations?

The second issue examines whether *Value Line's* rankings of convertible debt simply exploit its analyses of common stocks or use additional information. For example, if *Value Line* gives a rank of 2 to a convertible bond and a rank of 1 to the underlying common stock, does this reflect additional analysis or simply the observation that convertible bonds are hybrid securities that have equity warrant and straight debt components?

We find that *Value Line's* convertible recommendations earn significant unadjusted returns over time in the predicted direction, a finding that is consistent with other *Value Line* studies. We do not find similar results for risk-adjusted returns. Rather, excess returns tend to be insignificantly different from zero for groups that *Value Line* considers undervalued and significantly negative for groups that *Value Line* considers overvalued, for up to six months after the ranking change date. This suggests that *Value Line* does a good job identifying losers, but is not as successful identifying convertible bonds that earn positive excess returns. We also find evidence of significant excess performance in the period immediately following a ranking change.

Surprisingly, *Value Line* convertible recommendations do not appear to provide incremental information beyond that already provided in the *Value Line* equity rankings. In fact, significantly higher returns can be earned using the common stock rankings instead of the convertible rankings to invest in *convertible bonds*. This suggests that convertible bond investors would do better if they ignored *Value Line's* rankings of convertible bonds.

**EXHIBIT 1
VALUE LINE RANKING PAIRS FOR 5,478
CONVERTIBLE RANKING CHANGE DATES**

Convertible Bond Ranking	Common Stock Ranking				Total
	1	2	3	4	
1	184	265	56	4	510
2	27	627	758	47	3
3	6	91	1,362	358	30
4	1	18	368	681	1,214
5	0	2	49	191	203
	218	1,003	2,593	1,281	383
					5,478

The sample is sorted into five portfolios according to the convertible bond ranking subsequent to the ranking change date. Each convertible bond portfolio then is sorted into five more portfolios according to the stock ranking subsequent to the ranking change date.

tion in the stock rank. For example, if the underlying stock has a rank of 1, the convertible may have a rank of 2 because the long position in the bond component will diminish the upside potential of the stock investment. Exhibit 1 indicates that this is not the case, however. In fact, convertible bond rankings tend to have a lower (more timely) ranking than the underlying common stock.

For example, there are 1,003 convertible bonds that have a stock ranking of 2. Among these bonds, 265 have a convertible ranking of 1; 627 have a convertible ranking of 2; and 91 have a convertible ranking of 3. Similarly, there are 1,462 convertible bonds that have a convertible ranking of 2. Among these securities, 27 bonds have a common stock ranking of 1, 627 have a common stock ranking of 2, and 758 have a common stock ranking of 3. In each case, convertible bond rankings tend to be lower than the associated common stock rankings. This result is consistent across all ranking categories.

There are several possible explanations for these findings. First, since Value Line ranks all securities in each universe on the basis of relative performance, differences in rankings may simply reflect issuer differences in each universe. For example, not every company in Value Line's common stock universe issues convertible bonds. In this case, the lack of perfect correlation between common stock and convertible bond rankings would simply be a consequence of the information content of value line convertible bond rankings.

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$$R_{it} = (P_{it} + I_{it}) / P_{it-1} - 1$$

where P_{it} is the price of bond i in week t and I_{it} is the accrued interest for bond i in week t .

We obtained a daily convertible bond price file from Interactive Data Corporation (IDC) covering the same period as the ranking data. This file includes coupon rates, coupon payment dates, and transaction prices for all traded convertible bonds. We estimate realized returns as the weekly change in price plus accrued interest:

**Convertible Bond Data and
Excess Return Measurement**

At this point, it is not clear which explanation accounts for the lack of perfect correlation across the different securities of the same issuer. The fact that common stock rank changes do not always occur when convertible bond rank changes occur, however, provides some evidence in support of the second explanation.

A second possible explanation is that factors that Value Line assesses as influencing security performance differ across the various security classifications. In this case, differences in performance ranks would reflect Value Line's assessment of how these factors influence expected relative performance. For example, convertible debt performance would depend not only on changes in the performance of the underlying common stock, but also on changes in interest rates, credit quality, and credit spreads.

At this point, it is not clear which explanation accounts for the lack of perfect correlation across the different securities of the same issuer. The fact that common stock rank changes do not always occur when convertible bond rank changes occur, however, provides some evidence in support of the second explanation.

Investment Dealers Digest. This includes each bond's maturity and conversion price. Because we have this information only for newly issued bonds, the data are not available for all bonds included in the IDC price file. The measurement of excess returns is a major concern of prior research in this area. In the equity studies, a market model approach is the standard technique used to estimate excess returns. Copeland and Mayers [1982] caution against the use of data prior to a rank change, as "price momentum" is one of the factors Value Line uses to determine rank. Because such price behavior tends to bias the excess return estimates, they suggest using return data after the rank change. For corporate securities other than common stock, there is no consensus in the literature for detecting abnormal performance. Consequently, event studies and performance measurement for securities with credit risk often differ with respect to the selection of a benchmark model return. For example, Dennis and McConnell [1986] use a single-factor market-adjusted return model in their study of the impact of merger announcements on convertible bond prices, while Martias, Schipper, and Smith [1989] use a two-factor model in their study of the wealth effects of going private on senior corporate securities. Rather than estimate a risk-adjusted return directly from the past convertible bond prices, we use two benchmark portfolio techniques. The first benchmark is based on Standard & Poor's bond ratings. Since bond rating services provide an independent assessment of the bonds' risk, contemporaneous returns from a benchmark portfolio based on bond ratings provide a risk adjustment that controls not only for the bias problems noted above but also for changes in credit market conditions. Excess returns are estimated as the difference between the convertible bonds' realized return and the return to a bond index that has a similar bond rating. A limitation of this approach is that bond ratings consider only default risk. While this is perfectly adequate for straight debt, a convertible bond may have significant price risk unrelated to default, particularly if the conversion option is in the money. We address this latter concern with a second benchmark model that considers credit and equity price risk simultaneously. The second benchmark return is estimated as a weighted average of the bond rating benchmark return and the market return. The weighting is based on the relation between the underlying stock

$$R_{BR}^{jt} = 0.25\alpha_j + \beta_j R_{ft} \quad (2)$$

Weekly expected returns are estimated as

$$R_{jt} = \alpha_j + \beta_j R_{ft} + e_{jt} \quad (1)$$

where R_{jt} is the monthly return to the bond rating portfolio j in month t ; R_{ft} is the monthly return to the U.S. Treasury bond portfolio in month t ; and e_{jt} is the residual from corporate bond portfolio j in month t . The coefficients α_j and β_j are ordinary least squares estimates of corporate bond portfolio j 's market model parameters.

This approach has the advantage that it explicitly incorporates the degree to which the conversion option is in the money. The disadvantage is that calculation of the weighting factor requires a significant amount of additional data. We do not present separate results for the credit and equity risk benchmark for two reasons. First, the qualitative results are the same for either benchmark. Second, there is a larger sample size for the excess return analysis based on the credit risk benchmark.⁷

Bond Rating Benchmark and Excess Returns

If weekly return data were available for the corporate bond rating portfolios, they could be used to provide a contemporaneous estimate of the expected weekly return. We have only monthly data, however. We therefore estimate the expected weekly return to the bond rating portfolios using a modified market model approach. Monthly corporate bond data were obtained from Ibbotson Associates for the bond rating categories: AAA, AA, A, and BAA. Ryan Labs, Inc., provided index levels for a five-year U.S. Treasury bond portfolio. To estimate weekly expected returns to the bond rating portfolios, we estimate the parameters from a market model sort of regression using monthly data as follows:

Monthly corporate bond data were obtained from Ibbotson Associates for the bond rating categories: AAA, AA, A, and BAA. Ryan Labs, Inc., provided index levels for a five-year U.S. Treasury bond portfolio. To estimate weekly expected returns to the bond rating portfolios, we estimate the parameters from a market model sort of regression using monthly data as follows:

Raw Return Performance. Section A-1 in Exhibit 2 shows average cumulative raw returns for the five convertible ranking portfolios from weeks -26 through 26. Consistent with the Copeland and Mayers [1982] results, the Value Line convertible ranking system appears to classify convertible bonds correctly on average. The cumulative average raw return performance is perfectly ordered with the rankings in three

1. The return performance should be perfectly ordered with the bond rankings. That is, bonds with a ranking of 1 should outperform bonds with a ranking of 2, and so on.
2. The return performance for convertible bond portfolios based on convertible rankings should be more pronounced than portfolios based on common stock rankings. That is, bond portfolios with a convertible ranking of 1 (5) should have larger (smaller) returns than bond portfolios with a common stock ranking of 1 (5).

If the Value Line Convertibles service has information content relative to the Value Line Investment Survey, the convertible rankings should display two properties:

the convertible rankings should display two properties:

For each convertible bond in the Value Line universe, there are two rankings: one for the convertible bond, and another for the underlying common stock that the bondholder receives upon conversion. Our examination of convertible bond return performance considers whether Value Line Convertibles provides information beyond that already included in Value Line's common stock rankings.

Value Line Portfolio Results

The last section considers whether our results are affected by selecting ranking change dates at thirteen-week intervals. Since Value Line publishes weekly recommendations, we repeat the analysis using weekly ranking change intervals for the two-year subperiod from January 1, 1990, through December 31, 1991.

The empirical results are presented in four main sections. The first section provides return results for Value Line ranking portfolios sorted by convertible bond and common stock ranking. The second section considers the informativeness of the convertible bond rankings relative to the stock rankings. The third section examines excess return performance based on the size and direction of the ranking change.

EMPIRICAL RESULTS

where K is the period we begin to cumulate excess returns, and L is the period when this process terminates. We test the statistical significance of the cumulative excess returns using Z-statistics.⁹

$$CXR_{K,L} = \frac{1}{L} \sum_{t=K}^{t=L} AXR_t \tag{5}$$

Cumulative average excess returns are formed by summing average excess returns over time:

$$AXR_t = \frac{1}{N_t} \sum_{i=1}^{N_t} XR_{it} \tag{4}$$

The average excess return in week t for a sample size of N_t is calculated as:

making its recommendations. implicitly considers this investment horizon when focus on stock performance. Second, Value Line our results comparable with the Value Line studies that long-term performance for two reasons. First, it makes before and after the bond ranking change. We focus on Excess returns are calculated twenty-six weeks

Evaluating Excess Returns

where R_{jt}^i is the realized return for convertible bond i with bond rating j in week t .⁸

$$XR_{it} = R_{jt}^i - R_{BR}^j \tag{3}$$

The weekly excess return for convertible bond i in week t is estimated as:

where R_{jt}^i is the weekly return to the U.S. Treasury bond portfolio in week t . Note that we adjust to a weekly frequency.

Information content is examined in two ways. First, we examine the performance of convertible bond portfolios after controlling for the stock ranking. Then we examine the performance of common stock portfolios after controlling for convertible bond rankings. The evidence indicates that the convertible bond rankings do not provide investors with sufficient information to generate excess returns relative to the common stock rankings.

Relative Information Content of Convertible Rankings

Exhibit 3 shows cumulative excess return performance for the five convertible bond and stock ranking portfolios for the twenty-six-week period following the convertible bond ranking change date. Exhibit 3 shows cumulative excess return performance for the five convertible bond and stock ranking portfolios for the twenty-six-week period following the convertible bond ranking change date. The spreads between the cumulative excess returns on Portfolios 1 and 5 over the twenty-six-week period following the ranking change date are 8.77 percentage points and 5.22 percentage points for the stock and convertible bond ranking portfolios. Once again, these results suggest that the stock ranking may be a more informative measure of subsequent convertible bond performance than the convertible bond rankings. Portfolio 5 sorted by stock and convertible ranks are -5.14% and -3.88%, respectively.

Portfolio 5 sorted by stock and convertible ranks are -5.14% and -3.88%, respectively. Likewise, the cumulative excess returns for the stock and 1.84% for the convertible bond ranking period following the ranking change date are 3.63% for excess returns for Portfolio 1 over the twenty-six-week period for the convertible rankings. The cumulative excess return results are stronger for the stock rankings than for the convertible rankings. Similar to the raw return results, the cumulative excess return results are stronger for the stock rankings than for the convertible rankings. The cumulative excess return results are stronger for the stock rankings than for the convertible rankings.

Section B-2 in Exhibit 2 shows average cumulative excess returns for the five stock ranking portfolios from weeks -26 through 26. Similar to the convertible ranking portfolios, the cumulative return performance is perfectly ordered with the Value Line rankings for the twenty-six-week period prior to the change date and the twenty-six-week period following the ranking change date. Similar to the raw return results, the cumulative excess return results are stronger for the stock rankings than for the convertible rankings. The cumulative excess return results are stronger for the stock rankings than for the convertible rankings. Similar to the raw return results, the cumulative excess return results are stronger for the stock rankings than for the convertible rankings. Similar to the raw return results, the cumulative excess return results are stronger for the stock rankings than for the convertible rankings.

Consequently, this result is not surprising. Examination of Panels B through D in Exhibit 4

a factor that Value Line uses to determine its rankings. date, which is likely attributable to price momentum - twenty-six-week period prior to the ranking change

Panel A in Exhibit 4 reveals this tendency in the perfectly ordered with the convertible bond ranking.

rankings have information content relative to common of their convertible bond ranking. If convertible bond we then sort firms into five more portfolios on the basis common stock ranking. Within each stock portfolio, convertible bonds into five portfolios on the basis of **Rankings.** We control for stock rankings by sorting the **Return Performance After Controlling for Stock** stock rankings.

Finally, we examine whether the convertible bond and common stock rankings can be used together to earn excess returns. Our evidence suggests that convertible bond rankings have no additional (incremental) information content relative to common stock rankings.

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Dashed lines represent convertible bond ranking portfolios; solid lines represent stock ranking portfolios. C1 denotes the convertible bond portfolio with a convertible bond ranking of 1. S1 denotes the convertible bond portfolio where the underlying stock has a ranking of 1.

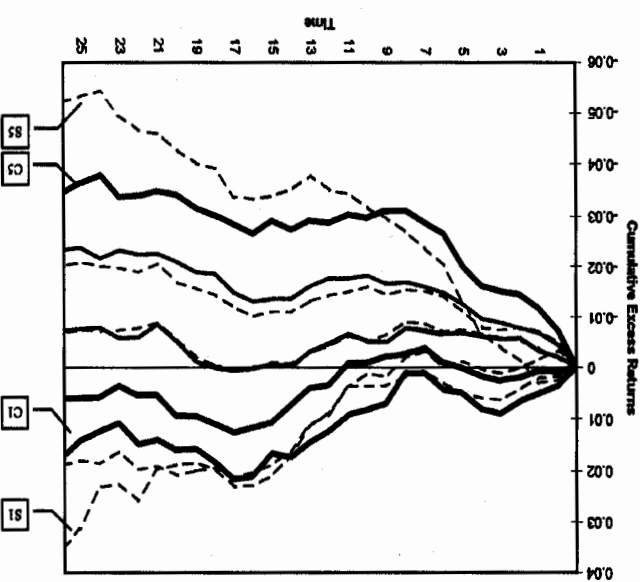


EXHIBIT 3
CUMULATIVE EXCESS RETURN PERFORMANCE FOR STOCK AND CONVERTIBLE PORTFOLIOS

EXHIBIT 4
VALUE LINE AVERAGE CUMULATIVE CREDIT RISK-ADJUSTED RETURNS
FOR SELECTED TIME PERIODS — FEBRUARY 21, 1977-AUGUST 3, 1992

Convertible	Bond	Ranking
		1
		2
		3
		4
		5
		Total

PANEL A. CUMULATIVE EXCESS RETURNS FROM WEEK -26 THROUGH WEEK -1

Average	1	2	3	4	5
0.1200***	0.0279**	-0.0993***	-0.1160**	-0.2727	0.0455
0.1501***	0.0705***	-0.0468***	-0.1486***	-0.4146***	0.0031
0.1359	0.0663***	-0.0027***	-0.1090***	-0.2713***	-0.0238
-0.0287	0.0125	0.0011	-0.0634***	-0.1929***	-0.0583
NA	-0.0320	0.0044	-0.0423***	-0.1314***	-0.0777
0.1235	0.0577	-0.0170	-0.0763	-0.1684	

PANEL B. CUMULATIVE EXCESS RETURNS FROM WEEK 0 THROUGH WEEK 1

Average	1	2	3	4	5
-0.0007	0.0093***	0.0037	-0.0073	0.0832	0.0003
-0.0026	0.0000	0.0014	-0.0028	0.0187	0.0006
-0.0244	-0.0022	-0.0045***	-0.0005	0.0267**	-0.0031
-0.0059**	-0.0122***	-0.0102***	-0.0074	0.0059	-0.0066
NA	0.0053	-0.0179***	-0.0192***	-0.0031	-0.0117
-0.0016	0.0020	-0.0037	-0.0071	0.0030	

PANEL C. CUMULATIVE EXCESS RETURNS FROM WEEK 0 THROUGH WEEK 13

Average	1	2	3	4	5
0.0208**	0.0038	0.0029	-0.0021	-0.0099**	0.4195**
0.0357	0.0054	0.0029	0.0005	-0.1671***	0.0148
0.0533	0.0288**	-0.0021	-0.0099**	-0.0592***	-0.0028
-0.0368	-0.0083	-0.0147***	-0.0112*	-0.0416*	-0.0159
NA	0.0113	-0.0209	-0.0287**	-0.0315***	-0.0290
0.0118	0.0114	-0.0026	-0.0129	-0.0374	

PANEL D. CUMULATIVE EXCESS RETURNS FROM WEEK 0 THROUGH WEEK 26

Average	1	2	3	4	5
-0.0336***	0.0166	-0.0279**	0.0397	0.1423	0.0183
0.0386	0.0137***	0.0054	-0.0186**	-0.3706**	0.0080
0.1135***	0.0741***	-0.0089	-0.0103	-0.1146	-0.0064
-0.0690***	-0.0142***	-0.0141***	-0.0215	-0.0510	-0.0227
NA	-0.0222	-0.0255	-0.0323***	-0.0323***	-0.0315
0.0360	0.0194	-0.0062	-0.0197	-0.0481	

Significance tests are based on Z-statistics, where ***, **, and * indicate significance at the 0.001, 0.01, and 0.05 levels. NA indicates that there are no securities available to make the required calculations.

gies can be used to examine this proposition. One is to purchase convertible bonds that have convertible bond and stock rankings of 1 and short-sell convertible bonds that have convertible bond and stock rankings of 5. That is, buy (sell) the set of bonds on which Value Line is the most optimistic (pessimistic). As Panel D in Exhibit 4 demonstrates, the cumulative excess return from weeks 0 through 26 for this strategy is 6.59% (3.36% minus -3.23%).

Compare this to a similar strategy that uses only common stock or convertible bond rankings. The cumulative excess return from weeks 0 through 26 for a portfolio that buys all convertible bonds with a common stock (convertible bond) ranking of 1 and sells all bonds with a common stock (convertible bond) ranking of 5 is 8.41% (4.98%). Once again, investors obtain better return performance using the equity rankings. Hence, there appears to be no incremental value in Value Line's ranking of convertible bonds over common stock rankings for identifying the future performance of convertible bonds.

Convertible Bond Change Portfolio Results

To assess the new information in the Value Line convertible ranking, we form portfolios based on how many levels the convertible bond ranking changes. This analysis is performed separately for ranking increases and decreases. We then examine the excess return performance for each of the separate ranking change portfolios. This allows us to examine the informativeness of ranking increases and decreases separately. It also allows us to examine the relative informativeness of ranking changes of different size.

Since the relationship of ranking and performance can be confusing, it needs to be emphasized that Value Line assigns a low (high) ranking when it believes the convertible bond will have superior (inferior) investment performance. That is, if Value Line lowers its ranking, the convertible bond's investment performance is expected to improve.

We find that excess return performance following bond ranking changes depends on the number of levels that the rank changes, rather than the final ranking of the bond. That is, if Value Line increases its ranking from 1 to 3 because it no longer believes that the bond is a timely investment, this bond will display approximately the same excess return performance over the twenty-six-week period following the ranking

using either service independently? A number of strategies can be observed by looking down the columns of each panel. For example, the cumulative excess return from weeks 0 through 26 for convertible bonds with common stock rankings of 2 are 1.66%, 1.37%, and 7.41% for portfolios with convertible bond rankings of 1, 2, and 3, respectively. See Panel D of Exhibit 4.

When these results are considered in conjunction with the earlier findings, they suggest that the information conveyed in the common stock rankings dominates the information conveyed in the convertible bond rankings. Another issue we need to consider is whether convertible bond and common stock rankings have joint information content. That is, can we use both Value Line services to produce better return performance than that available from using either service independently?

Examining the perfect ordering detected in Panel A indicates that the perfect ordering detected in Panel A does not hold for excess return performance in the period following the ranking change date. If we consider all portfolios that hold at least twenty bonds (the relevant cells can be identified in Exhibit 1), cumulative excess returns are perfectly ordered with the convertible bond rankings.

Return Performance After Controlling for Convertible Bond Rankings. We control for convertible bond rankings by sorting the convertible bonds into five portfolios on the basis of convertible bond ranking. Within each of these bond portfolios, we then sort firms into five more portfolios on the basis of their common stock ranking. If common stock rankings have information content relative to convertible bond rankings, the cumulative excess returns should be perfectly ordered with the common stock ranking.

Examination of Panels B through D in Exhibit 4 indicates that this is indeed the case in the period following the ranking change date. For example, if we consider all portfolios that hold at least twenty convertible bonds with convertible bond rankings of 2 are, respectively, 3.86%, 1.37%, 0.54%, and -1.86% for portfolios with common stock rankings of 1, 2, 3, and 4 (see Panel D of Exhibit 4).

When these results are considered in conjunction with the earlier findings, they suggest that the information conveyed in the common stock rankings dominates the information conveyed in the convertible bond rankings. Another issue we need to consider is whether convertible bond and common stock rankings have joint information content. That is, can we use both Value Line services to produce better return performance than that available from using either service independently?

- ⁷The sample size is smaller when we use the credit and equity risk benchmark model because of omitted indicative information for the convertible bond or insufficient equity return data on CRSP.
- ⁸Excess returns for bonds with credit ratings below BAA are calculated using the BAA benchmark return.
- ⁹The details of these calculations are available upon request from the authors.
- ¹⁰Tables are available upon request from the authors.
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