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MANAGING THE MATURITY STRUCTURE
THE SHORT-TERM--- LONG-TERM DECISION

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List of Tables

Table		Page
Table	Base Run Simulation	15
2	Results of Control of STAR	16
3	Results of Control of Current Ratio	18
4	Results of Control of Months of Borrowing Potential	19
5	Control of Months of Borrowing Potential Impact on the Long-Term Financing Multiplier and Control	21
6	Control of Months of Borrowing Potential Impact on the Long-Term Financing Multiplier and Control of Time Between Debt Issue	22

Table of Contents

	Page
Introduction	1
Managing the Maturity Structure	3
The Model	6
Sample Output - The Base Run	12
Effects of Debt Policy Control	14
Conclusions	23
Appendix	25

List of Figures

Figure		Page
1a	The hedging approach to maturity structure.	2
1b	The financing pattern.	2
2	Structure of the total firm.	7
3	Debt management subsector.	9
4	Difference between current and historical long-term interest rates.	10
5	STAR (Short-Term Liabilities to Total Asset Ratio)	11
6	Test firm, initial financial statements.	13
7	Effect of short-term debt to total asset ratio on debt issue size.	16
8	Effect of current ratio on debt issue size.	18
9	Effect of months of borrowing potential on debt issue size.	19
10	Effect of months of borrowing potential on payback of the line of credit loan.	21

Introduction

A hedging approach to determining the maturity structure of a firm's debt requires that each asset be balanced by a liability of comparable life. As current assets and current liabilities vary in the ebb and flow of cyclical business behavior, the employment of short-term sources of financing has to be altered accordingly. In the same manner, as the permanent current assets increase with normal firm growth, the increase should be financed through long-term sources. Such policies will minimize risk in the sense that, in theory, maturing debt obligations could be repaid through asset liquidation. Figure 1a represents a hedging approach to debt financing. Note that variations in the proportional utilization of long-term and short-term debt are directly dependent upon the expansion and contraction of long-term and short-term assets.

Another factor which affects the maturity structure of a firm's debt is the discontinuous availability of long-term debt. The structure of the capital market is such that firms do not enjoy continuous access to long-term debt; rather, relatively large amounts of such capital are obtained at periodic intervals. Figure 1b shows how financing is likely to occur. The firm finances the acquisition of all assets, current and fixed, using short-term debt until the level of short-term liabilities reaches at least the minimum long-term debt issue size. Then a sale of long-term debt is arranged and the proceeds are used to pay off all or part of the short-term liabilities. If the amount of the long-term issue exceeds short-term borrowing, the firm acquires marketable securities with the excess funds. As asset expansion continues, the marketable securities may be sold before additional short-term borrowing occurs.

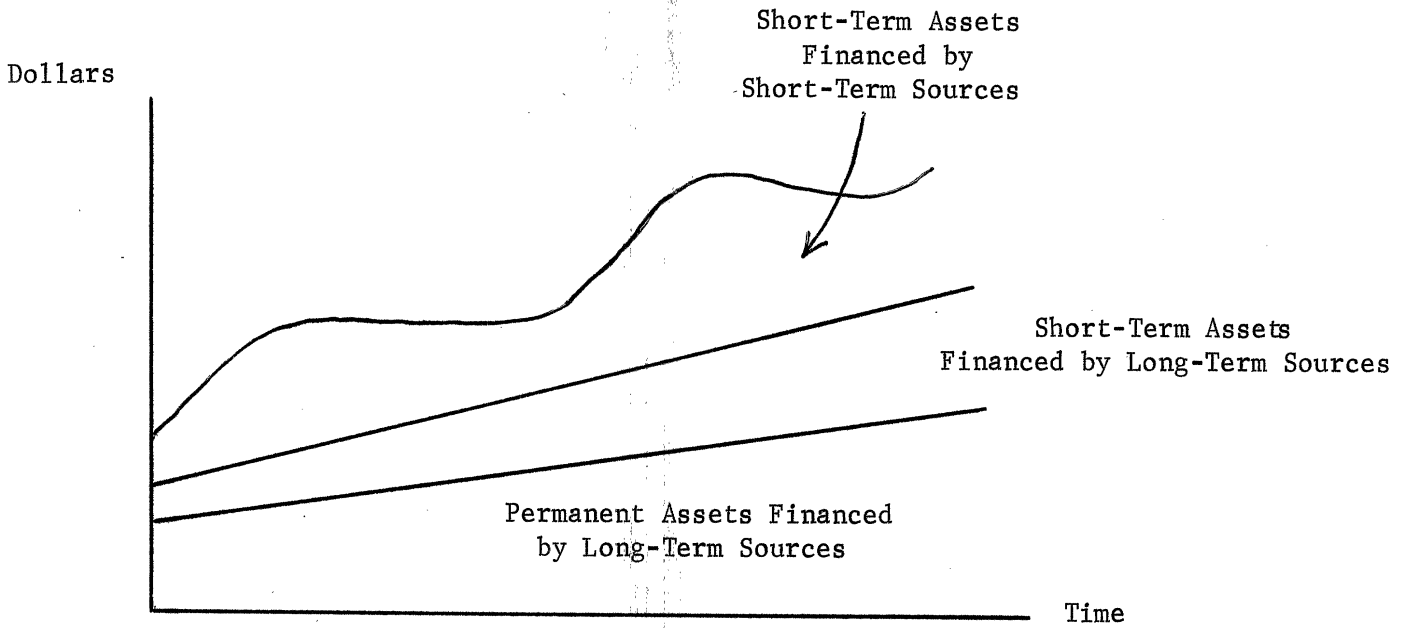


Fig. 1a. The hedging approach to maturity structure.

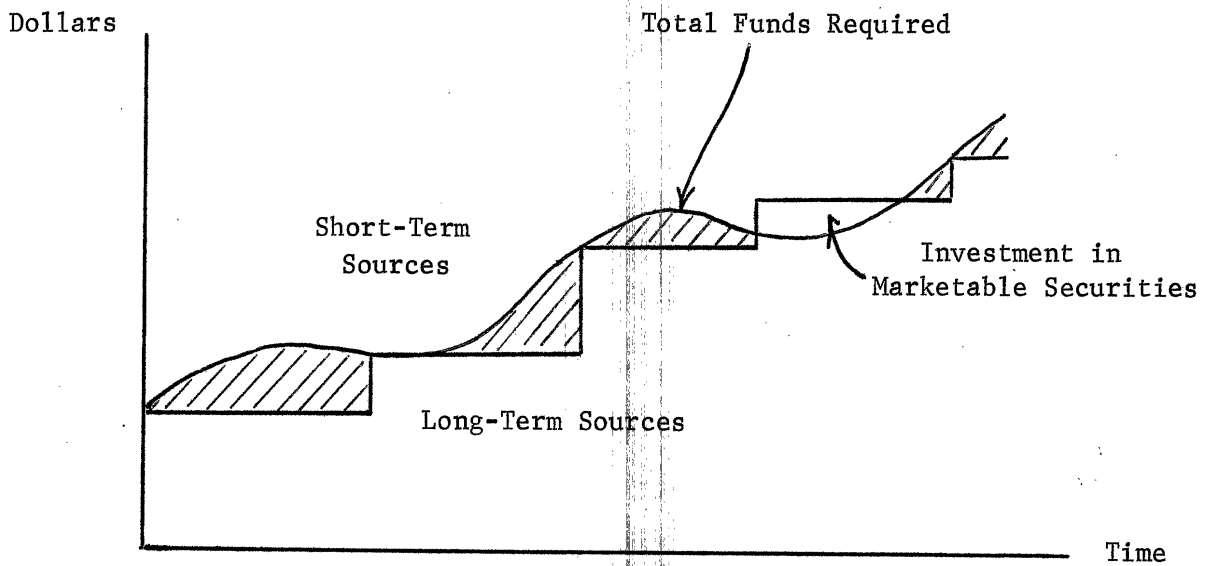


Fig. 1b. The financing pattern.

The critical decisions in this financing procedure relate to the amount and timing of the long-term debt issues. The availability of short-term funds gives management flexibility in timing the sale of each issue to coincide with periods of relatively low interest cost. Debt management policies which seek to control the factors related to the attainment of the availability, flexibility, and cost objectives are evaluated in this paper using a dynamic simulation technique called "System Dynamics."

Tests of the debt management model lead to the conclusion that explicit control of a short-term funds availability measure, months of borrowing potential, coupled with recognition of limits on certain liquidity and availability measures, achieves a desirable financing pattern.

Managing the Maturity Structure

Given a degree of uncertainty about future interest rates and a specified debt equity ratio, the optimal maturity composition of the firm's debt will be the structure which minimizes the cost of debt financing. Worthy as such an objective might be, it is difficult to attain, because the risk in future interest rate changes is difficult to measure and the debt-equity ratio is likely to change in time. Moreover, the financing cost difference for a spectrum of possible short-long proportions can be shown to be quite small. When this is the case, noncost factors, such as availability and flexibility, play an increasingly important role in the determination of the maturity structure.

Ideally, a multiattributed objective function could be formulated

and optimized to select debt composition. But such theory is not well developed. ^{1/} It is not our intention in this paper, therefore, to attempt to optimize an objective which simultaneously considers cost, availability, and flexibility of alternate debt financing procedures. Neither do we succumb to the temptation to focus solely on cost minimization. Interviews with treasurers verify that cost is only one and perhaps not even the most important factor in the maturity structure decision. ^{2/} Instead, this work complements the debt management techniques used by financial managers by focusing on the behavior of certain balance sheet and income statement ratios which measure indirectly the multiple objectives cited above.

If availability, flexibility, and cost were independent components of the overall debt management objective, the task of establishing debt policy would be greatly simplified. An unambiguous measure of each component could probably be determined. Debt management would consist of following policies which would result in some "best" value for each measure of a subobjective. "Best" would be determined by such factors as managerial

^{1/}

An extensive attempt to develop decision-making techniques for multiple objective situations is contained in James Hatch, "The Application of Decision Analysis to Multi-attributed Business Decisions" (Ph.D. dissertation, The University of Michigan, Ann Arbor, 1972). The bibliography presented in the dissertation is particularly useful.

A discussion of how goal programming may be useful for considering multiple objectives is contained in James C.T. Mao, Quantitative Analysis for Financial Decisions (Toronto: The Macmillan Company, 1969), chapters 4 & 5.

^{2/} The financial officers of several large firms in the Detroit area cooperated in the effort to obtain insight into the debt management process.

risk preference, creditor debt availability parameters, and market characteristics.

The debt financing subobjectives are interdependent, however. If flexibility is defined as the ability to speed up or delay the timing of a long-term debt issue, the ability to obtain the lowest interest cost clearly depends on flexibility. At the same time, flexibility is dependent upon the availability of both short-term and long-term debt, which in turn are a function of risk and thus cost. Moreover, the measures of debt management goals may not be singularly related to a particular goal. The proportion of short-term debt to total debt is both an availability measure and a weak flexibility measure. Debt rating reflects both the cost and availability of funds.

Because the components of the debt objective function are difficult, if not impossible, to separate and because the common measures of goal satisfaction (financial ratios) are imperfect measures of the objectives, the financial manager continues to judge debt management performance on the basis of the relative (to time and to other businesses) performance of a number of financial ratios simultaneously. This work follows that procedure. Of particular significance, however, is the fact that one flexibility measure, months of short-term borrowing potential, is found to exert a particularly strong control over the variations in several other measures of goal satisfaction. This measure, found by dividing the unused line of credit by a projected rate of short-term borrowing, combines availability and use to determine the flexibility for achieving low-cost borrowing. The discovery of such factors is an important output of the

application of system dynamics to problems of the firm.

The Model

The system dynamics model used in this study consists of a set of difference equations which describe the causal relations among balance-sheet and income-statement variables, managerial policies, and exogenous forces. If each of the equations were linear, as are the relations between balance-sheet and income-statement variables, a direct solution of the impact of change would be possible. But the equations which describe the way in which information (e.g., balance sheet ratios) is translated into action (e.g., how much long-term debt to issue) may be nonlinear. In such a case, the recursive simulation approach of system dynamics is necessary.

The output of the model is evolutionary. Starting with an initial system state and the set of difference equations which describe the process of change, the model calculates the impact of an exogenous force (e.g., demand) to yield the state of the system at the end of a single period. When multiperiod exogenous change is induced, the model proceeds recursively to provide a time series of system states. An analysis of this output allows management to evaluate policy in terms of its effect on the performance of the firm over time.

The debt financing subsystem studied in this paper is part of the total firm model diagrammed in Figure 2. The firm model is complete in the sense of balance-sheet and income-statement relationships, but this study makes no attempt to consider the effect of managerial policy on areas other than debt management.

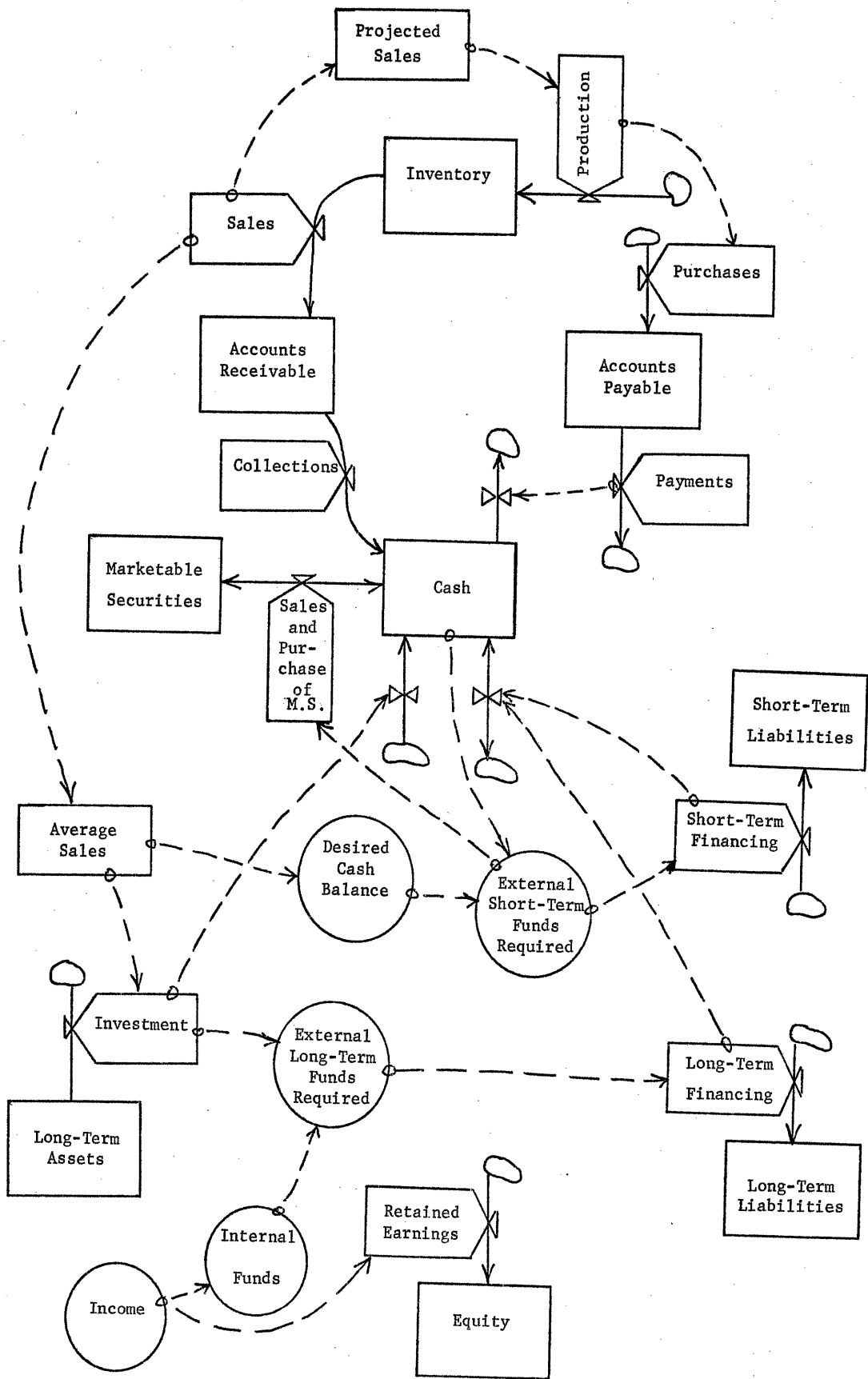


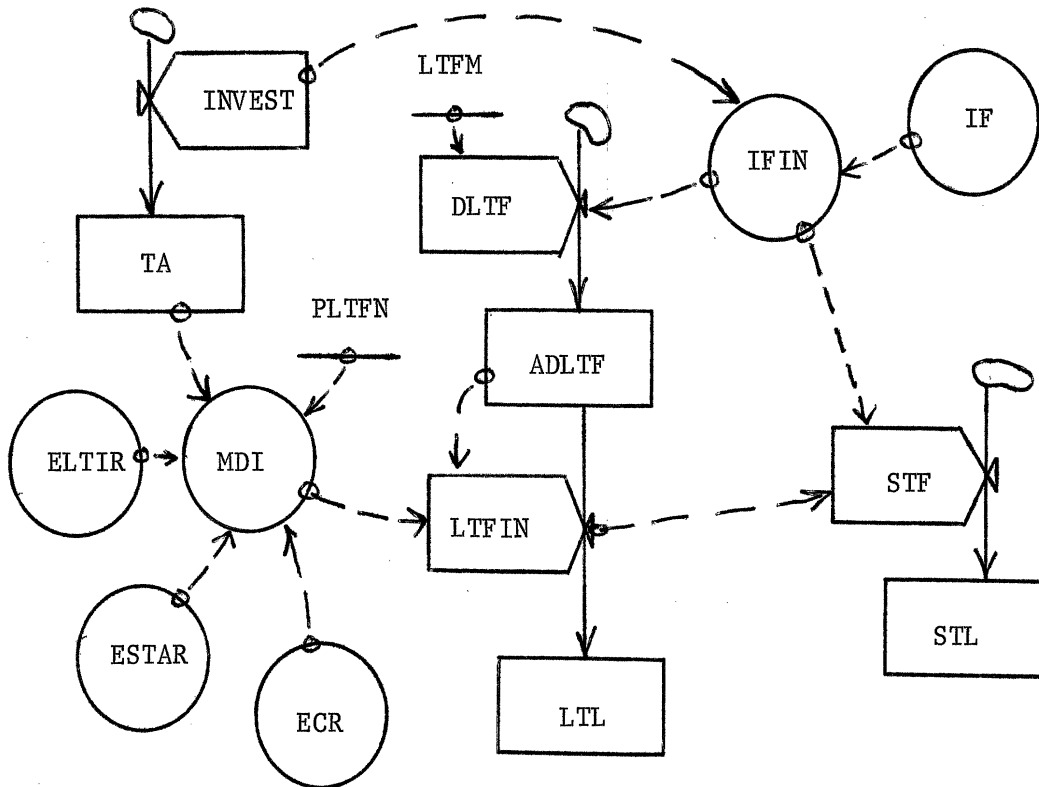
Fig. 2. Structure of the total firm.

in areas other than debt management. ^{1/}

The structure and equations used in the debt financing subsector are shown in Figure 3. The exogenous force which causes the system to change is growth in sales. As sales grow, the firm requires additional investment in assets. The portion of asset expansion which is not financed through retained earnings is financed with debt capital (Equation 1). (Equations 1-4 are shown as part of Figure 3.) The sale of new equity capital is not included as an option. In the range of total debt to total capital encountered in the simulation, it is assumed that the terms on short- and long-term debt are not altered because of changes in this ratio. Once the total financing need is found, managerial policy determines the extent to which short-term and long-term debt sources will be employed in meeting that need (Equation 2).

Two sources of debt capital are available: a line of credit loan and long-term debt. Commercial paper was not included, because its use effectively lowers the credit line by a corresponding amount. Since long-term financing is not available on a continuous basis, the firm finances continuously with the line of credit loan. Periodically, a

^{1/} Policies regarding cash management, receivables, inventory, payables, and dividends are held constant. Two related papers explore the working-capital policies. See James M. Lyneis and Raymond R. Reilly, "Working Capital Management: A System Dynamics Approach," Working Paper No. 73, Graduate School of Business Administration, The University of Michigan, Ann Arbor, 1973, and Raymond R. Reilly and James M. Lyneis, "Accounts Receivable Management," Midwest AIDS Proceedings, 1973, pp. G-29 to G-32.



Equations:

$$\text{IFIN} = \text{INVEST} - \text{IF} \quad (1)$$

$$\text{DLTF} = \text{IFIN} * \text{LTFM} \quad (2)$$

$$\text{ADLTF}(t) = \text{ADLTF}(t-1) + (\text{DLTF} - \text{LTFIN}) \quad (3)$$

$$\text{LTFIN} = \begin{cases} 0 & \text{if } \text{ADLTF}(t) < \text{MDI} \\ \text{ADLTF} & \text{if } \text{ADLTF}(t) \geq \text{MDI} \end{cases} \quad (3)$$

$$\text{STF} = \text{IFIN} - \text{LTFIN} \quad (4)$$

$$\text{MDI} = \text{TA} * \text{PLTFN} * \text{ELTIR} * \text{ESTAR} * \text{ECR} * \text{EMBP} * \text{ESP} * \text{ETBDI} * \text{EICOV} \quad (4)$$

Definitions:

- IFIN - Indicated External Financing
- INVEST - Investment
- IF - Internal Funds (After tax income plus depreciation minus dividends)
- LTFM - Long-Term Financing Multiplier
- DLTF - Desired Long-Term Financing
- ADLTF - Accumulated Desired Long-Term Financing
- LTFIN - Long-Term Financing
- STF - Short-Term Financing
- MDI - Minimum Acceptable Debt Issue (Managerial Viewpoint)
- PLTFN - Percentage Long-Term Financing Normal
- TA - Total Assets
- ELTIR - Effect of Differential Between Current and Historical Long Term Interest Rates
- ESTAR - Effect of Short Term Liabilities to Total Asset Ratio
- ECR - Effect of Current Ratio
- EMBP - Effect of Months of Borrowing Potential
- ESP - Effect of Spread Between Long and Short Rates
- ETBDI - Effect of Time Between Debt Issues
- EICOV - Effect of Interest Coverage

Fig. 3. Debt management subsector.

Fig. 3. Debt management subsector.

long-term issue is sold and the proceeds used to reduce loans (Equation 3). The minimum acceptable debt issue from management's viewpoint is considered to be a function of total asset size, interest rates, debt proportions, liquidity considerations, risk, short-term borrowing potential, and limits on frequency of capital market entry (Equation 4).

Determination of the amount of long-term debt to be sold is the central issue in this model. The effects of managerial policy, creditor constraints, and capital market limitations on issue size are captured in the debt issue size policy by specifying the desired amount of long-term debt financing as a function of the firm's asset size.

$$MDI = PLTFN * TA$$

As the use of the line of credit loan for permanent needs approaches the level MDI, the firm prepares and finally markets the long-term issue. Suppose, however, that interest rates at the time of the proposed issue are at an all-time high. The financial manager might want to delay the debt issue in hope of a fall in rates. The effect of his feelings about the relation between present rates, historical rates, and his willingness to market a debt issue of a given size can be represented as in Figure 4.

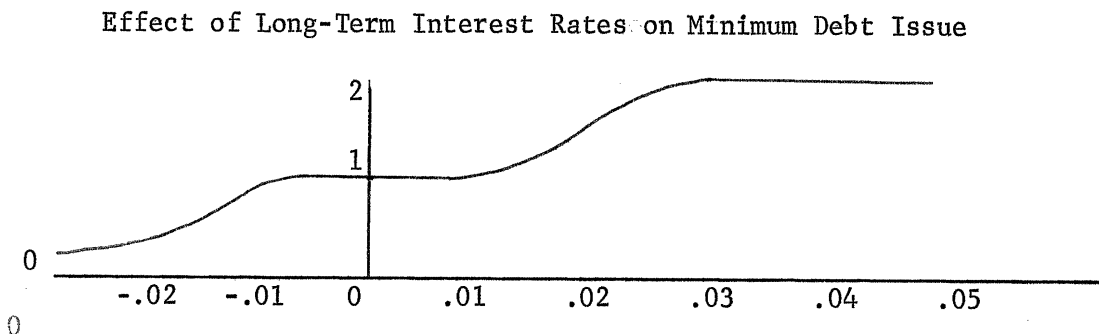


Fig. 4. Difference between current and historical long-term interest rates.

The debt issue size equation can be written:

$$MDI = PLTFN * TA * ELTIR$$

When current rates are greater than the historical rates, the minimum debt issue acceptable to management increases and the debt issue is delayed; the greater the difference, the longer the delay. When current long-term rates are comparable to historical rates, interest rate differentials have no effect on the minimum debt issue size.

Now consider a managerial policy which also attempts to consider the availability of short-term debt in determining the minimum debt issue size. This availability might be represented by the ratio of short-term liabilities to total assets (STAR) as shown in Figure 5.

Effect of Short-Term Liabilities to Total Asset Ratio on the Minimum Debt Issue (ESTAR)

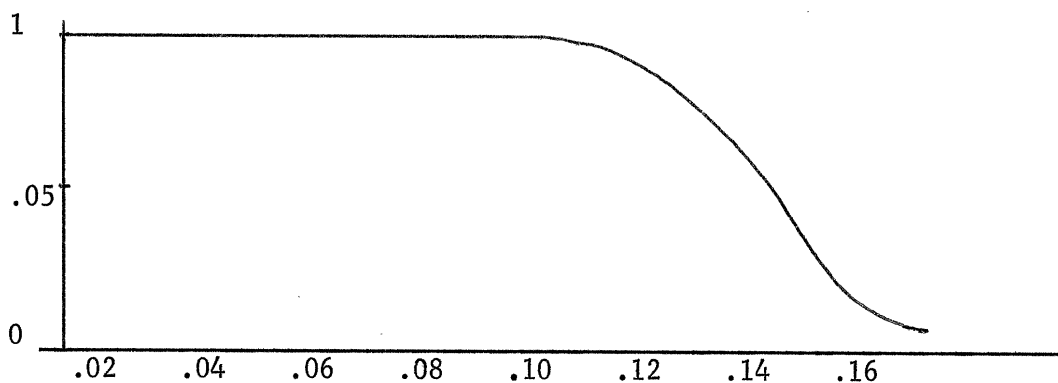


Fig. 5. STAR (Short-Term Liabilities to Total Asset Ratio)

The minimum debt issue equation is now written:

$$MID = PLTFN * TA * ELTIR * ESTAR$$

For low levels of short-term liabilities to total assets the firm has

an adequate availability of short-term debt and STAR has no effect on the minimum debt issue size. As STAR increases above 10 percent the minimum debt issue acceptable to management falls in recognition of the firm's approach to the limit of short-term debt availability. At STAR levels near 16 percent the sale of long-term debt is almost immediate.

Note that the effects of historic versus current rate levels and proportion of short-term debt are combined multiplicatively in Equation 4. When high levels of STAR combine with relatively low long-term rates, the debt issue will be sold sooner and in smaller amounts. Clearly the combined effects could cancel or, in the case of combinations of other policies, result in a long delay and a very large sale of debt issue.

This model can consider the potential impact on long-term debt timing and amount of all the factors included in Equation 4. In the following section, the results of several tests of the model are described and interpreted.

Sample Output - The Base Run

The data used in the simulation runs are hypothetical. The figures are roughly comparable to those of a so-called typical firm in industries where the growth rate for the past several years approximated 10 percent.^{1/} The initial financial statements for the firm and the policy assumptions which are held constant throughout the simulations are presented in Figure 6.

^{1/} Balance sheet and income statement figures and ratios were obtained from Statement Studies Annual (Philadelphia: Robert Morris and Associates, 1972 ed.).

Test Firm Initial Financial Statements

Balance Sheet (Time 0)

Cash	\$ 10.00	Accounts Payable	\$ 85.00
Marketable Securities	10.00	Short-Term Liabilities	<u>79.71</u>
Accounts Receivable	150.00	Total Current Liabilities	164.71
Inventory	<u>116.25</u>	Long-Term Liabilities	<u>460.27</u>
Total Current Assets	286.25	Total Liabilities	624.98
Fixed Assets	<u>799.00</u>	Equity	<u>460.27</u>
Total Assets	\$1085.25	Total Liabilities & Equity	\$1085.25

Income Statement (preceeding year)

Revenue	1204.80
Cost of Goods Sold	1104.00
Interest	<u>41.60</u>
Income Before Taxes	59.20
Taxes	<u>29.60</u>
Net Income	29.60

Exogenous Inputs: Sales growth at 10 per cent per year
 Short-term interest rate of 6 percent
 Long-term interest rate of 8 percent

Constant Policies:

- Inventory - Maintain a Coverage Ratio of 1.5 times average sales
- Cash - Desire a Cash Balance of 10 percent of average sales
 First sell all marketable securities to meet cash
 needs, then borrow short-term; with extra cash,
 repay short-term liabilities to desired level,
 then buy marketable securities.
- Payables - repayment time one month on average
- Dividend - maintain a 10 percent payout ratio
- Investment - invest so as to be able to produce at a level
 equal to short-term average of sales

Fig. 6. Test firm, Initial financial statements.

The initial simulation generates a base run which is used as a comparative standard. Summarized results are shown in Table 1 and a more complete presentation of the output is given in Table A-1 (Appendix). Control over debt issue size in the base-run simulation is exerted only by fixing the minimum issue size at 4 percent of total assets. All other policy controls are set at unity, and have no impact in Equation 4. In the base run, financing occurs with increasing frequency, then at equal ten-month intervals. Months of short-term borrowing potential declines at a decreasing rate to a low of only 1.8 months of available delay in the sale of a long-term debt issue. The proportion of short-term liabilities increases to 0.14, indicating a potential problem with the availability of short-term funds. Both measures of liquidity, net working capital and the current ratio decline. Such a loss of availability and flexibility would probably be considered undesirable by a financial manager.

Effects of Debt Policy Control

Each of the following simulations represents an attempt to achieve a pattern of ratio behavior which is, in the manager's view, more desirable than that shown in the base run. Moderate and strong controls are placed successively upon the proportion of short-term liabilities to total assets, current ratio, and months of short-term borrowing potential as each affects the minimum debt issue.

Figure 7 shows the control placed on the proportion of short-term liabilities. The solid line reflects moderate control; the dashed line a stronger effect. The simulation output is summarized in Table 2 and

TABLE 1
Base Run Simulation

Time Since Prior Debt Issue (Months)	Value at Time of Long-Term Debt Issue			
	Months of Borrowing Potential	Short Liabilities - Total Asset Ratio	Net Working Capital (Dollars)	Current Ratio
14	39.0	0.08	106	1.54
13	8.4	0.11	84	1.32
10	5.0	0.13	79	1.26
10	3.2	0.13	76	1.21
10	1.8	0.14	75	1.19

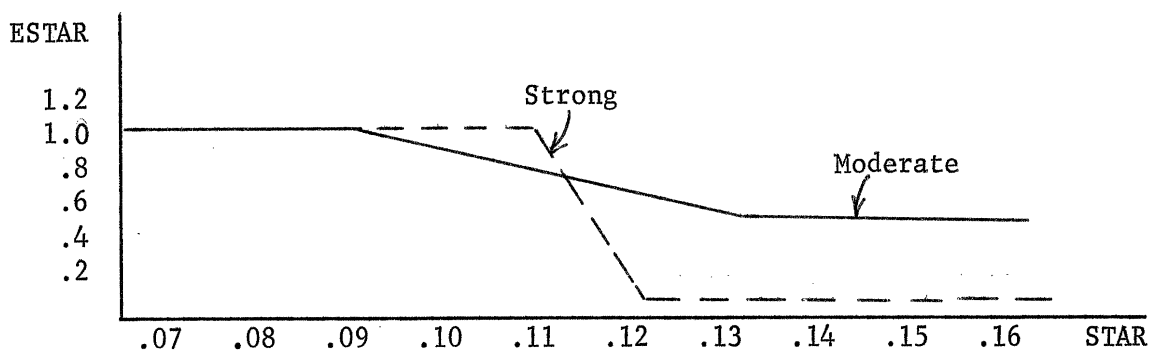


Fig. 7. Effect of short-term debt to total asset ratio on debt issue size.

TABLE 2

Results of Control of STAR

Degree of Control of STAR	Time Since Prior Debt Issue (Months)	Value at Time of Long-Term Debt Issue			
		Months of Potential Borrowing	Short Liabilities-Total Asset Ratio	Net Working Capital (Dollars)	Current Ratio
Moderate	14	39.0	.08	106.5	1.54
	12	9.6	.11	88.0	1.34
	8	9.2	.11	93.3	1.33
	6	9.0	.11	97.0	1.32
	5	7.7	.12	97.5	1.30
	6	7.5	.12	101.1	1.29
Strong	14	39.0	.08	106.5	1.54
	13	8.4	.11	84.2	1.32
	8	8.9	.11	92.7	1.33
	6	8.9	.11	97.0	1.32
	6	9.2	.12	101.9	1.32
	5	10.9	.11	109.0	1.32
	3	9.0	.12	110.5	1.31

detailed in Tables A-2 and A-3. Under moderate control of STAR the frequency of long-term financing increases, the decline in months of borrowing potential is made less severe, and STAR increases at a far lower rate compared to the base run. Liquidity is improved as the net working-capital position first declines and then increases, and the current ratio is minimized at an earlier time and at a higher value. When control over STAR is strengthened, the liquidity and STAR results are not greatly affected, but debt issue occurs with greater frequency and months of borrowing potential first declines and then improves with successive financings. Controlling STAR has improved results, but the cost is a greater frequency of long-term debt sales.

Figure 8, Table 3, and Tables A-4 and A-5 describe similar controls and results on the current ratio. Recall that each control is exerted independently. STAR is not controlled during these runs. The effects of controlling CR are similar to those generated through control of STAR. As the CR effect is strengthened, the decline in months of borrowing potential is reversed, the increase in STAR is limited to lower values, and the deterioration in liquidity is less severe.

Finally, controlling debt issue size through control over months of borrowing potential (MBP) is shown in Figure 9, Table 4, and Tables A-6 and A-7. The pattern of results is similar to the STAR and CR control output, but the effects are not identical. Months of borrowing potential is intuitively appealing as a control because it considers both availability and usage rate. These and other simulation runs indicate that control

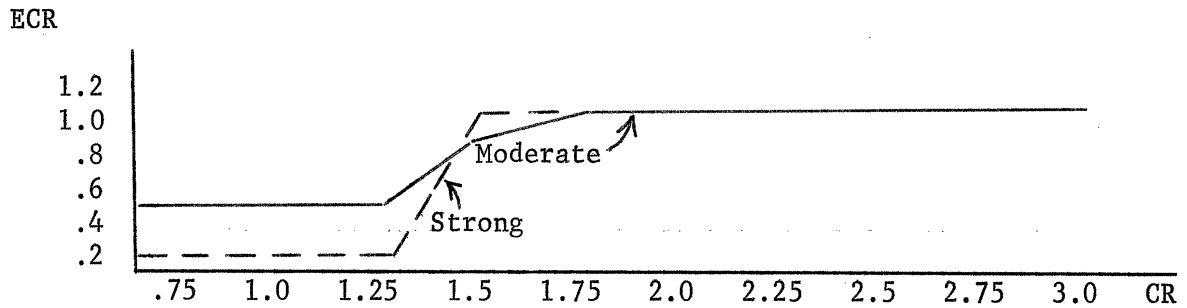


Fig. 8. Effect of current ratio on debt issue size.

TABLE 3

Results of Control of Current Ratio

Type of Control of CR	Time Since Prior Debt Issue (Months)	Value at Time of Long-Term Debt Issue			
		Months of Borrowing Potential	Short Liabilities-Total Asset Ratio	Net Working Capital (Dollars)	Current Ratio
Moderate	14	39.0	.08	106.5	1.54
	11	11.0	.10	91.8	1.37
	7	9.5	.11	94.0	1.34
	6	10.3	.11	99.7	1.34
	5	8.5	.12	98.8	1.31
	5	7.8	.12	100.9	1.30
	5	8.5	.12	107.4	1.30
Strong	14	39.0	.08	106.5	1.54
	10	12.5	.10	95.3	1.39
	7	12.0	.10	99.2	1.38
	5	14.9	.10	106.2	1.39
	5	11.9	.11	105.2	1.36
	4	11.6	.11	107.7	1.35
	4	13.3	.11	113.2	1.35
	3	14.6	.11	117.5	1.35

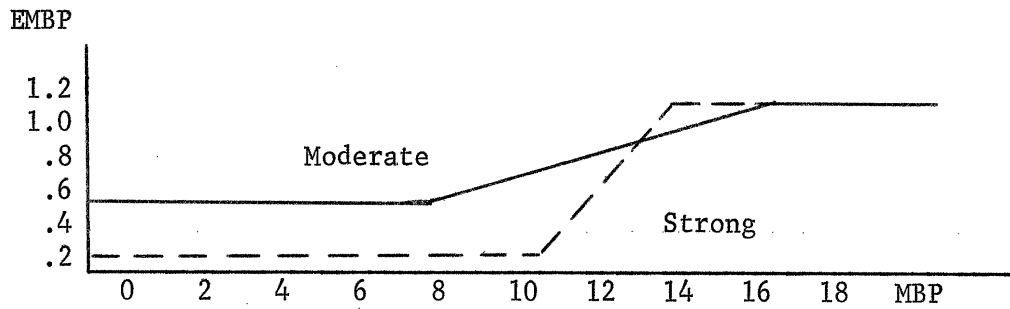


Fig. 9. Effect of months of borrowing potential on debt issue size.

TABLE 4

Results of Control of Months of Borrowing Potential

Degree of Control of MBP	Time Since Prior Debt Issue (Months)	Months of Borrowing Potential	Value at Time of Long-Term Debt Issue		
			Short Liabilities-Total Asset Ratio	Net Working Capital (Dollars)	Current Ratio
Moderate	14	39.0	.08	106.5	1.54
	11	11.0	.10	91.8	1.37
	7	9.5	.11	94.0	1.34
	6	10.4	.11	99.7	1.34
	5	10.4	.11	103.0	1.33
	5	8.9	.12	103.8	1.31
	5	9.6	.12	109.3	1.31
	Strong	14	39.0	.08	106.5
	10	12.5	.10	95.3	1.39
	7	12.0	.10	99.2	1.38
	5	11.2	.11	101.2	1.36
	5	11.9	.11	105.2	1.36
	5	11.6	.11	107.7	1.35
	4	10.4	.11	108.7	1.33
	4	11.6	.11	114.2	1.33

of MBP yields less variability in the low points of MBP at debt issue time than does control of STAR or CR, while at the same time maintaining the same variability in the other measures. Thus MBP presents an effective means of controlling both flexibility and availability measures.

Perhaps the most disturbing conclusion derived from the above analysis is that the firm is required to sell debt issues with increasing frequency in order to achieve desirable liquidity and flexibility. But suppose management uses information about a key measure such as months of borrowing potential to formulate policy on the extent to which short-term liabilities will be reduced each time a debt issue is sold? Let Equation 2 be revised to read:

$$DLTF = IFIN * LTFM * EMBPL \quad (5)$$

The factor EMBPL increases the size of the debt issue when months of borrowing potential is low. The effect is to pay off a greater portion of the outstanding short-term loans, thereby improving the liquidity ratios. Figure 10 shows how this control affects debt-issue size. The results are presented in Table 5, and Table A-8. Now the number of financings has been reduced to five, the same as in the base run. But months of borrowing potential, the proportion of short-term liabilities to total assets, and the liquidity ratios are greatly improved. Table 6 and Table A-9 show the results if a constant frequency of capital market entry is required. In this run, Equation 5 still operates, but an entry constraint is effected. Although borrowing potential drops, liquidity is actually improved over the prior output. Control of the amount of

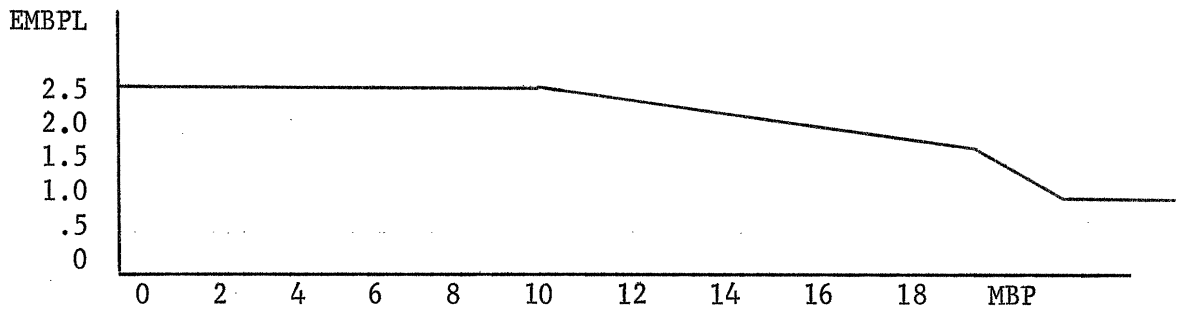


Fig. 10. Effect of months of borrowing potential on payback of the line of credit loan.

TABLE 5

Control of Months of Borrowing Potential Impact on the Long-Term Financing Multiplier

Time Since Prior Debt Issue (Months)	Value at Time of Long-Term Debt Issue			
	Months of Borrowing Potential	Short Liabilities- Total Asset Ratio	Net Working Capital (Dollars)	Current Ratio
14	39.0	.08	106.5	1.54
11	11.0	.10	91.9	1.37
8	11.7	.10	104.4	1.39
8	11.1	.10	112.9	1.39
8	12.6	.10	128.4	1.42

TABLE 6

Control of Months of Borrowing Potential Impact on the
Long-Term Financing Multiplier and Control of Time Between Debt Issue

Time Since Prior Debt Issue (Months)	Value at Time of Long-Term Debt Issue			
	Months of Borrowing Potential	Short Liabilities- Total Asset Ratio	Net Working Capital (Dollars)	Current Ratio
14	39.0	.08	106.5	1.54
11	11.0	.10	91.9	1.37
10	8.2	.11	94.6	1.33
10	9.4	.11	112.7	1.37
10	9.7	.10	133.6	1.40

short-term debt repaid presents the key to effective control of the financing pattern as well as control of the liquidity and availability measures.

C

Conclusions

The recursive simulation procedure used in this study is a powerful tool for investigating the tradeoffs between various debt policy alternatives. Although the tradeoffs between size of debt issue, frequency of market entry, ratio of short-term liabilities to total assets, current ratio, net working capital, and months of borrowing potential are perhaps obvious (which, after the results of a simulation of this type, ~~they should be~~), the model provides a way of measuring the relative magnitude of the tradeoffs involved and the relative value of each as a control factor.

The effects of controlling minimum debt-issue size using these various measures of objectives are shown to be similar, but the factors are not direct proxies for each other. As sales grow, months of borrowing potential, ratio of short-term liabilities to total assets, and current ratio are shown to deteriorate, while net working capital remains relatively constant. In various simulation runs a short- to total-asset ratio of .12 corresponded to months of borrowing potential in a range of six to nine months. It is clear that control of one factor does not always guarantee control over the range of variation in others. The manager's primary objectives determine which factors to control. From a flexibility standpoint, months of borrowing potential seems to provide the best control. Here the manager has direct control over the length of time during which he can delay long-

term financing. At the same time, since months of borrowing potential also reflects availability, its control keeps other measures of performance in desirable range. The study also found that control of debt issue size using the liquidity and flexibility ratios does not solve the problem of increasingly frequent sales of long-term debt. It further shows that controlling the proportion of short-term liabilities repaid at each long-term financing as a function of policies on months of short-term borrowing potential both improves the ratios and obviates the need for more frequent financing.

In closing, it must be recognized that the real value of this type of analysis can only be seen in its application to an actual situation. By using it, the manager can explore the impact of changes in policy and recognize the effects of changing sales, interest rates, and other exogenous factors.

APPENDIX

TABLES OF OUTPUT FROM COMPUTER RUNS

Symbols

TIME - Time in Months

MBP - Months of Short-Term Borrowing Potential Remaining

STAR - Proportion of Short-Term Debt to Total Capital

SLR - Ratio of Short-Term Debt to Long-Term Debt

CR - Current Ratio

NWC - Net Working Capital

ICOV - Interest Coverage

Note: The symbol *** for months of borrowing potential represents an indefinitely large amount remaining.

TABLE A-1
Base Conditions

TIME	MBP	STAR	SLR	CR	NWC	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.75	2.82
16.00	***	0.07	0.09	1.63	120.23	2.82
17.00	***	0.07	0.09	1.61	118.66	2.83
18.00	73.18	0.08	0.09	1.58	116.33	2.84
19.00	39.53	0.08	0.10	1.56	113.77	2.85
20.00	28.25	0.08	0.10	1.53	111.03	2.86
21.00	22.47	0.09	0.11	1.50	108.15	2.87
22.00	18.85	0.09	0.11	1.47	105.14	2.89
23.00	16.27	0.09	0.11	1.45	101.99	2.90
24.00	14.25	0.10	0.12	1.42	98.70	2.91
25.00	12.53	0.10	0.12	1.39	95.28	2.92
26.00	11.02	0.10	0.13	1.37	91.72	2.93
27.00	9.65	0.11	0.14	1.34	88.01	2.94
28.00	8.39	0.11	0.14	1.32	84.16	2.94
29.00	***	0.09	0.12	1.46	110.05	2.90
30.00	***	0.09	0.11	1.51	119.52	2.89
31.00	***	0.09	0.11	1.48	116.80	2.89
32.00	***	0.09	0.12	1.45	112.55	2.89
33.00	26.87	0.10	0.12	1.42	108.03	2.89
34.00	16.40	0.10	0.13	1.39	103.38	2.89
35.00	11.96	0.11	0.13	1.36	98.62	2.89
36.00	9.37	0.11	0.14	1.33	93.76	2.89
37.00	7.56	0.12	0.15	1.31	88.81	2.89
38.00	6.16	0.12	0.15	1.28	83.78	2.89
39.00	4.99	0.13	0.16	1.26	78.67	2.89
40.00	***	0.11	0.14	1.33	97.49	2.85
41.00	***	0.10	0.12	1.45	121.93	2.82
42.00	***	0.10	0.12	1.43	120.04	2.83
43.00	***	0.10	0.13	1.40	115.07	2.83
44.00	29.06	0.11	0.13	1.37	109.68	2.84
45.00	14.78	0.11	0.14	1.34	104.19	2.84
46.00	9.96	0.12	0.15	1.31	98.64	2.85
47.00	7.37	0.12	0.15	1.29	93.01	2.85
48.00	5.62	0.13	0.16	1.26	87.30	2.85
49.00	4.29	0.13	0.17	1.24	81.52	2.85
50.00	3.17	0.13	0.17	1.21	75.66	2.85
51.00	***	0.11	0.13	1.39	120.92	2.82
52.00	***	0.10	0.13	1.40	126.15	2.83
53.00	***	0.11	0.13	1.38	121.40	2.86
54.00	46.68	0.11	0.14	1.35	115.42	2.88
55.00	15.42	0.12	0.15	1.32	109.19	2.89
56.00	9.11	0.12	0.15	1.29	102.78	2.91
57.00	6.17	0.13	0.16	1.26	96.20	2.92
58.00	4.31	0.13	0.17	1.24	89.42	2.93
59.00	2.92	0.14	0.18	1.21	82.43	2.94
60.00	1.79	0.14	0.18	1.19	75.22	2.95

TABLE A-2

Moderate Effect of Short to Total Asset
Ratio on Minimum Debt Issue Size

TIME	MBP	STAR	SLR	CR	NWC	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.75	2.82
16.00	***	0.07	0.09	1.63	120.23	2.82
17.00	***	0.07	0.09	1.61	118.66	2.83
18.00	73.18	0.08	0.09	1.58	116.33	2.84
19.00	39.53	0.08	0.10	1.56	113.77	2.85
20.00	28.25	0.08	0.10	1.53	111.03	2.86
21.00	22.47	0.09	0.11	1.50	108.15	2.87
22.00	18.85	0.09	0.11	1.47	105.14	2.89
23.00	16.27	0.09	0.11	1.45	101.99	2.90
24.00	14.25	0.10	0.12	1.42	98.70	2.91
25.00	12.53	0.10	0.12	1.39	95.28	2.92
26.00	11.02	0.10	0.13	1.37	91.72	2.93
27.00	9.65	0.11	0.14	1.34	88.01	2.94
28.00	***	0.09	0.11	1.50	116.18	2.90
29.00	***	0.09	0.11	1.51	119.17	2.89
30.00	***	0.09	0.11	1.49	115.82	2.85
31.00	44.80	0.09	0.12	1.45	111.62	2.90
32.00	21.99	0.10	0.12	1.42	107.22	2.90
33.00	15.01	0.10	0.13	1.39	102.68	2.90
34.00	11.47	0.11	0.13	1.36	98.03	2.90
35.00	9.20	0.11	0.14	1.33	93.28	2.90
36.00	***	0.10	0.12	1.44	114.48	2.86
37.00	***	0.09	0.11	1.47	121.39	2.85
38.00	***	0.10	0.12	1.44	117.70	2.85
39.00	32.30	0.10	0.12	1.41	112.72	2.85
40.00	17.07	0.11	0.13	1.38	107.52	2.84
41.00	11.83	0.11	0.14	1.35	102.26	2.85
42.00	9.04	0.11	0.14	1.32	96.96	2.86
43.00	***	0.10	0.12	1.42	117.70	2.83
44.00	***	0.10	0.12	1.44	124.16	2.82
45.00	***	0.10	0.12	1.42	120.03	2.83
46.00	26.54	0.10	0.13	1.39	114.62	2.83
47.00	14.68	0.11	0.14	1.36	108.99	2.84
48.00	10.19	0.11	0.14	1.33	103.28	2.84
49.00	7.68	0.12	0.15	1.30	97.48	2.84
50.00	***	0.10	0.12	1.42	126.82	2.80
51.00	***	0.10	0.13	1.41	124.95	2.82
52.00	33.93	0.11	0.13	1.38	119.46	2.85
53.00	15.70	0.11	0.14	1.35	113.48	2.87
54.00	10.26	0.12	0.15	1.32	107.37	2.89
55.00	7.45	0.12	0.15	1.29	101.13	2.91
56.00	***	0.10	0.13	1.39	127.92	2.88
57.00	***	0.11	0.13	1.39	128.58	2.89
58.00	31.72	0.11	0.14	1.36	122.61	2.90
59.00	13.28	0.11	0.14	1.33	115.69	2.91
60.00	8.17	0.12	0.15	1.29	108.46	2.91

TABLE A-3

Strong Effect of Short to Total Asset
Ratio on Minimum Debt Issue Size

TIME	MBP	STAR	SLR	CR	NWC	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.75	2.82
16.00	***	0.07	0.09	1.63	120.23	2.82
17.00	***	0.07	0.09	1.61	118.66	2.83
18.00	73.18	0.08	0.09	1.58	116.33	2.84
19.00	39.53	0.08	0.10	1.56	113.77	2.85
20.00	28.25	0.08	0.10	1.53	111.03	2.86
21.00	22.47	0.09	0.11	1.50	108.15	2.87
22.00	18.85	0.09	0.11	1.47	105.14	2.89
23.00	16.27	0.09	0.11	1.45	101.99	2.90
24.00	14.25	0.10	0.12	1.42	98.70	2.91
25.00	12.53	0.10	0.12	1.39	95.28	2.92
26.00	-11.02	0.10	0.13	1.37	91.72	2.93
27.00	9.65	0.11	0.14	1.34	88.01	2.94
28.00	8.39	0.11	0.14	1.32	84.16	2.94
29.00	***	0.09	0.11	1.49	115.59	2.89
30.00	***	0.09	0.11	1.51	119.18	2.89
31.00	***	0.09	0.11	1.48	115.78	2.89
32.00	53.47	0.10	0.12	1.45	111.46	2.89
33.00	22.81	0.10	0.12	1.41	106.93	2.89
34.00	14.99	0.10	0.13	1.38	102.28	2.89
35.00	11.24	0.11	0.14	1.36	97.52	2.90
36.00	8.92	0.11	0.14	1.33	92.66	2.89
37.00	***	0.10	0.12	1.43	114.52	2.86
38.00	***	0.09	0.12	1.47	121.67	2.84
39.00	***	0.10	0.12	1.44	117.94	2.84
40.00	33.16	0.10	0.13	1.41	112.88	2.84
41.00	17.07	0.11	0.13	1.38	107.63	2.84
42.00	11.73	0.11	0.14	1.35	102.33	2.85
43.00	8.92	0.11	0.14	1.32	96.97	2.86
44.00	***	0.10	0.12	1.43	122.48	2.83
45.00	***	0.10	0.12	1.43	123.75	2.82
46.00	65.89	0.10	0.13	1.41	118.96	2.83
47.00	21.06	0.11	0.13	1.37	113.40	2.83
48.00	12.83	0.11	0.14	1.34	107.69	2.83
49.00	9.20	0.12	0.15	1.32	101.89	2.83
50.00	***	0.10	0.13	1.42	125.69	2.80
51.00	***	0.10	0.13	1.41	126.25	2.82
52.00	39.97	0.11	0.13	1.38	121.03	2.84
53.00	16.97	0.11	0.14	1.35	115.09	2.87
54.00	10.87	0.11	0.14	1.32	108.98	2.89
55.00	***	0.10	0.13	1.39	125.61	2.88
56.00	***	0.10	0.13	1.40	129.61	2.88
57.00	34.21	0.11	0.13	1.37	124.21	2.90
58.00	14.47	0.11	0.14	1.34	117.55	2.91
59.00	9.00	0.12	0.15	1.31	110.55	2.91
60.00	***	0.11	0.13	1.38	132.24	2.89

TABLE A-4

Moderate Effect of Current Ratio on
Minimum Debt Issue Size

TIME	MBP	STAR	SLR	CR	NWC	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.75	2.82
16.00	***	0.07	0.09	1.63	120.23	2.82
17.00	***	0.07	0.09	1.61	118.66	2.83
18.00	73.18	0.08	0.09	1.58	116.33	2.84
19.00	39.53	0.08	0.10	1.56	113.77	2.85
20.00	28.25	0.08	0.10	1.53	111.03	2.86
21.00	22.47	0.09	0.11	1.50	108.15	2.87
22.00	18.85	0.09	0.11	1.47	105.14	2.89
23.00	16.27	0.09	0.11	1.45	101.99	2.90
24.00	14.25	0.10	0.12	1.42	98.70	2.91
25.00	12.53	0.10	0.12	1.39	95.28	2.92
26.00	11.02	0.10	0.13	1.37	91.72	2.93
27.00	***	0.09	0.10	1.51	116.76	2.89
28.00	***	0.09	0.10	1.52	119.18	2.89
29.00	***	0.09	0.11	1.49	115.89	2.90
30.00	39.29	0.09	0.11	1.46	111.81	2.90
31.00	21.41	0.10	0.12	1.43	107.54	2.90
32.00	15.10	0.10	0.13	1.40	103.12	2.91
33.00	11.73	0.11	0.13	1.37	98.59	2.91
34.00	9.52	0.11	0.14	1.34	93.95	2.91
35.00	***	0.09	0.11	1.48	120.77	2.86
36.00	***	0.09	0.11	1.47	119.55	2.86
37.00	48.70	0.10	0.12	1.44	115.00	2.86
38.00	21.04	0.10	0.13	1.40	109.99	2.86
39.00	13.83	0.11	0.13	1.37	104.86	2.86
40.00	10.35	0.11	0.14	1.34	99.65	2.85
41.00	64.98	0.10	0.13	1.39	109.90	2.84
42.00	***	0.10	0.12	1.45	123.77	2.83
43.00	***	0.10	0.12	1.43	120.61	2.83
44.00	31.27	0.10	0.13	1.40	115.44	2.84
45.00	16.40	0.11	0.13	1.37	109.97	2.84
46.00	11.25	0.11	0.14	1.34	104.41	2.85
47.00	8.49	0.12	0.15	1.31	98.78	2.85
48.00	***	0.10	0.12	1.43	126.16	2.81
49.00	***	0.10	0.13	1.41	124.17	2.81
50.00	32.08	0.11	0.13	1.38	118.71	2.81
51.00	15.62	0.11	0.14	1.35	112.83	2.84
52.00	10.45	0.11	0.14	1.32	106.88	2.86
53.00	7.76	0.12	0.15	1.30	100.87	2.88
54.00	***	0.10	0.13	1.41	129.03	2.87
55.00	***	0.10	0.13	1.39	126.74	2.88
56.00	26.13	0.11	0.14	1.36	120.78	2.89
57.00	12.98	0.11	0.14	1.33	114.23	2.91
58.00	8.45	0.12	0.15	1.30	107.44	2.92
59.00	***	0.11	0.14	1.37	126.18	2.90
60.00	***	0.11	0.13	1.38	130.66	2.89

TABLE A-5

Strong Effect of Current Ratio on
Minimum Debt Issue Size

TIME	MBP	STAR	SLR	CR	NWC	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.75	2.82
16.00	***	0.07	0.09	1.63	120.23	2.82
17.00	***	0.07	0.09	1.61	118.66	2.83
18.00	73.18	0.08	0.09	1.58	116.33	2.84
19.00	39.53	0.08	0.10	1.56	113.77	2.85
20.00	28.25	0.08	0.10	1.53	111.03	2.86
21.00	22.47	0.09	0.11	1.50	108.15	2.87
22.00	18.85	0.09	0.11	1.47	105.14	2.89
23.00	16.27	0.09	0.11	1.45	101.99	2.90
24.00	14.25	0.10	0.12	1.42	98.70	2.91
25.00	12.53	0.10	0.12	1.39	95.28	2.92
26.00	***	0.08	0.10	1.53	117.33	2.89
27.00	***	0.08	0.10	1.53	119.20	2.89
28.00	***	0.09	0.11	1.50	115.97	2.90
29.00	35.56	0.09	0.11	1.47	112.03	2.90
30.00	21.03	0.10	0.12	1.44	107.89	2.91
31.00	15.28	0.10	0.12	1.41	103.60	2.91
32.00	12.05	0.10	0.13	1.38	99.19	2.91
33.00	***	0.09	0.11	1.49	119.39	2.88
34.00	***	0.09	0.11	1.49	120.14	2.87
35.00	52.24	0.09	0.12	1.45	115.99	2.87
36.00	22.60	0.10	0.12	1.42	111.19	2.87
37.00	14.89	0.10	0.13	1.39	106.23	2.87
38.00	11.20	0.11	0.13	1.36	101.19	2.87
39.00	***	0.09	0.11	1.47	122.88	2.83
40.00	***	0.10	0.12	1.45	120.77	2.83
41.00	30.36	0.10	0.12	1.42	115.85	2.84
42.00	16.90	0.10	0.13	1.49	110.58	2.84
43.00	11.93	0.11	0.14	1.36	105.22	2.85
44.00	***	0.10	0.12	1.44	124.12	2.83
45.00	***	0.10	0.12	1.44	123.94	2.83
46.00	33.77	0.10	0.13	1.41	118.99	2.83
47.00	17.10	0.11	0.13	1.38	113.41	2.83
48.00	11.59	0.11	0.14	1.35	107.70	2.83
49.00	***	0.10	0.12	1.43	127.59	2.81
50.00	74.52	0.10	0.13	1.41	124.66	2.80
51.00	22.24	0.11	0.13	1.38	119.07	2.83
52.00	13.32	0.11	0.14	1.35	113.15	2.86
53.00	***	0.10	0.13	1.40	126.42	2.86
54.00	***	0.10	0.13	1.41	129.08	2.87
55.00	29.24	0.11	0.13	1.38	123.84	2.88
56.00	14.62	0.11	0.14	1.35	117.54	2.90
57.00	34.86	0.11	0.13	1.37	123.15	2.90
58.00	***	0.10	0.13	1.39	131.42	2.89
59.00	26.18	0.11	0.13	1.37	126.14	2.90
60.00	12.65	0.11	0.14	1.33	119.10	2.91

TABLE A-6

Moderate Effect of Months of Borrowing
Potential on Minimum Debt Issue Size

TIME	MBP	STAR	SLR	CR	NWC	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.75	2.82
16.00	***	0.07	0.09	1.63	120.23	2.82
17.00	***	0.07	0.09	1.61	118.66	2.83
18.00	73.18	0.08	0.09	1.58	116.33	2.84
19.00	39.53	0.08	0.10	1.56	113.77	2.85
20.00	28.25	0.08	0.10	1.53	111.03	2.86
21.00	22.47	0.09	0.11	1.50	108.15	2.87
22.00	18.85	0.09	0.11	1.47	105.14	2.89
23.00	16.27	0.09	0.11	1.45	101.99	2.90
24.00	14.25	0.10	0.12	1.42	98.70	2.91
25.00	12.53	0.10	0.12	1.39	95.28	2.92
26.00	11.02	0.10	0.13	1.37	91.72	2.93
27.00	***	0.09	0.10	1.51	116.76	2.89
28.00	***	0.09	0.10	1.52	119.18	2.89
29.00	***	0.09	0.11	1.49	115.89	2.90
30.00	39.29	0.09	0.11	1.46	111.81	2.90
31.00	21.41	0.10	0.12	1.43	107.54	2.90
32.00	15.10	0.10	0.13	1.40	103.12	2.91
33.00	11.73	0.10	0.13	1.37	98.59	2.91
34.00	9.52	0.11	0.14	1.34	93.95	2.91
35.00	***	0.09	0.11	1.48	120.77	2.86
36.00	***	0.09	0.11	1.47	119.55	2.86
37.00	48.70	0.10	0.12	1.44	115.00	2.86
38.00	21.04	0.10	0.13	1.40	109.99	2.86
39.00	13.83	0.11	0.13	1.37	104.86	2.86
40.00	10.35	0.11	0.14	1.34	99.65	2.85
41.00	***	0.10	0.12	1.43	118.00	2.83
42.00	***	0.10	0.12	1.45	123.44	2.83
43.00	***	0.10	0.12	1.42	119.31	2.83
44.00	24.41	0.10	0.13	1.39	114.02	2.84
45.00	14.50	0.11	0.13	1.36	108.54	2.84
46.00	10.38	0.11	0.14	1.33	102.99	2.85
47.00	***	0.10	0.13	1.41	120.96	2.82
48.00	***	0.10	0.12	1.43	125.99	2.81
49.00	61.89	0.10	0.13	1.40	121.42	2.81
50.00	20.29	0.11	0.13	1.37	115.67	2.81
51.00	12.40	0.11	0.14	1.34	109.76	2.84
52.00	8.92	0.12	0.15	1.31	103.81	2.87
53.00	***	0.10	0.13	1.41	127.37	2.85
54.00	***	0.10	0.13	1.40	127.71	2.87
55.00	33.40	0.11	0.13	1.37	122.20	2.88
56.00	15.00	0.11	0.14	1.34	115.87	2.90
57.00	9.55	0.12	0.15	1.31	109.29	2.91
58.00	***	0.11	0.13	1.37	126.53	2.90
59.00	***	0.11	0.13	1.38	130.47	2.89
60.00	26.05	0.11	0.14	1.35	124.48	2.90

TABLE A-7

Strong Effect of Months of Borrowing
Potential on Minimum Debt Issue Size

TIME	MBP	STAR	SLR	CR	NCW	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.75	2.82
16.00	***	0.07	0.09	1.63	120.23	2.82
17.00	***	0.07	0.09	1.61	118.66	2.83
18.00	73.18	0.08	0.09	1.58	116.33	2.84
19.00	39.53	0.08	0.10	1.56	113.77	2.85
20.00	28.25	0.08	0.10	1.53	111.03	2.86
21.00	22.47	0.09	0.11	1.50	108.15	2.87
22.00	18.85	0.09	0.11	1.47	105.14	2.89
23.00	16.27	0.09	0.11	1.45	101.99	2.90
24.00	14.25	0.10	0.12	1.42	98.70	2.91
25.00	12.53	0.10	0.12	1.39	95.28	2.92
26.00	***	0.08	0.10	1.53	117.33	2.89
27.00	***	0.08	0.10	1.53	119.20	2.89
28.00	***	0.09	0.11	1.50	115.97	2.90
29.00	35.56	0.09	0.11	1.47	112.03	2.90
30.00	21.03	0.10	0.12	1.44	107.89	2.91
31.00	15.28	0.10	0.12	1.41	103.60	2.91
32.00	12.05	0.10	0.13	1.38	99.19	2.91
33.00	***	0.09	0.11	1.49	119.39	2.88
34.00	***	0.09	0.11	1.49	120.14	2.87
35.00	52.24	0.09	0.12	1.45	115.99	2.87
36.00	22.60	0.10	0.12	1.42	111.19	2.87
37.00	14.89	0.10	0.13	1.39	106.23	2.87
38.00	11.20	0.11	0.13	1.36	101.19	2.87
39.00	***	0.09	0.11	1.47	122.88	2.83
40.00	***	0.10	0.12	1.45	120.77	2.83
41.00	30.36	0.10	0.12	1.42	115.85	2.84
42.00	16.90	0.10	0.13	1.39	110.58	2.84
43.00	11.93	0.11	0.14	1.36	105.22	2.85
44.00	***	0.10	0.12	1.44	124.12	2.83
45.00	***	0.10	0.12	1.44	123.94	2.83
46.00	33.77	0.10	0.13	1.41	118.99	2.83
47.00	17.10	0.11	0.13	1.38	113.41	2.83
48.00	11.59	0.11	0.14	1.35	107.70	2.83
49.00	***	0.10	0.12	1.43	126.47	2.81
50.00	***	0.10	0.12	1.42	125.94	2.80
51.00	28.21	0.10	0.13	1.39	120.63	2.83
52.00	15.06	0.11	0.14	1.36	114.74	2.85
53.00	10.36	0.11	0.14	1.33	108.73	2.88
54.00	***	0.10	0.13	1.41	129.94	2.87
55.00	65.89	0.10	0.13	1.39	126.85	2.88
56.00	19.83	0.11	0.14	1.36	120.79	2.90
57.00	11.57	0.11	0.14	1.33	114.24	2.91
58.00	***	0.10	0.13	1.39	131.18	2.89
59.00	52.16	0.11	0.13	1.38	129.35	2.90
60.00	16.82	0.11	0.14	1.35	122.70	2.90

TABLE A-8

Months of Borrowing Potential Control of
Amount of Short-Term Debt Repaid

TIME	MBP	STAR	SLR	CR	NWC	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.90	2.82
16.00	***	0.07	0.09	1.63	120.45	2.82
17.00	***	0.07	0.09	1.61	118.88	2.83
18.00	75.26	0.08	0.09	1.58	116.56	2.84
19.00	40.06	0.08	0.10	1.56	114.00	2.85
20.00	28.50	0.08	0.10	1.53	111.26	2.86
21.00	22.62	0.09	0.11	1.50	108.38	2.87
22.00	18.96	0.09	0.11	1.47	105.36	2.89
23.00	16.36	0.09	0.11	1.45	102.22	2.90
24.00	14.32	0.10	0.12	1.42	98.93	2.91
25.00	12.60	0.10	0.12	1.40	95.51	2.92
26.00	11.08	0.10	0.13	1.37	91.94	2.93
27.00	***	0.09	0.11	1.47	109.45	2.91
28.00	***	0.08	0.09	1.61	131.84	2.87
29.00	***	0.08	0.09	1.60	130.84	2.87
30.00	***	0.08	0.10	1.56	127.02	2.88
31.00	71.27	0.08	0.10	1.52	122.76	2.88
32.00	29.02	0.09	0.11	1.49	118.33	2.89
33.00	19.08	0.09	0.11	1.46	113.79	2.89
34.00	14.48	0.10	0.12	1.42	109.13	2.89
35.00	11.70	0.10	0.13	1.39	104.37	2.89
36.00	***	0.09	0.11	1.49	122.55	2.86
37.00	***	0.07	0.09	1.63	146.09	2.82
38.00	***	0.08	0.09	1.61	144.30	2.82
39.00	***	0.08	0.10	1.57	139.52	2.82
40.00	53.33	0.08	0.10	1.53	134.32	2.82
41.00	25.43	0.09	0.11	1.49	129.05	2.82
42.00	17.46	0.09	0.12	1.46	123.72	2.83
43.00	13.55	0.10	0.12	1.42	118.35	2.84
44.00	11.10	0.10	0.13	1.39	112.93	2.85
45.00	***	0.07	0.09	1.63	156.84	2.79
46.00	***	0.07	0.09	1.66	162.05	2.78
47.00	***	0.08	0.09	1.62	157.62	2.79
48.00	***	0.08	0.10	1.58	152.01	2.79
49.00	36.50	0.08	0.10	1.53	146.19	2.79
50.00	21.51	0.09	0.11	1.50	140.28	2.79
51.00	15.73	0.09	0.11	1.46	134.33	2.82
52.00	12.55	0.10	0.12	1.42	128.37	2.85
53.00	***	0.08	0.09	1.61	164.53	2.82
54.00	***	0.07	0.08	1.67	177.60	2.82
55.00	***	0.07	0.09	1.64	173.52	2.84
56.00	***	0.08	0.09	1.59	167.33	2.86
57.00	36.63	0.08	0.10	1.55	160.73	2.87
58.00	20.73	0.09	0.11	1.50	153.90	2.88
59.00	14.71	0.09	0.11	1.46	146.87	2.89
60.00	11.37	0.10	0.12	1.42	139.61	2.90

TABLE A-9

Run of Table A-8 With Control of Timing
Between Debt Issues

TIME	MBP	STAR	SLR	CR	NCW	ICOV
0.0	19.29	0.07	0.09	1.72	121.08	2.29
1.00	23.43	0.07	0.09	1.69	119.33	2.35
2.00	28.78	0.07	0.09	1.68	117.97	2.41
3.00	35.53	0.07	0.09	1.67	116.91	2.47
4.00	43.96	0.07	0.09	1.66	116.09	2.52
5.00	54.19	0.07	0.09	1.65	115.40	2.56
6.00	65.87	0.07	0.09	1.64	114.78	2.61
7.00	77.69	0.07	0.09	1.63	114.16	2.64
8.00	***	0.08	0.09	1.62	113.49	2.68
9.00	***	0.08	0.09	1.61	112.72	2.71
10.00	***	0.08	0.09	1.60	111.82	2.74
11.00	***	0.08	0.09	1.59	110.76	2.77
12.00	74.34	0.08	0.09	1.57	109.53	2.79
13.00	52.66	0.08	0.10	1.55	108.11	2.81
14.00	39.21	0.08	0.10	1.54	106.49	2.83
15.00	***	0.07	0.09	1.61	116.90	2.82
16.00	***	0.07	0.09	1.63	120.45	2.82
17.00	***	0.07	0.09	1.61	118.88	2.83
18.00	75.26	0.08	0.09	1.58	116.56	2.84
19.00	40.06	0.08	0.10	1.56	114.00	2.85
20.00	28.50	0.08	0.10	1.53	111.26	2.86
21.00	22.62	0.09	0.11	1.50	108.38	2.87
22.00	18.96	0.09	0.11	1.47	105.36	2.89
23.00	16.36	0.09	0.11	1.45	102.22	2.90
24.00	14.32	0.10	0.12	1.42	98.93	2.91
25.00	12.60	0.10	0.12	1.40	95.51	2.92
26.00	11.08	0.10	0.13	1.37	91.94	2.93
27.00	***	0.09	0.11	1.47	109.45	2.91
28.00	***	0.08	0.09	1.61	131.84	2.87
29.00	***	0.08	0.09	1.60	130.84	2.87
30.00	***	0.08	0.10	1.56	127.02	2.88
31.00	71.27	0.08	0.10	1.52	122.76	2.88
32.00	29.02	0.09	0.11	1.49	118.33	2.89
33.00	19.08	0.09	0.11	1.46	113.79	2.89
34.00	14.48	0.10	0.12	1.42	109.13	2.89
35.00	11.70	0.10	0.13	1.39	104.37	2.89
36.00	9.74	0.11	0.13	1.36	99.51	2.89
37.00	8.22	0.11	0.14	1.33	94.56	2.89
38.00	***	0.08	0.10	1.58	140.67	2.82
39.00	***	0.07	0.08	1.70	158.82	2.79
40.00	***	0.07	0.08	1.67	156.26	2.79
41.00	***	0.07	0.09	1.63	151.26	2.79
42.00	***	0.08	0.09	1.59	145.95	2.80
43.00	39.34	0.08	0.10	1.55	140.56	2.81
44.00	23.07	0.09	0.11	1.51	135.12	2.82
45.00	16.86	0.09	0.11	1.47	129.61	2.82
46.00	13.43	0.10	0.12	1.44	124.04	2.83
47.00	11.15	0.10	0.13	1.40	118.39	2.83
48.00	9.43	0.11	0.13	1.37	112.67	2.83
49.00	***	0.07	0.09	1.65	166.29	2.77
50.00	***	0.06	0.07	1.79	187.44	2.74
51.00	***	0.06	0.07	1.76	184.59	2.76
52.00	***	0.07	0.08	1.71	178.93	2.79
53.00	***	0.07	0.08	1.66	172.90	2.82
54.00	46.19	0.08	0.09	1.61	166.74	2.84
55.00	25.73	0.08	0.10	1.57	160.46	2.86
56.00	18.35	0.08	0.10	1.52	154.02	2.87
57.00	14.35	0.09	0.11	1.48	147.40	2.89
58.00	11.70	0.09	0.12	1.44	140.59	2.90
59.00	9.72	0.10	0.12	1.40	133.57	2.90
60.00	***	0.07	0.08	1.70	194.10	2.84