

A Rising Market and Capital Structure Decisions*

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Abstract This paper examines capital structure decisions in the 1990s. We test a number of capital structure theories and find notable differences between investment- and junk-grade issuers in this period. Consistent with the trade-off theory, 67% of junk-grade issues were equity as opposed to only 9% of investment-grade issues. In addition, consistent with the trade-off theory, for junk-grade issuers, we find a direct relationship between collateral and debt issuance and an inverse relationship between debt issuance and the treasury yield. However, contrary to the predictions of the trade-off theory, we do not find similar evidence for investment-grade issuers. Moreover, our analysis suggests that junk-grade issuers are concerned with the wealth-transfer consequences of choosing equity over debt; this does not seem to be the case for investment-grade issuers. We find some evidence in support of market timing and little evidence for the pecking order theory or the equity undervaluation hypothesis.

Keywords Capital Structure, Junk-grade, Investment-grade

1. Introduction and Prior Literature Review

According to the trade-off theory, a company's capital structure is formed by the trade-off between tax savings of debt and deadweight costs of bankruptcy. This leads to an optimal leverage for which a firm's value is maximized. Another word, a company's worth is a concave function of its leverage.

A competing theory, pecking order, was proposed by Myers et al. [1, 2]. Pecking order argues that companies follow a pecking order when choosing between debt and equity for external funding. Firms issue equity only after they have exhausted their internal funds, short- and long-term debt capacity. Consequently, issuing equity is the costliest form of financing because of the highest level

of asymmetric information associated with equity issuance.

Market timing hypothesis asserts that firms opportunistically issue equity after a period of increase in their stock price. It predicts negative returns after stock issues. Equity undervaluation hypothesis suggests that firms issue debt when their equity is undervalued. It predicts positive equity returns after debt issues. Finally, according to the wealth transfer hypothesis of capital structure, issuing equity transfers wealth from existing shareholders to creditors. Another word, after stock issuance, the new equity cushion reduces the default risk that causes higher bond values and effectively transferring wealth from stock to bondholders. Eberhart and Siddique relate the negative reaction following stock issues to the wealth transfer concerns (from existing shareholders to creditors) [3].

This paper contributes to the literature by focusing on a specific period of steady rise in the stock market. We test a number of capital structure theories in order to understand the underlying reasons as to why companies preferred debt over equity or vice versa during a decade of strong investor sentiment: the 1990's bull market. In doing so, we compare investment- and junk-grade firms and find distinguishing differences between the two groups. The paper is organized as follows: section 2 describes the data and sample construction. We discuss the results in section 3 and conclude in section 4.

2. Data, Sample, and Methodology

All private and public non-convertible debt issues and public equity issues are extracted from SDC (Securities Data Company) for the 1990-1999 period. We first exclude utility, regulate, foreign firms, and financial firms and then merge the data with Compustat. Issues with missing assets in Compustat were dropped and we detect and assign debt ratings to all firms using both SDC and Compustat data. BBB ratings and higher ratings are classified as investment-grade. Else, they are classified as junk-rated. For comparison purposes, if we could not identify a

company's rating, the observation was dropped. This is the case for both debt and equity issues. When a subsequent debt or equity issuance occurs within 20 days of the first issuance, the issue is dropped.

Further, for each issue, we require the price data (from CRSP) to be available 250 days (excluding weekends) before and after issue else, we drop the issue. Similarly, we require all of our control variables, i.e. collateral, profitability, market-to-book, and leverage to be available for all the issuing companies or the issue is dropped. Table 1 presents the sample, a total of 1891 debt issues and 519 equity issues in the 1990-1999 period. Later, we drop all the debt issues used to refinance the debt in place because debt refinancing does not effectively change the capital structure. This reduces the debt sample to 1346 observations.

Table 1. Distribution of Offerings by Year

	Debt		Equity
	All	No Debt Refinancing	All
1990	101	73	30
1991	202	131	76
1992	206	129	73
1993	233	151	90
1994	119	81	53
1995	186	129	55
1996	189	144	56
1997	217	184	44
1998	260	201	13
1999	178	123	29
Total	1891	1346	519

Marginal tax rates are downloaded from John Graham's website. As a substitute for leverage, we calculate and use leverage-deficit as a control variable in our analysis. This follows Hovakimian et al. [4] and Leary et al. [5]. They show that the deviation from leverage ratio is a better determinant of capital structure choices than leverage. Lastly, we calculate post-issue firm-specific return as the difference between the firms and market holding-period returns (HPRs) over a one-year period after issue.

2.1. General Sample Characteristics

Our initial sample consists of 519 equity issues and 1891 debt issues in the 1990-1999 period (Table 1). Out of 1891 debt issues, 545 were used to refinance existing debt and therefore were dropped. Our final sample consists of 1346 debt issues and 519 equity issues that we use in our analysis.

Table 2 shows how the overall proceeds from debt (no refinancing) and equity issues were used during the 1990-1999 period.

Table 2. Primary Use of Proceeds Obtained from SDC

Panel A: Debt- No Refinancing		
Use of Proceeds	Observations	Percentage (%)
Project Finance	3	0.22
Acquiring of securities	5	0.37
Capital Expenditure	5	0.37
Working Capital	5	0.37
Stock Repurchase	7	0.52
Aircraft Financing	7	0.52
Future Acquisitions	11	0.82
Acquisition Financing	33	2.45
Pay on long term borrowing	89	6.61
Reduce Indebtedness	550	40.86
General Corporate Purpose	623	46.29
Unknown	8	0.59
Total	1346	100%
Panel B: Equity		
Use of Proceeds	Observations	Percentage (%)
Project Finance	1	0.19
Working Capital	2	0.39
Capital Expenditure	4	0.77
Future Acquisitions	4	0.77
Stock Repurchase	4	0.77
Aircraft Financing	7	1.35
Acquisition Financing	17	3.28
Pay on long term borrowing	22	4.24
Reduce Debt	65	12.52
Reduce Indebtedness	144	27.75
General Corporate Purpose	190	36.61
Unknown	59	11.37
Total	519	100%

Over 87% of proceeds from debt issues were used for General Corporate Purpose (46.29%) or to repay debt (40.86%). Another 10% of debt issues were used to pay off long-term borrowing (6.61%) or to finance acquisitions (2.45%); less than 3% were used for other purposes. Similarly, 36.61% of equity issuers used the proceeds for General Corporate Purpose. Further, 40.27% of proceeds were used to reduce debt, 4.24% of equity issues were used to repay long-term debt, and 3.28% were used for acquisition financing. Effectively, 44.51% of proceeds from equity issues were used to reduce debt or pay off long-term borrowing, in contrast with the debt sample for which 47.47% of issues were used for debt reduction or to pay off long-term borrowing. Interestingly, these figures are comparable between the two samples. It is worth noting that SDC does not clearly define what is included in the General Corporate Purposes. Especially, for the equity sample, 11.37% of issues were used for unknown purposes. Therefore, these proportions could be affected by the

specifics of the General Corporate Purpose and the number of unknown issues for the equity sample.

On the surface, just a sheer volume of debt issues, 1346 and equity issues 519 in this period (2.6 debt issues for every equity issue) could indicate a pecking order; firms issue equity as the last resort due to asymmetric information and the agency costs associated with equity issues. Equity undervaluation hypothesis can also justify debt preference if we observe positive stock abnormal returns after debt issues. We will test this hypothesis.

Table 3. Descriptive Statistics

	Debt		Equity	
	Mean	Median	Mean	Median
Log (asset)	8.36	8.41	5.74	5.51
Collateral	0.56	0.56	0.53	0.54
Profitability	0.16	0.16	0.13	0.14
Market-to-book	1.48	1.21	1.70	1.24
Leverage	0.27	0.24	0.26	0.22
Pre-issue marginal tax rate	0.26	0.34	0.22	0.33
Months to maturity	145.59	120	--	--
Obs.	1346		519	

Table 3 compares the general characteristics of our control variables. Variables in this table are defined in the Appendix. Graham marginal tax rates are recorded as of one year before the issue date [6]. Debt maturity is calculated by extracting issue date and maturity date from SDC. The table shows that debt issuers are more sizable than equity issuers. Size is measured by the log of assets. The mean (median) size for the debt issuers is 8.36 (8.41) as opposed to 5.74 (5.51) for equity issuers. Debt issuers show slightly higher mean (median) profitability than equity issuers; 0.16 (0.16) versus 0.13 (0.14), and they are slightly more leveraged than equity issuers are. Debt issuers have mean (median) leverage of 0.27 (0.24) relative to equity issuers, 0.26 (0.22).

Consistent with the trade-off theory, debt issuers have lower mean market-to-book ratio than equity issuers, 1.48 versus 1.70. However, median market-to-book ratios are more comparable between the two groups, 1.21 for debt issuers versus 1.24 for equity issuers. In addition, consistent with the trade-off theory, debt issuers have pre-issue mean marginal tax rate of 0.26 versus 0.22 for equity issuers. However, the medians are more comparable, 0.34 versus 0.33. The mean (median) maturity for the debt issues is 12 (10) years.

3. Results

Panel A in Table 4 provides a logit comparison of debt-equity choices for our final sample of 1865 observations comprised of all equity issues (519) and debt issues with no refinancing (1346). The dependent variable is either 1 if debt was issued or 0 if equity was issued. The independent variables are defined in the Appendix. The dependent variable is 1 for debt issues and 0 for equity issues. Leverage deficit, Market-to-book, Collateral, Profitability, and Prior 1 yr. firm-specific return are winsorized at the 1% level. Appendix contains a complete description of these variables. *, **, and *** indicates significance at 10%, 5% and 1% level.

Consistent with the trade-off theory the leverage deficit (median industry leverage minus firm's leverage) has a positive and significant coefficient. Assuming that the industry leverage is a reasonable substitution for a firm's optimal leverage, this shows that underleveraged firms attempt to issue additional debt to get closer to their optimal leverage ratio. This is in line with the predictions of the trade-off theory. In addition, Table 4 shows that bigger (measured by log (assets)) and more profitable firms are expected to issue more debt. This is also consistent with the trade-off because bigger and more profitable firms tend to have higher marginal tax rates and thus more incentive to issue debt instead of equity. However, for the overall sample, higher rates (T-bill) do not seem to deter firms from issuing less debt. The coefficient for T-bill is negative (in line with trade-off) but insignificant. The coefficient for collateral is positive (in line with trade-off) but insignificant.

Consistent with market timing, firms with higher momentum (pre-runup) issue more equity and consistent with the trade-off theory, firms with higher growth options (measured by market-to-book ratio) tend to issue more equity. The coefficient is significant at the 5% level. Further, bullish markets seem to encourage firms to issue more equity; the coefficients for pre-mkt and pre-runup are significant at 1% level.

A higher credit spread could signal deteriorating economic conditions. The logit regression shows that firms issue more equity during deteriorating economic conditions. This is probably due to the tightening of credit market during an economic downturn or precession conditions. Further, trade-off predicts a negative correlation between debt issuance and uncertainty regarding economic prospects. In line with trade-off, the coefficient for the credit spread is significant at 1% level.

Table 4. Logit Comparison of Debt and Equity Issues

Panel A: All (n=1865)					
Variable	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	sig
Intercept	-3.068	0.7472	16.8597	<.0001	***
Def_Mlev	1.6081	0.4309	13.9267	0.0002	***
MB	-0.192	0.0978	3.8542	0.0496	**
Collateral	0.4451	0.3542	1.5797	0.2088	
Profit	3.5972	1.143	9.9041	0.0016	***
Log-asset	0.829	0.0466	316.1626	<.0001	***
TBILL	-0.0949	0.0767	1.5312	0.2159	
spread	-1.618	0.4314	14.0666	0.0002	***
pre_Mkt	-1.6332	0.4387	13.8577	0.0002	***
pre_runup	-1.1837	0.1544	58.7644	<.0001	***
Panel B: Investment grade (n=1254)					
Variable	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	sig
Intercept	-1.7498	1.2168	2.0678	0.1504	
Def_Mlev	2.1835	0.7806	7.8251	0.0052	***
MB	-0.4494	0.1708	6.9263	0.0085	***
Collateral	-1.2393	0.5567	4.955	0.026	**
Profit	9.2302	2.4103	14.6649	0.0001	***
Log-asset	0.6301	0.0901	48.9465	<.0001	***
TBILL	0.1517	0.1205	1.5847	0.2081	
spread	-1.756	0.6205	8.0093	0.0047	***
pre_Mkt	-1.9115	0.6175	9.5826	0.002	***
pre_runup	-1.4153	0.3028	21.8546	<.0001	***
Panel C: Junk grade (n=611)					
Variable	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	sig
Intercept	-0.8984	1.1572	0.6027	0.4375	
Def_Mlev	0.3788	0.5804	0.4261	0.5139	
MB	-0.0901	0.1314	0.4706	0.4927	
Collateral	1.704	0.4921	11.9907	0.0005	***
Profit	-0.6984	1.2866	0.2947	0.5872	
Log-asset	0.5301	0.0783	45.834	<.0001	***
TBILL	-0.2963	0.1125	6.94	0.0084	***
spread	-2.4981	0.8402	8.8398	0.0029	***
pre_Mkt	-0.6267	0.6939	0.8157	0.3664	
pre_runup	-0.94	0.1807	27.055	<.0001	***

Results in Panel B for the subsample of 1254 investment grade firms are very similar to Panel A. With the exception of collateral, all other coefficients have the same sign and similar statistical significance. Surprisingly, collateral has a negative sign and is significant at 5% level suggesting that investment-grade firms with more collateral issue more equity. This cannot be explained by the capital structure theories tested in this paper.

We observe several differences in panel C when we run the logit regression for the junk-grade firms. First,

junk-rated firms follow the predictions of the trade-off regarding collateral. They issue more debt when they have more collateral in their balance sheets (1% significance). Second, leverage deficit loses significance for this group suggesting that junk-grade firms do not issue debt to reach their optimal leverage ratio (median industry leverage) as predicted by trade-off. The market-to-book ratio also loses significance, indicating that junk-grade firms with higher growth option will not necessarily issue more equity. Further, profitability has no impact on the debt-equity choice of

junk-grade firms. This is also inconsistent with the predictions of the trade-off theory. Interestingly, unlike the investment-grade firms, junk-rated firms are more sensitive to the yield curve (T-bill). Panel C suggests that during the 1990-1999 period as rates increased junk-rated firms made fewer debt issues. The coefficient for the T-bill is significant at a 1% level. This is consistent with the trade-off; as rates go up the dead-weight costs of bankruptcy exceed the tax saving benefits of debt. Junk-grade firms behave similarly to the investment-grade firms when it comes to pre-runup and credit spread. Overall, we find mixed results for the trade-off theory.

Table 5 presents firm and market returns post issue. First, 67% of junk-grade firms issued equity (411/611) as opposed to 9% of investment-grade firms (108/1254). This is consistent with the trade-off because junk-grade firms have lower marginal tax rate and higher cost of bankruptcy. Further, junk and investment-grade issuers' mean and median raw and firm-specific returns (firm's raw return minus market return) are presented and compared. As expected, consistent with the bull market wave of the 1990s, post-issue market returns are positive for all the categories (1% significance level).

Investment-grade as well as junk-grade equity issuers face post-issue firm-specific returns that are negative at 1% significance level. Several theories in capital structure can explain this finding. According to the market-timing hypothesis, overvalued equity incentivizes companies to take advantage of the good market conditions by issuing equity. The negative post-issue returns are consistent with the market-timing hypothesis as it predicts that a firm's stock price to revert to its intrinsic value following the issuance of overvalued equity. The pecking order theory also predicts this. As the least desirable way of external financing, due to its agency costs, equity is always more expensive than debt. However, this argument is weakened when we look at junk-grade issuers with logically higher agency costs than investment-grade issuers. Table 5 shows that firm-specific returns for junk-grade debt issues are negative and even 9.23% lower than junk-grade equity issues.

As was the case for equity issuers, both investment and junk-grade debt issuers have negative and significant

post-issue returns. Among the four categories, junk-grade debt issuers' stock price drops the most post-issue. While negative stock returns after debt issues are well documented in the literature, Spiess and Affleck-Graves find that straight, as well as convertible debt issuers, also face negative post-issue stock returns [7]. They also find that this problem is more severe for younger, smaller, and junk-grade issuers and NASDAQ-listed firms have the same problem. They conclude that similar to equity issues, debt offerings also signal overvaluation.

Next, in both categories, equity issuers' raw returns outperform those of debt issuers. We also observe that for investment-grade firms, consistent with the equity undervaluation hypothesis, debt issuers show higher firm-specific post-issue returns than equity issuers. Yet interestingly, for the junk sample we observe the opposite. That is, junk-grade post-issue firm-specific returns are higher for equity issuers than debt issuers. This observation cannot be explained by the equity undervaluation hypothesis since according to this hypothesis, debt issues are caused by equity undervaluation. Therefore, Table 5 provides evidence against the equity undervaluation hypothesis for the junk-grade issues.

Finally, we use Carhart 4-factor model [8] that is similar to Fama-French 3-factor model [9] with an added factor (momentum). We do not find any statistical significance for post-issue returns using this model.

In Table 6, we present three-day cumulative abnormal returns (CAR3) around the announcement of the security issues for the investment- and junk-grade samples. Mean and median CAR3 is negative and significant at 1% for all the categories with the exception of junk-rated debt issues. In addition, junk-rated equity issues show the highest reaction (-1.59% CAR3) followed by investment-grade equity issues (-1.17% CAR3). A more negative market response to equity issues is consistent with pecking order because equity is the least desirable source of external financing according to the pecking order. However, post-issue firm-specific returns presented in Table 5 do not support the notion that in the long run debt financing, especially junk-debt, has any advantage over equity financing.

Table 5. Post-issue Stock Returns

	Investment-grade firms						Junk-grade firms						
	Equity			Debt			Equity			Debt			
		(%)		p-value	(%)		p-value	(%)		p-value	(%)		p-value
Post 1yr. firm raw return	Mean	14.50%	***	0.000	12.00%	***	0.000	15.19%	***	0.000	7.19%	***	0.000
	Median	10.49%			8.33%			4.09%			0.77%		
Post 1 yr. market return	Mean	43.39%	***	0.000	38.83%	***	0.000	39.50%	***	0.000	40.73%	***	0.000
	Median	45.95%			39.55%			39.96%			38.92%		
Post 1 yr. firm-specific return	Mean	-28.89%	***	0.000	-26.83%	***	0.000	-24.31%	***	0.000	-33.54%	***	0.000
	Median	-34.83%			-29.80%			-35.65%			-41.58%		
Fama-French 4-factor alpha		0.11		0.933	0.92		0.158	1.06		0.284	1.66		0.327
N		108			1146			411			200		

In Table 4 we got mixed results when we tried to explain the debt-equity choices of junk-grade firms by the trade-off theory. In Table 6, junk-grade debt issuers are the only group with no negative stock reaction to the announcement of the issue. In fact, the mean CAR3 is positive (0.14%) although not significant. This observation is consistent with the wealth-transfer notion as elaborated by Eberhart and Siddique [3]. The authors show that adverse stock response to equity issue announcements signals wealth transfer concerns. According to the wealth transfer hypothesis, shareholders of risky firms (such as junk-grade firms) are more inclined to issue debt because issuing equity will result in a wealth-transfer from existing stockholders to bondholders by reducing the default risk. The results in Table 6 are consistent with their finding. The stock reaction to the announcement of junk-grade equity issues is -1.59% and significant at 1% as opposed to a positive and insignificant reaction observed for junk-grade debt issues.

Table 6. Analysis of Stock Reaction to Announcement of Security Issues

	N		CAR3		z-statistics
Investment equity	108	Mean	-1.17%	***	-4.33
		Median	-1.52%		
Investment debt	1146	Mean	-0.25%	***	-3.02
		Median	-0.34%		
Junk equity	411	Mean	-1.59%	***	-4.91
		Median	-1.67%		
Junk debt	200	Mean	0.14%		0.95
		Median	-0.32%		

4. Conclusions

In this paper, we attempt to understand the underlying reasons for debt versus equity issues during the 1990s. We find that debt issuers used approximately 87% of proceeds for general corporate purposes or to repay debt. Almost

77% of equity issuers used the proceeds for the same purpose. On the surface, higher debt issues in this period are in line with the predictions of the pecking order theory; but our subsequent analysis does not support pecking order. In addition, debt issuers were larger, slightly more profitable, and more leveraged than equity issuers. Consistent with the trade-off theory, debt issuers had higher marginal tax rates and lower growth options measured by market-to-book ratio. Additionally, consistent with the trade-off, we find a negative relationship between debt issuance and uncertainty regarding economic prospects as measured by the higher credit spread.

We show that 67% of junk-grade firms issued equity as opposed to 9% of investment-grade firms. While this is in line with the trade-off theory because junk-grade firms have lower marginal tax rates and higher costs of bankruptcy, we find evidence that junk-grade firms avoid issuing equity also due to wealth-transfer concerns. According to the wealth-transfer hypothesis, an equity issuance will benefit bondholders at the expense of equity holders by lowering the default risk. In contrast, we show that such wealth transfer concerns do not seem to alarm investment-grade issuers. We also find evidence in support of the market timing hypothesis since firms with higher stock price momentum were more likely to issue equity. We find little evidence in support of pecking and equity undervaluation.

We are not able to explain the following: first, investment-grade firms with higher collateral issued more equity (but consistent with the trade-off theory, junk-grade firms with more collateral issued more debt). Second, unlike investment-grade firms and consistent with trade-off, junk-grade issuers issued less debt and more equity when yields were high. Yet, for junk-grade firms, evidence from profitability and market-to-book ratios are inconsistent with the predictions of the trade-off theory.

We conclude that the trade-off theory fares the best among all the competing theories examined in this paper although it falls short in some cases.

Appendix: Variable Definitions

The following variable definitions are borrowed from Frank and Goyal [10] and Kadapakkam, Meisami, and Wald [11].

1. $\text{Market value of assets calculated as follows} = \text{market equity} + \text{current liabilities} + \text{long-term debt} + \text{preferred} - \text{liquidation value} - \text{deferred taxes and investment tax credit}$
2. $\text{Market-to-Book} = \frac{\text{market value of assets divided}}{\text{total book assets}}$
3. $\text{Firm leverage} = \frac{\text{total debt}}{\text{market value of assets by year and by industry classification}}$
4. $\text{Profitability} = \frac{\text{operating income before depreciation}}{\text{total assets}}$

5. $\log(\text{asset}) = \log(\text{total assets})$
6. $\text{Median industry leverage} = \frac{\text{industry median debt}}{\text{market value of assets by year and by industry classification}}$
7. $\text{Leverage deficit} = \text{median industry debt-ratio} - \text{firm's debt-ratio}$
8. $\text{Collateral} = \frac{\text{inventory} + \text{net PP \& E}}{\text{total assets}}$
9. 1-year T-bill rate: available on Federal Reserve's Bank of St Louis website
10. $\text{Default spread} = \text{monthly yield Baa bonds} - \text{monthly yield of AAA bonds}$
11. Prior 1 yr. market return is the HPR for the period beginning 250 trading days before the issue and ending a day before the issue date
12. $\text{Prior 1 yr. firm-specific return} = \text{firm HPR} - \text{the market HPR over the 1-year period before the issue}$
13. $\text{Post 1 yr. market return}$ is the market HPR over the one-year period post-issue
14. $\text{Post 1 yr. firm-specific return} = \text{firm HPR} - \text{the market HPR over the one-year period post-issue}$

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