New York University
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Report on

Market Size And Investment Performance of
Defaulted Bonds & Bank Loans:
1987-2001

by

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With
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Abstract

The defaulted and distressed, public and private debt markets in the United States swelled to a record $680 billion (face value) at the end of 2001. The market value of this “niche” segment was approximately $400 billion.

Defaulted security investors enjoyed an excellent year on average, as returns in 2001 were 17.5% on bonds, 13.9% on bank loans, and 15.6% combined defaulted public bonds and private bank loans.

The Altman-New York University Salomon Center Index of Defaulted Bonds grew to over 200 individual issues and a face value of $56.2 billion; the market value was only $11.8 billion. The market-to-face value ratio of the Bond Index grew somewhat to 0.21 from 0.15 one year ago, but remained at a relatively low figure. The face value of our Defaulted Bank Loan Index also grew to $44.7 billion and the market-to-face value ratio remained quite low at 0.53.

The recovery rate on defaulted bonds (price just after default) was very low at 25 cents on the dollar; likewise, the bank loan recovery rate in 2001 was also relatively low at 55 cents on the dollar. With new defaulted bonds rising in 2001 to a record $63.6 billion (default rate of 9.80%) and the default outlook for 2002 high, but lower than for 2001 investment opportunities should abound in the distressed debt market.

Indications are that distressed investors (both old and new) are successfully raising funds because investor expectations are buoyant.
Introduction

This report on the performance of defaulted bonds and bank loans presents our annual update and analysis. For in-depth discussions of the supply and demand elements of defaulted and stressed securities, as well as their performance and other attributes, see Altman (1993-2000), (1991), (1993); Branch and Ray (1992); Altman & Eberhart (1994); Ward & Gripepentrog (1993); Gilson (1995); Hotchkiss and Mooradian (1998); Reilly, Wright and Altman (1998); and Eberhart, Altman and Aggarwal (1999). Defaulted bonds and bank loans performed very well during 2001, reversing their relatively poor performance of the preceding several years. Moreover, this “asset class” has attracted an increasing amount of new capital as the supply of distressed and defaulted securities continued its substantial growth over the past three years.

Monitoring performance

The Altman-NYU Salomon Center Defaulted Bond Index (A-NYU Index) was developed in 1990 for the purpose of monitoring and measuring the performance of defaulted debt securities. The sample period of our Index begins in January 1987 and, as of December 31, 2001, includes 202 issues from 86 firms (Figure 1). The Index’s market value is $11.8 billion and its face value is $56.2 billion, more than double the $4.3 and $27.8 billion amounts of 2000 and almost triple the 1999 amounts of $4.1 and $16.3 billion. The number of bond issues in the Index increased substantially during 2001 and continues to approach the record levels set for the Index’s size during the early 1990s. The size of our Index, as measured by the face value of public defaulted bonds, is more

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1 This index, originally developed in Altman’s Foothill Report (1990) is maintained and published on a monthly basis at the NYU Salomon Center of the Leonard N. Stern School of Business. It is available along with data and reports on high yield debt default rates and performance, from the Center (212/998-0701 or 212/998-0709).
than double the face value of the Index during the early 1990s; yet, the market value of
our Index is only slightly higher than its highest measure previously observed in 1992.
Figure 1 exhibits various measures of our Index’s size since its December 1986 inception.
The variability in the number of issues, with a low of 30 in 1986 and a high of 231 in 1992, continues to be notable. Our expectation that the huge new issue supply of non-investment grade debt in the years 1996-1999 would result in a continued increase of default amounts during subsequent years was again realized in 2001. Indeed, total bond defaults in 2001 were $63.6 billion - more than double the record amount set during 2000. And, this total does not include the huge Enron and Pacific G&E defaults (see our partner Annual Report, E. Altman and P. Arman, “Defaults and Returns on High Yield Bonds: Analysis Through 2001,” NYU Salomon Center Working Paper, #S-02-4 and Salomon Smith Barney, January 2002.

We consider the ratio of the aggregate market value to face value of the component securities that comprise our index (last column of Figure 1) to be an important measure of the defaulted bond market’s current relative health. This ratio has ranged, at year-end, from a maximum level of 0.74 in 1987 to a minimum level of 0.15 in 2000. While the market/face value ratio has varied within a fairly narrow range of 0.30 to 0.50 during most years in our 16-year sample period (1986-2001), abnormal returns for the Index have resulted in a number of market/face value ratio observations well outside of this range. In particular, a +38.0% return for the Index during 1987 increased the market/face ratio to 0.74, while the significant negative returns of 1989, 1990, 1998, and 2000 pushed the market/face ratio to under 0.30, especially in the last four years. During 2001, this ratio increased to 0.21 from 0.15 in 2000. A positive 17.47% return for the
Index in 2001 and the increase in the market/face ratio are consistent with our continued belief in a “reversion to the mean”. This suggests that the relatively low 2001 year-end market/face ratio of 0.21 is an indication of continued future increases in this ratio and strong Index returns. An analysis of the Index’s historical average market/face ratios to the price levels of newly defaulted (40%) and senior unsecured bonds (50%) of face value, is particularly interesting, even more so considering that the majority of the bonds in our Index are “senior” in priority. For 2001, the weighted average recovery price of defaulted bond issues was approximately 25.4% of face value (including FINOVA) and 21.1% (without FINOVA), which is quite similar to the end-of-year Index’s market/face ratio of 0.21. Again, these current market/face value ratios are all significantly below average levels.

The A-NYU Index includes the securities of firms at various stages of reorganization, either in bankruptcy or restructuring. We calculate the returns for the Index using data compiled from just after default to the point when the bankrupt firm emerges from Chapter 11, is liquidated, or until the default is “cured” or resolved through an exchange. The securities of distressed restructuring companies are also included in the Index. The Index includes bond issues of all seniorities, from senior-secured to junior-unsecured debt. A study by Altman & Eberhart (1994), updated by Standard & Poor’s (Brand & Behar, 1998), measures the performance of defaulted debt from the time of original issuance through default and then to emergence from bankruptcy. These studies conclude that the seniority of the issue is an extremely important determinant of the performance of defaulted securities over specific periods, whether from issuance to
emergence or from default to emergence. The A-NYU Index does not include convertible or international company issues, nor does it include distressed, but not defaulted, securities.

2001 Performance

The Altman-NYU Salomon Center Index of Defaulted Bonds reversed its poor performance in 2000, increasing 17.47% in 2001, marking the Index’s fifth highest annual return in our 15-year period (Figure 2). The Index experienced positive returns in all but the third quarter in 2001, with a significant negative return in September preventing the Index from achieving positive returns in all four quarters of a year for the first time since 1993. In particular, the Index performed well in the second quarter of the year, finishing higher by almost 10%. The results are somewhat surprising as the supply of newly defaulted bond issues increased throughout 2001. Monthly returns for all 15 years of the A-NYU Index are listed in Appendix A. The level of the Index increased from 165.3 at the end of 2000 to 194.1 at the end of 2001 (December 1986=100).

In 2001, the market experienced only three months with negative returns. Two of the three negative monthly returns were in excess of 5% with the most significant negative return being –7.84% in September. In contrast with 2000, the Index experienced four of the nine months with positive returns in excess of 5%. The S&P 500 Stock Index, which finished with an annual return of –11.87% (assuming reinvestment of dividends) in 2001, was comparatively volatile and experienced four consecutive months of negative monthly returns as well as four months with negative returns in excess of 5% (See Figure 8 for our discussion on comparative returns for highly volatile months).
Defaul ted debt securities outperformed the total return on the S&P 500 Stock Index for the first year since 1994. The Index also outperformed the Salomon Smith Barney High Yield Bond Market Index, which returned +5.44%; however, all three indexes of risky securities have posted strong positive gains for the fourth quarter of 2001. Relatively safe government securities also increased in 2001 posting an annual return of 4.01%.

**Fifteen-Year Comparative Performance**

Figure 2 exhibits the return on defaulted bonds, common stocks, and high yield bonds over the entire fifteen-year sample period, 1987–2001. The arithmetic average for the Altman-NYU Salomon Center Defaulted Bond Index (7.08% per year) is still less than half that of the S&P 500 Stock Index (14.89%) and below that of the Salomon Smith Barney High Yield Bond Market Index (9.14%) for the sample period. 2001 marks the first year since 1994 that defaulted bonds outperformed the S&P 500 Stock Index and the Salomon Smith Barney High Yield Bond Market Index and represents the sixth year of this positive relative performance over the entire sample period. There have been seven of the fifteen years in which defaulted bonds have performed worse than both of the other two indexes.

The standard deviation of annual returns for the defaulted bond index decreased in 2001, but it still remains the largest of the three indexes. Comparing volatility on a monthly basis, the standard deviation of monthly returns for defaulted bond issues (4.27%) is in fact lower than that of the S&P 500 Stock Index (4.51%), while both of these indexes are considerably more volatile than the high yield bond index (1.95%). The discrepancy between the standard deviations of high yield bonds and defaulted bonds is
consistent with high yield bonds paying a fairly steady fixed interest component and
defaulted bonds having no interest component.

We calculate the Sharpe ratio for each of our risky asset indexes. This ratio
compares the excess performance (if any) of an asset class compared to default risk-free
Treasury Bonds (we use the 10-year Treasury Bond as our benchmark) and then divide
this excess return by a measure of the volatility of the asset class (the standard deviation).
By observing this measure of return/risk performance for each of the three asset classes,
we determine that the performance of the defaulted Bond Index continues to compare
unfavorably to the performance of the other two asset classes.

Figure 3 plots the monthly index levels for our three security classes for the
fifteen-year sample period. In March 1995, the S&P 500 Index level rose above the
levels of the other two indexes and remains well ahead. The High Yield Bond Index took
over second place from the Defaulted Bond Index in mid-1997.

Diversification Attributes: Risky Asset Returns Correlations

One strategy that our analysis suggests is to include defaulted debt in a larger
portfolio of risky securities. Several domestic pension funds and foreign portfolios have
effectively used this strategy by allocating a portion of their total investments to defaulted
debt money managers. Almost all portfolio managers involved in the distressed market
have been specialists in the sector, rather than investors in distressed bonds within
broader-based portfolios. Therefore, the avenue of diversification appears to be primarily
through the use of different investment managers (there are some rare exceptions where a
mutual fund combines investments in more traditional debt and equity securities with
distressed securities). Some “fund-of-funds” that have adopted this strategy have also
selected managers of distressed securities with different styles including active, semi-active and passive approaches. A similar strategy, practiced by foreign closed-end funds, is to directly invest in a large number of private U.S. distressed securities investment funds. Instead of diversifying across asset classes, these funds have a strategy of investing with managers of distressed securities who practice different approaches (e.g., active, passive, long-short, senior vs. subordinate).

Figure 4 exhibits the correlation between the Altman-NYU Defaulted Bond Index and each of the two other risky asset classes - common stocks and high yield bonds - for the last fifteen years. As of December 31, 2001, we observe that the monthly return correlation between defaulted debt and the S&P 500 Stock Index is only 24.89%. The correlation between defaulted debt and S&P equities is below the correlation between these two asset classes as of last year (26.6%) and 1999 (25.6%). The low correlation is important to note because holders of defaulted debt usually exchange their debt for the equity of the emerged Chapter 11 entity, unless they sell the debt just prior to emergence. The correlation between these two asset classes on a quarterly basis is slightly higher at 30.68%.

The correlation between defaulted bonds and high yield bonds, however, is comparatively high. The monthly correlation of returns is 56.67%, while the quarterly correlation between these two asset classes is 57.51%. As was the case in 2000, the correlation between high yield bonds and the Altman-NYU Salomon Center Defaulted Loan Index (see discussion below) is lower than that of defaulted bonds and high yield bonds, at 38.34% and 37.97% for monthly and quarterly returns, respectively. The returns for defaulted bank loans have an implied inverse relationship with the S&P 500
Stock Index, as we observe negative correlations between these two asset classes (Figure 7, below).

We believe that the relatively high correlation of defaulted securities and risky bonds is partially a function of the operating performance of firms in general, the outlook for risky companies, and the overall level of confidence in the market for risky debt. Although these latter correlations are relatively high, it is also clear that the Defaulted bond Index is more volatile, in both good and bad years. Again, this is not surprising since high yield debt has a base inflow of interest payments received in each period while virtually all defaulted bonds and most defaulted loans trade “flat” (without interest receipts). In addition, there is a great deal of uncertainty about what the reorganization plan will specify and how each class of creditors will be treated – not to mention the possibility that the end-result could be a liquidation. Finally, there are several critical events that occur during a bankruptcy reorganization (i.e., bankruptcy filing, post-default financing, outside merger offer, filing of a reorganization plan and the actual plan confirmation and emergence) which can result in large swings in the price of debt issues on or around those specific event dates.

We do observe that the relative volatility between defaulted bonds and equity returns, when measured on a monthly basis, puts the former in a much more favorable light than when measured on an annual basis. This implies a greater degree of autocorrelation (strings of gains or losses) that can exacerbate annual return levels and volatility but not monthly return variability.
**Defaulted Bank Loan Performance**

Managers of distressed securities are more commonly investing in both distressed bonds and the private debt (particularly bank debt) of defaulting companies. The observed increasing investment in defaulted private debt has been coincident with the bank loan market’s increasing size and liquidity as market makers have devoted considerable resources to bank debt trading. We have responded by calculating an index of defaulted bank debt facilities, as well as a Combined Index of bonds and bank loans.

The Altman-NYU Salomon Center Index of Defaulted Bank Loans, like the defaulted bond index, is a market-weighted index comprised of U.S. companies. The Index contained 17 facilities at its inception in December 1995 and has grown by about fifty issues in each of the past two years to reach 141 facilities as of December 31, 2001 (Figure 5). The market/face ratio climbed from 0.51 in 2000 to 0.53 as of the end of 2001, even as the Index’s face and market values nearly doubled during the year to reach $44.7 billion and $23.8 billion, respectively.

The increase in the market/face ratio, albeit a marginal one, reverses a four-year downward trend of this important measure and suggests additional future positive Index returns. The Bank Loan Index’s market/face value ratio compares very favorably with that of our Defaulted Bond Index (0.21); however, our loan index is comprised of only senior debt, much of which is secured, while the Bond Index is made up of both senior and subordinated debt. Furthermore, the Bank Loan Index market/face ratios of 0.53 is just above the measure’s lowest level in the six-year history of our index and is considerably lower than what is typical for defaulted bank loans (see our summary Figure 15 below of a number of empirical studies).
In 2001, our Bank Loan Index performed very well, returning 13.94% for the year and closing at 116.99 (December 1995=100). The Index outperformed both the S&P 500 Index and the Salomon Smith Barney High Yield Bond Market Index. Although bank loans did not perform as well as defaulted bonds, our Defaulted Bond Index was almost twice as volatile as the Bank Loan Index (when comparing standard deviation of monthly returns). In fact, bank loans were the least volatile of all four risky asset indexes in 2001 (on both a quarterly and monthly basis) even as the Salomon Smith Barney High Yield Bond Market Index continued to be the least volatile index on a historical basis. Our Bank Loan Index experienced only one abnormal monthly return, February 2001, when it gained 6.71% and only four months of negative returns, including the –1.99% in September. Appendix B shows performance of our Defaulted Bank Loan Index from its inception through December 31, 2001.

The average annual return of our Defaulted Bank Loan Index since its inception in 1996 jumped from 1.03% in 2000 to 3.18% as of 2001 and remains above the average annual returns for the Defaulted Bond Index over the comparable period (-3.76%); however, it still trails both the equities and high yield bond indexes (Figure 6).

As we previously noted, the correlations between our Defaulted Bank Loan Index and equity returns is –14.1% (versus only –7.4% as of last year), while the correlation between bank loans and the High Yield Bond Index (38.34%) was lower than that of 2000 (Figure 7). The correlation coefficients of defaulted bonds with equities and high yield bonds are considerably different (24.89% and 56.67%, respectively). The continued disparity in return correlations supports our argument that monthly movements
of bonds and bank loans are driven in large part by strategic objectives related to the seniority of securities of individual firms as well as overall assessment of the company.

**Correlation in Exceptional Months**

Although we focus our analysis on correlation coefficients for the entire sample period of 1987-2001, we also believe that it is important to analyze correlations between these asset classes for months with abnormal stock market returns. We define abnormal equity returns as months in which the S&P 500 Stock Index experienced returns greater/less than +/-5.0%. In 2001, our sample size increased to 43 months of abnormal equity returns during the fifteen-year period (Figure 8).

The correlations calculated (not shown) from the data for the exceptional months are all considerably higher than the correlations when they are measured over the entire fifteen-year period. For example, our defaulted bond index had a 35.76% correlation with the stock market compared to 24.89% for the entire period. The S&P 500 Stock Index correlation with high yield bonds jumps from 56.67% to 69.6%. This implies a type of contagion effect in these highly volatile months, i.e., the more liquid, and larger stock markets’ extreme performance in these months impacts the performance of debt securities that are also perceived as risky but quite a bit less liquid. Despite the higher correlations during exceptional months, we also observe that in twenty of the 43 months, the stock market and defaulted bond market moved in opposite directions.

**Combined Bond and Bank Loan Index**

Our Combined Defaulted Securities Index is calculated based on the market values and total returns of public bonds and private bank loans and returns. This Index, from its inception in 1996 through 2001, is displayed in Appendix C. The annual return
for the Combined Index was 15.56% for 2001 while the cumulative index level closed out the year at 97.2, up from 84.2 in 2000. The addition of the Combined Index enables us to benchmark performance criteria for a more broadly defined defaulted securities market.

Size of the Defaulted and Distressed Debt Market

The size of the defaulted and distressed debt market again grew in 2001 to its largest size since we have been indexing this asset class, topping even the extraordinary levels of 2000. Figure 9 exhibits the significant amount of newly defaulted bonds during 2001, as the figure more than doubled ($63.6 billion) from that of 2000 ($30 billion). At the end of 2001, the distressed proportion of the total high yield market (including defaulted securities) was 22% and the defaulted proportion grew to 13% (Figure 10). Although the supply of distressed high yield bonds (defined as yield to maturity greater than 1000 basis points over ten-year Treasuries) declined in 2001 to $160.6 billion from $186 billion in 2000, the total face value amount of defaulted and distressed public bonds outstanding grew from 2000’s record levels of $233 billion to $256.9 billion (Figure 11). Assuming an average private to public debt ratio of 1.65, down from 1.8 in 2000 and 2.0 in 1999, the level of public and private defaulted and distressed debt reached a face value of $680.8 billion and topped 2000’s record amount of $652.4 billion. We have maintained our market value benchmarks at 0.25 and 0.50 of face value for public defaulted and distressed bonds, respectively, and 0.60 and 0.75 of face value for private defaulted and distressed debt, respectively. The resulting estimated market value for
distressed and defaulted debt fell slightly to just under $400 billion and the trends of these amounts are shown in Figure 12.

We expect a minimum of another 7%-8% default rate on high yield bonds in 2002. This will add to our base supply of defaulted securities. And, if the default rate peaks in the first or second quarter of 2002, this will probably be good news for distressed investors as the supply of new distressed debt should subside somewhat relative to the demand.

**Bank Loan Recovery Study**

Despite the significant increase in the number of loan facilities contained within our Index, there are few published studies on recovery rates on defaulted bank loans. Given the continued disparity between our Bank Loan Index’s market/face value ratio and the typical experience for defaulted bonds, we believe that estimating recovery rates on defaulted bank loans using our Index will be interesting. The analysis contained a sample of 172 defaulted bank loan facilities from 1996 through November 2001. The recovery rate is determined by prices from the secondary market at or just after default.

We discovered that the median, mean, and weighted average values of defaulted bank loan recovery rates over this period were 64.75%, 62.23% and 58.38% respectively (Figure 13). The standard error was 21.22%, which somewhat supports a wide dispersion of defaulted bank loan recovery rates and a number of particularly low recovery rates. We also observed recovery rates by year of default and found that both the median and mean defaulted bank loan recovery values generally decreased over time, with 1999
being the only exception. This was particularly true for the weighted average, which fell from the 80-90% range in 1996-1998 to the 55-60% range in 1999-2001.²

In addition, we attempted to determine the extent to which defaulted bank loan recovery rates for telecommunications and e-commerce companies mirrored the experience of defaulted bonds for companies in those sectors, which were considerably lower than those of companies in more traditional sectors. Figure 14 displays the results for telecommunications and e-commerce companies only. It is interesting to note that median, mean and weighted mean recoveries are only marginally lower (62.25%, 59.09% and 54.23%) and do not have the same experience as recovery rates on defaulted bonds in these sectors.

As expected, these results compare favorably with the recovery rates of defaulted bonds. Average loan recoveries in recent years, however, are somewhat below average as reflected in the market/face value ratio. Our analysis of defaulted bonds estimates the mean and median recovery rate for defaulted bonds for the period of 1987-2001 is 35.85% and 40.05%, respectively. Figure 15 illustrates the key results of this and several other studies. Although none of the other studies of bank loan recovery rates analyze the same period of time and sample size as we do here, it is interesting to note the wide range of results. Fitch estimates the mean recovery rate of senior secured loans at 73% at Chapter 11, while Moody’s average recovery rate for senior secured bank loans is considerably lower at 64% - much closer to our results of 62.23%; however, their estimated recovery rate for unsecured bank loans is significantly lower at 49%.