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Financial Distress, Liquidity Policy, and Financing Policy: A Comparison of Korea and the United States

Hae Young Lee*
M. Andrew Fields**

<Abstract>

This paper develops models for identifying the interrelationship between a firm's probability of financial distress and both its liquidity and financial policy decisions. And it empirically investigates the models using both Korea Stock Exchange firm panel data and those of a matched industry sample of Nasdaq firms from the United States. The results for both the Korean and the U. S. samples provide strong evidence that a higher level of liquidity and a lower level of debt are consistent with a firm having a lower probability of financial distress. Results also show that financial distress and financial policy are important determinants of a firm's liquidity policy. Finally, results show that there is a negative relationship between liquidity policy and debt financing, and a positive relationship between financial distress and the level of debt financing.

* Professor, School of Management, Kangnam University, Korea
** Associate Professor, Department of Finance, University of Delaware, Newark, DE USA 19711

I. Introduction

This paper empirically investigates the interrelationship between a firm's probability of financial distress and both its liquidity and financial policy decisions. Previous studies consider the basic relationship between financial distress and financial policy decisions. However a firm's financial distress and its liquidity and debt levels are related not only to similar firm-specific attributes, but also directly to one another. Thus, the direct and indirect relationships among these policies warrant a systematic investigation. This study builds on research in each of these areas in order to focus on the contribution and importance of both liquidity and debt decisions to the probability of financial distress. The analysis focuses on the interrelationship between firm specific variables important to each of these three dimensions.

In previous studies, financial distress has been assumed to be an exogenous firm-specific attribute hypothesized to affect liquidity or debt policy. Despite this common assumption, there is strong reason to believe that financial distress is itself determined by many of the same firm-specific features that affect liquidity and debt policy. If financial distress itself is endogenous, previous evidence that financial distress affects liquidity and debt policy might be misleading. Estimation within an interrelated system helps to avoid any false attribution of causality. Previous studies have utilized cross sectional or time series analysis, which causes them to be restrictive in interpreting these relationships. Therefore, an empirical study on panel data incorporating cross sectional information into time series information is required.

The purposes of this study are to develop models for identifying the interrelationship between financial distress and a firm's liquidity and financing decisions, and to empirically test the models using data sets from Korea and the United States (Korea Stock Exchange data and comparable data from the U. S. Nasdaq exchange). In order to accomplish the purpose of this study, both literature survey and empirical test have been made. Especially, as for the methodology of research, panel data estimation technique Which pools the cross section data and time series data have been made.

The results provide strong evidence that a higher level of liquidity and a lower level of debt are consistent with a firm having a lower probability of financial distress, and that financial distress and financial policy are important determinants of a firm's liquidity policy. In addition, the results provide evidence of a negative relationship between liquidity policy and debt financing, and a positive relationship between financial distress and the level of debt financing. Both the Korean and the U. S. samples used in this study consistently support these results. There are differences in the financial characteristics of the two samples however. In general, Korean firms have higher book to market values, less liquidity, and higher debt levels. They also are much smaller that their U. S. counterparts and are more likely to pay dividends or pay higher dividends.

This paper proceeds as follows. Section II reviews the relevant issues in the analysis of financial distress, liquidity, and debt policies, and discusses empirical results in each area. Section III describes the empirical model and methods, and the data used in this study. Section IV reports findings from the empirical analysis. Summary and conclusions are presented in Section V.

II. Related Literature

1. Financial Distress

Financial distress occurs when debtors fail to fulfill their financial obligations properly to creditors. It generally includes not only high chances of technical insolvency, but also the firm's inability to pay debts, which sometimes leads to bankruptcy. The financial distress of a firm is closely related to its liquidity and financing policy, since financial distress results from a mismatch between the currently available liquid assets of a firm and its current obligations under its financial contracts.

John (1993a) extensively surveys theoretical and empirical literature on the mechanisms for managing financial distress and resolving default. He points out that the role of high leverage in corporate restructuring and the popularity of junk bonds have been important aspects of corporate finance in the 1980s and he presents a

conceptual framework for managing financial distress. Opler and Titman (1994) find that highly distressed firms lose substantial market share to their more conservatively financed competitors in industry downturns. Chen et al. (1995) derive an equation systems that allow the development of a series of examples that convey the logic and intuition of financial distress. They generate alternative assumptions that predict the effects of financial distress on investment efficiency and restructuring strategy.

Denis and Denis (1995) report that 31% of the firms completing leveraged recapitalizations between 1985 and 1988 subsequently encounter financial distress. They attribute the high rate of distress primarily to unexpected macroeconomic and regulatory developments. Chatterjee et al. (1996) present evidence that the decision solving of the financial distress problem depends on the degree of the firms leverage, the severity of its liquidity crisis, the firm's size, the extent of creditors coordination, and the magnitude of its economic distress. Andrade and Kaplan (1998) provide the quantitative and qualitative estimates of direct and indirect financial distress costs and their determinants. According to their estimates, financial distress costs were 10 to 20% of firm value, and the determinants of financial distress are highly leveraged transactions value and the fraction of total debt owed to banks.

2. Liquidity Policy

Liquid assets amount to a considerable portion of total assets and have implications for firm risk and profitability. John (1993,b) reports that among 223 major U. S. corporations, the average annual cash and marketable securities to total assets ratio was 6.3% during the period 1979-1981. In Korea, the average annual cash and marketable securities to total assets ratio for all the companies listed on the Korea Stock Exchange was 16.39% during the period of 1991-1996. Kallberg and Parkinson (1992) argue that top managers should pay attention to corporate liquidity management. They describe the six stages of decreasing liquidity, which suggest a direct link between liquidity policy pursued by management and the onset of financial distress.

Titman and Wessels (1988), using a factor-analytic technique that mitigates the measurement problems faced when working with proxy variables, find that short-term debt ratios are negatively related to firm size. Mian and Smith (1992) test a hypothesis that explains the choice of a firm's liquidity policy. They show that size and the credit

standing of the firm's debt were important in explaining the use of factoring, accounts receivable, secured debt and general corporate credit. Investigating the determinants of liquidity, Kim et al. (1998) show a negative relationship between liquidity and the debt ratio, cash flow measures, and the probability of financial distress, and that firm size tends to be negatively related to liquidity. The authors also report that firms with more volatile earnings and lower returns on physical assets relative to those on liquid assets tend to have significantly larger percentage of assets committed to liquid assets.

3. Financing Policy

Many researchers have analyzed the relationship between financial policy and financial variables. For example, Ferri and Jones (1979) analyze the relationship between a firm's financial structure and its operating characteristics. They show that firm size and operating leverage influence the percentage of debt that a firm will assume. Flath and Knoeber (1980) suggest that variations in capital structure are best explained by differences in operating risk. And, Marsh (1982) concludes that operating risk, company size, and asset composition influences debt ratios.

Castanias (1983), and Bradley et al. (1984) analyze the direct relationship between bankruptcy and a firm's financing decision. Although these studies show the existence of an inverse relationship between bankruptcy costs and financial leverage, they fail to deal with the financial distress problems directly. But, Castanias empirically shows that high leverage firms tend to have high failure rates and tend to have less debt in their capital structures. Bradley et al.'s analysis claims that strong industry influences exist across firm leverage ratios and that earnings volatility is inversely related to firm leverage ratios.

4. The Relationship among Financial Distress, Liquidity Policy and Financing Policy

Since financial distress results from a mismatch between the currently available liquid assets of a firm and its current obligations under its financial contracts, the interrelationship between financial distress and liquidity and financial policies can be linked to the following mechanism. A firm with a high likelihood of financial distress will reduce its exposure in three ways: (1) by increasing the liquid component of its assets, (2) by reducing the extent of its hard financial contracts, and (3) by employing

the methods in (1) and (2) simultaneously. These mechanisms for dealing with financial distress rectify the mismatch by either restructuring the assets, which increases the liquidity of the assets through asset sales, or restructuring the financial contracts through debt renegotiation, or both.

Studies of financial distress and financial policy assume that any causality here runs from financial distress to financial policy. Financial distress is typically viewed as exogenous and its determinants are not subjected to economic analysis. A more plausible explanation is that these variables are determined simultaneously. In particular, debt policy may also affect financial distress, or both may be independent of each other, but related to similar firm-specific attributes. For example, poor economic conditions can force a firm toward financial distress and have a direct impact on its debt policies. However, a firm that undergoes a highly leveraged transaction may enter financial distress as a result of its financial policy decisions.

Chatterjee et al. (1996) and Andrade and Kaplan (1998) predict a negative relationship between financial distress and debt. Kim et al. (1998) hypothesize a negative relationship between financial distress and liquidity. But, empirical evidence on the relationship between liquidity and debt policy is sparse.

III. Methodology and Data

1. Model and Methods

The following linear models are used to measure the interrelationship between financial distress, liquidity policy and financing policy.

Model 1 :

$$FD = \gamma_{01} + \gamma_{11}LQ + \gamma_{21}DR + \gamma_{31}BR + \gamma_{41}PR + \gamma_{51}SZ + \gamma_{61}GR + \gamma_{71}DV + e_1 \quad (1)$$

Model 2 :

$$LQ = \gamma_{02} + \gamma_{12}DR + \gamma_{22}FD + \gamma_{32}BR + \gamma_{42}PR + \gamma_{52}SZ + \gamma_{62}GR + \gamma_{72}DV + e_2 \quad (2)$$

Model 3 :

$$DR = \gamma_{03} + \gamma_{13}LQ + \gamma_{23}FD + \gamma_{33}BR + \gamma_{43}PR + \gamma_{53}SZ + \gamma_{63}GR + \gamma_{73}DV + e_3 \quad (3)$$

where FD = the proxy variable for financial distress, LQ = the proxy variable for the firm liquidity decision, DR = the proxy variable for the firm financing decision, BR = firm business risk, PR = firm profitability, SZ = firm size, DV = firm dividend policy, and e_1, e_2, e_3 = error terms

Control variables include business risk, profitability, firm size, growth, and dividend yield. These variables capture various real attributes that help determine each policy.

Although a system of equation has been the estimation technique of choice in empirical analyses of financial policies, the use of panel data estimation technique to address the questions we have posed in single equation estimation is unprecedented. In order to estimate the structural equations individually, the panel data estimation technique based on the maximum likelihood estimation is applied.

In panel data, cross section data consists of individual N firms referring to i = 1,. . .,N and each individual firm has T_i units of time series data, referring to t= 1,. . .,T_i. A balanced panel data set occurs when each individual firm has an identical number of time series data, as opposed to an unbalanced panel data set where the number of time series data differs. Data employed here is a balanced panel data set that has 128 individual firms and 10 time series data for both the Korean and U. S. samples. Firms with missing time series data were excluded. Also, a random effects model was used to determine each individual firm's specific properties stochastically.

The maximum likelihood function for firm i is defined as follows:

$$L_i = (2\pi)^{-\frac{T_i}{2}} \mid V_i^{-\frac{1}{2}} \mid \exp\left(-\frac{1}{2} u_i' V_i^{-1} u_i\right) \quad (3)$$

And, the maximum likelihood function for each sample is $L = \prod_{i=1}^{N} L_i$.

By assumption, it follows that

$$L = \sum_{i=1}^{N} \ln L_i = \sum_{i=1}^{N} \ln \frac{1-\rho_i}{\hat{\sigma}^{T_i}} + k' \quad (4)$$

where, $k' = \sum_{i=1}^{N} T_i/2$

$$\rho_i = 1 - \sqrt{\frac{(1-\delta)/T_i}{\delta + (1-\delta)/T_i}}$$

$0 \le \delta \le 1$

$\hat{\sigma}$: standard error of the estimate using associated changes in data.

The panel data estimation technique is used to find the value of δ, which maximizes the value of L. To find the value of δ, a grid search method is applied. The interval search in the first stage assumes an interval that starts from 0 with a 0.1 increment, and finds the segment of the interval where the δ with the highest likelihood occurs. In the second stage, the interval obtained from the first stage is further divided into smaller segments using 0.01 increments to narrow down the interval where the δ with the highest likelihood falls. This procedure is repeated until the δ with the highest likelihood is obtained.

With the estimate of δ and associated changes in the data, which is multiplied by square matrix, model estimates are provided from a simple OLS procedure. This statistical procedure is executed through the use of a statistical software module developed by the authors.

2. Data and Proxy Variables

The Korean sample consists of panel data for 128 industrial firms during the 10-year period from January 1987 to December 1996. This sample period begins in 1987 in order to provide a relatively large sample, and it ends in 1996 due to the foreign exchange crisis in Asia during 1997. The Korean firms are drawn from all manufacturing companies listed on the Korea Stock Exchange (KSE), which included 760 listed companies in December 1996. However, only 389 of these firms were listed on January 1987. To be included in the final sample, each firm had to have data available for each one of the variables used in the empirical analysis for the entire 10 years. In addition, it was necessary to meet the following sample selection criteria: (1) same reporting year, covering 12 months and ending on December 31 (2) not more than 100% capital deficit (3) and not to have been acquired by the end of the sample

period.

The same criteria were applied to select the firms included the U. S. sample. In addition, firms were matched with the Korean sample from similar industries. All information was provided by the Compustat Research Insight database. To help mitigate the inherent difference in firm size between the Korean and U. S, samples, the smallest available U. S. firm was selected while maintaining the same industrial representation. All 128 U. S. firms are listed on the Nasdaq exchange.

Table 1 provides the number of firms from each industry represented in both samples.

<Table 1> Number of firms from each Industry

Industry	Firms
Food & beverages	13
Textiles, apparel & leather	18
Pulp paper & paper	6
Chemical, coke & petroleum	30
Rubber & plastic	5
Non-metallic mineral	15
Basic metals	10
Machinery & equipment	31
Total	128

The empirical proxy for financial distress is developed from a basic financial model. Since financial distress is resolved through asset restructuring and/or financial restructuring, the costs of these different mechanisms for resolving distress will directly represent the likelihood of financial distress. Consider the liquidation costs, which are the costs incurred when assets are sold to raise cash and remedy distress. The most important cost of liquidation is the destruction to going-concern value that occurs when assets are sold to pay down debt. Replacement costs approximate what the firm's assets could be sold for separately, and are positively correlated with the liquidation value of the assets. Therefore, the ratio of the firm's market value to book

value is used as a proxy for the loss of going concern value due to asset sales and premature liquidations associated with financial distress. If the ratio of the firm's market value to book value were higher, the likelihood of financial distress would be lower, and vice versa. Thus, it is possible to measure the probability of financial distress by using the inverse of the market value to book value ratio as a proxy.

The proxy variables for both liquidity and financing policy are straightforward. The current ratio is used as a proxy for liquidity and the total debt to total assets ratio is used as a proxy for the financial policy decision.

The control variables are measured in the following way. The unlevered beta provided by the Hamada-Rubinstein Model(1973) is used as a proxy for business risk. The levered or market beta is estimated for each firm by using weekly returns, and dividing taxes paid by earnings before tax provides the tax rate. The market beta and the tax rate are then used to calculate the unlevered beta. The operating income to total assets ratio is used as a proxy for profitability, the natural logarithm of total assets is the proxy for the firm size, and the 3 year sales growth rate is the proxy for firm growth. Finally, the ratio of dividends to operating income is used as a proxy for firm dividend policy. Dividend yield is measured as a percentage of operating income primarily to assure a more consistent denominator across firms.

V. Results

1. Summary Statistics

Table 2 contains descriptive statistics (mean, median, and standard deviation) for the Korean and the U.S. samples. There are 1280 (128 firms×10 years) firm-year observations for each variable.

<Table 2> Descriptive Statistics for the Korean and U. S. samples.

Variables	Korean Firms			U.S. Firms		
	mean	median	standard deviation	mean	median	standard deviation
FD	0.97867	0.96154	0.18961	0.86271	0.79167	0.44849
LQ	1.24266	1.13516	0.54293	2.51761	2.15777	1.69991
DR	0.66353	0.68000	0.13620	0.53401	0.51747	0.22836
BR	0.31119	0.28633	0.20281	0.30016	0.17842	0.40716
PR	0.07286	0.06811	0.05097	0.07812	0.08050	0.10311
SZ	25.95498	25.78867	1.34702	26.44182	26.19169	1.66654
GR	0.14245	0.11971	0.19935	0.12551	0.08831	0.35578
DV	0.12017	0.08486	0.19310	0.13814	0.02888	0.33936

In comparing the descriptive statistics for the Korean and U. S. samples, Korean firms have higher FD - book to market value (or a lower market to book value), less liquidity - LQ, and higher debt levels - DR. The control variables are very similar between the two samples, except for size and dividend policy. The statistics above are similar between the two samples for firm size. However, average size is the natural log of the only currency denominated variable and there is a substantial difference in the value of the two respective currencies. Thus, as noted previously, each U. S firm is significantly larger than its Korean counterpart. With respect to dividend policy, the mean is similar between the two samples, but the U. S. median is significantly lower. A larger number of the U. S. firms used in this study pay little or no dividends compared to their Korean counterparts. There has been a well-documented decline in dividend paying firms in the U. S. recently. Fama and French (2001) report that there has been a decline of over fifty percent in the number of U. S non-financial and non-utility firms that pay dividends during the twenty years from 1978-1998. The authors attribute this to both a shift in the population of publicly held firms to include more companies that are typical of non-dividend paying firms and a reduction in dividends by firms that historically would have been expected to have a higher payout to shareholders. The Fama and French grouping can be generally classified as industrial and would include the industry classifications used in this study.

2. Relationships between Variables

The iterative grid search method, as described above, is employed to find the value of δ that maximizes the value of L. Tables 3 shows the results of the grid search method for each of the three models. For Model 1, the maximum value of L occurs when δ=0.38 (Korea) and δ=0.56 (U. S.). For Model 2, δ=0.49 (Korea) and δ= 0.36(U. S.) and for Model 3 δ=0.59 (Korea) and δ=0.48 (U. S.) to obtain the maximum value of L.

<Table 3> δ and L for Model 1, 2 and 3

Model 1				Model 2				Model 3			
Korean Data		American Data		Korean Data		American Data		Korean Data		American Data	
δ	L	δ	L	δ	L	δ	L	δ	L	δ	L
0.30	2519.836	0.50	1694.622	0.40	1382.725	0.30	1408.527	0.50	3400.762	0.40	2380.219
0.37	2521.902	0.55	1696.211	0.48	1385.937	0.35	1410.148	0.58	3403.930	0.47	2382.451
0.38	2521.903	0.56	1696.272	0.49	1385.984	0.36	1410.222	0.59	3403.951	0.48	2382.475
0.39	2521.840	0.57	1696.258	0.50	1385.957	0.37	1410.214	0.60	3403.890	0.49	2382.431
0.50	2517.391	0.60	1695.784	0.60	1381.867	0.40	1409.704	0.70	3398.573	0.60	2377.673

The results of the OLS estimations using the transformed data are presented in Tables 4, 5, and 6. These results support the proposition that financial distress, liquidity policy, and financial policy are interdependent, and the conclusions are similar between the Korean and U. S. samples in all three cases. An F-test is performed to test the null hypothesis that the three endogenous variables, when included as control variables in the other models, are equal to zero. In each model, the null hypothesis is rejected at the 0.0001 levels for both samples. Overall, all models display a comparatively high degree of explanatory power for the regressions. For the Korean sample, the adjusted R-squares are 0.288 in Model 1, 0.242 in Model 2, and 0.404 in Model 3 respectively. For the U. S. sample, the adjusted R-squares are 0.043 in Model 1, 0.110 in Model 2, and 0.210 in Model 3 respectively. The R-squares for the U. S. sample are smaller than those for the Korean sample, but the

explanatory power is still at a very significant level.

Model 1 results, shown in Table 4, indicate that a higher level of liquidity and a lower level of debt are consistent with a firm having a lower probability of financial distress. The negative coefficient on LQ is consistent with the model's prediction, and the coefficient estimates are significant for both samples. The positive sign and statistical significance on the total debt to total assets ratio (DR) also are consistent with the model's prediction for both samples, thus confirming that firms with a high debt ratio find financial distress to be more likely to occur.

<Table 4> Model 1 Regressions-Financial Distress (Dependent Variable: FD)

Regression	Korean Firms	American Firms
Constant	0.216(3.725)*	-0.027(-0.273)
LQ	-0.070(-6.204)*	-0.018(-2.707)*
DR	0.881(17.929)*	0.268(4.523)*
BR	-0.338(-14.621)*	-0.076(-3.155)*
PR	-0.403(-4.141)*	-0.524(-4.639)*
SZ	0.047(8.226)*	0.462(3.193)*
GR	0.020(1.040)	-0.058(-2.355)**
DV	-0.090(-4.202)*	0.022(0.586)
Adjusted R^2	0.288	0.043
Regression F	74.575*	8.231*
N	1280	1280

Notes: *significantly different from zero at the 0.01 probability level.
**significantly different from zero at the 0.05 probability level.
***significantly different from zero at the 0.10 probability level.
Numbers in parentheses are t-statistics.

The negative sign and statistical significance of the coefficient on FD in Model 2, shown in Table 5, indicate that financial distress is an important determinant of a firm's liquidity policy for both samples. This result is consistent with the studies of John (1993,a) and Kim et al (1998), which report that a firm's financial distress causes

deterioration in its liquidity. The coefficient on the financing policy variable in model 2 also is negative and significant for both samples, indicating that financial policy is an important determinant of liquidity, and confirming that firms trade off their liquidity position with fixed financial charges.

<Table 5> Model 2 Regressions-Liquidities Policy (Dependent Variable: LQ)

Regression	Korean Data	American Data
Constant	1.325(11.215)*	2.255(4.686)*
DR	-1.809(-14.426)*	-2.733(-11.682)*
FD	-0.428(-6.397)*	-0.257(-2.262)**
BR	-0.083(-1.384)	-0.116(-1.129)
PR	0.772(3.239)*	0.688(1.454)
SZ	-0.057(-3.780)*	-0.006(-1.222)
GR	-0.078(-1.678)***	-0.360(-3.398)*
DV	0.101(1.965)**	-0.006(-0.434)
Adjusted R^2	0.242	0.110
Regression F	59.390*	22.435*
N	1280	1280

Notes: *significantly different from zero at the 0.01 probability level.
**significantly different from zero at the 0.05 probability level.
***significantly different from zero at the 0.10 probability level.
Numbers in parentheses are t-statistics.

Model 3 results, shown in Table 6, provide strong support for the model's prediction of a negative relationship between liquidity policy and debt financing, and a positive relationship between financial distress and the level of debt financing for both samples. As before with models 1 and 2, the Korean and U. S. samples respond similarly.

<Table 6> Model 3 Regressions-Financial Policy (Dependent Variable: DR)

Regression	Korean Data	American Data
Constant	0.133(6.042)*	0.168(3.346)*
LQ	-0.075(-14.011)*	-0.034(-11.339)*
FD	0.220(17.622)*	0.059(4.574)*
BR	-0.179(-15.897)*	-0.090(-8.018)*
PR	-0.190(-3.870)*	-0.523(-10.148)*
SZ	0.020(6.152)*	0.006(0.954)
GR	0.041(4.290)*	-0.020(-1.680)***
DV	-0.047(-4.498)*	-0.013(-0.729)
Adjusted R^2	0.404	0.210
Regression F	124.689*	48.353*
N	1280	1280

Notes: *significantly different from zero at the 0.01 probability level.
**significantly different from zero at the 0.05 probability level.
***significantly different from zero at the 0.10 probability level.
Numbers in parentheses are t-statistics.
Numbers in parentheses are t-statistics.

3. Effects of Control Variables

The regression results show that the coefficients for the control variables are generally consistent with predictions. Table 4 reports the regressions of financial distress on the various control variables. The coefficient estimate on business risk is negative and significant. This result shows the trade off between business risk and financial risk, the hypothesis that firms substitute financial and business risk to keep total risk at a manageable level. And, there is strong evidence that profitability is negatively related to the probability of financial distress, and that firm size is positively related. In addition, the coefficient estimate on growth is positive, but not significant for the Korean sample. It is significant and negative for the U. S. sample. This may indicate that a poor recent growth rate increases the likelihood of financial distress. Finally the dividend payout ratio is negatively related to financial distress for

the Korean sample, indicating that financially distressed firms have a lower payout. The U. S. sample coefficient is positive, but not significant.

The results for model 2 reported in Table 5 are generally consistent with the findings of Kim et al. (1998). Business risk, size and growth are related negatively to a firm's liquidity, while profitability is related positively to liquidity. Significant negative coefficients on the business risk, size and growth variables indicate that greater business risk, size and growth opportunities reduce liquidity. The coefficient on profitability is significantly positive, suggesting that firms generating more earnings have higher liquidity. It is expected that the dividend payout ratio should be negatively related to liquidity, but the Korean sample shows a positive significance. The coefficients for the U. S. sample are not significant except for the growth variable.

The results for model 3 reported in Table 6 are generally consistent with previous evidence on the determinants of financial policy. The negative coefficients on the business risk variable and dividend payout ratio are consistent with previous findings, as are the observed positive coefficients for the size and growth variables. The business risk variable was included as an explanatory variable in numerous capital structure studies and the observed relationships have varied considerably. The result shown here provides evidence supporting a negatively significant relationship, which is consistent with the static tradeoff theory. The results for the U. S. sample are similar except for the growth variable, where there is a significant-negative relationship with the level of debt.

Overall, the results for all three models are similar between the Korean and U. S firms for business risk, profitability and size. The growth and dividend variables differ with respect to sign and significance across the three models. The decline in dividends in the U. S. may explain the inconsistencies in effect between the two groups for that variable, and it is possible that the growth rate reflects a difference in the age or life cycle for the firms in the two respective samples.

V. Summary and Conclusions

This paper develops models for identifying the interrelationship between a firm's probability of financial distress, its liquidity policy, and its financial policy; and it empirically tests the models using both Korea Stock Exchange firm panel data and those of a matched industry sample of Nasdaq firms from the United States. This study builds on research in each of these areas in order to focus on the contribution and importance of both liquidity and debt decisions to the probability of financial distress.

Despite strong theoretical arguments and empirical evidence that financial distress and firm liquidity and financial decisions are interdependent, previous studies of these variables have employed only cross sectional or time series techniques. The results have been inconsistent. The analysis here utilizes a panel data estimation technique in examining the interrelationship between the probability of a firm's financial distress, its liquidity policy and financial policy decisions. The panel data estimation approach allows for interdependence of firm decisions, while controlling for effects that other firm characteristics may have. The results for both the Korean and the U. S. samples provide strong evidence that a higher level of liquidity and a lower level of debt are consistent with a firm having a lower probability of financial distress. Results also show that financial distress and financial policy are important determinants of a firm's liquidity policy. Finally, results show that there is a negative relationship between liquidity policy and debt financing, and a positive relationship between financial distress and the level of debt financing.

There are differences in the financial characteristics for the sample of Korean and U. S. firms used in the study however. In general, Korean firms have higher book to market values, less liquidity, and higher debt levels. Not surprisingly, they also are much smaller than their U. S. counterparts. Finally, the fact that Korean firms are more likely to pay dividends or pay higher dividends may be indicative of a recent decline in dividend payout in the United States.

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