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Abstract: This paper examines the interrelationships among debt policy, dividend policy, and ownership structure using a simultaneous equation framework. Our approach allows us to test both the convergence of interests theory and entrenchment theory. Using a sample of publicly traded South Korean manufacturing firms, we find that debt policy and ownership structure have a positive impact on dividend policy. We also find that both debt and dividend policy are positively related to ownership structure. Our findings support both the theory of convergence of interests between management and ownership and entrenchment theory, and also explain why many studies have found conflicting results.

INTRODUCTION

Over the past few decades, a significant portion of the economics and finance literature has examined the impact of a firm's ownership structure on decision-making and profitability. Often termed a "principal-agent" problem, this literature highlights the conflict of interest between a firm's owners and managers. The role of a manager is to maximize wealth for the firm's shareholders. However, managers who do not have a significant ownership stake in the firm may choose instead to maximize their own net benefits (possibly through managerial slack, poor decision-making, and/or a diversion of resources away from productive uses to those that exclusively benefit the manager) at the expense of the firm's owners. As a

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result, the owners are forced to incur an agency (or monitoring) cost to ensure that the firm's management acts in an appropriate fashion.

The crucial issue for a firm's shareholders is how to induce management to make decisions that maximize shareholder wealth while minimizing agency costs. One possibility is to give the firm's management a significant ownership stake in the firm. As Morck et al. (1988) note, this approach may be successful, but is not without drawbacks. If management currently owns a very small stake in the firm, then increasing that stake will induce managers to strive toward shareholder wealth maximization as their objectives become more closely aligned with other shareholders' (i.e., a "convergence of interests"). However, as the proportion of shares owned by managers increases, managers become insulated from the discipline provided by the managerial labor market as their ownership stake becomes sufficient to prevent them from being replaced should they make improper or inefficient decisions. As a result, managers become "entrenched," and thus may actually cease to maximize shareholder wealth.

A second option to reduce agency costs is to force the firm to increase debt. As Ross (1977) and Jensen and Meckling (1976) note, because debt incurred today must be repaid in the future, managers who increase debt may be signaling their intent to maximize future firm wealth. As a firm increases its debt load, there are more individuals outside of the company, most notably those holding the firm's debt instruments, who have an incentive to actively monitor the company's performance and, by proxy, its management. Therefore, forcing the firm into debt markets should reduce agency costs, on average, and increase the convergence of interests between owners and management.

Rozeff (1982) makes a similar argument with respect to dividend payments. Because cash dividends are usually followed by the issuing of new securities to finance existing and future investments, the individuals and/or firms who underwrite these new securities will necessarily be forced to monitor a manager's actions. This, in turn, reduces agency costs in much the same way as the use of debt.

Given the array of tools that can be used to reduce agency costs, it is reasonable to expect that owners use a combination of these policies. For example, stakeholders may increase managerial ownership until they suspect that managerial entrenchment is eminent. After that, a combination of debt and dividend policies may be used. This implies two things. First, there may be an optimal combination of policies that minimizes agency costs. Second, leverage policy is not determined independently, but rather simultaneously with other factors, including a firm's dividend policy and its ownership structure (Jensen et al. 1992, Crutchley et al. 1999). Consequently, if one is interested in explaining and predicting the determinants of corporate financial policy, one cannot rely on ordinary least squares (OLS) to estimate these relationships. OLS produces biased and inconsistent estimates in the presence of simultaneously determined variables (Neter et al. 1983).

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In response, empirical research on corporate financial policy utilizes alternatives to OLS. For example, Bathala et al. (1994) use two stage least squares (2SLS) to investigate the impact of institutional and managerial ownership on debt policy. Chen and Steiner (1999) use nonlinear 2SLS to estimate the impact of ownership on debt policy and dividend policy. The use of 2SLS is advantageous, providing consistent and asymptotically unbiased estimates in the presence of simultaneously determined variables. However, 2SLS provides estimated coefficients that are inefficient, particularly when each regression equation contains a different number of independent variables and the error terms in the system are heteroskedastic. As a result, a small number of studies, including Crutchley et al. (1999), have used three stage least squares (3SLS) to examine the impact of ownership on agency costs. Like 2SLS, 3SLS produces consistent results in the presence of simultaneity bias. Moreover, if the error terms in each regression are heteroskedastically linked (and if each equation does not contain identical regressors), then 3SLS produces more efficient estimates than 2SLS, and thus is a more appropriate technique for policy analysis (Davidson and MacKinnon 1993).

In this paper, we empirically analyze the relationship between a firm's ownership structure and debt and dividend policies. Consistent with the literature, we postulate a system of regression equations that simultaneously determine ownership, debt policy, and dividend policy. We also include several control variables believed to be important determinants of these policies: firm cash flow, liquidity, profitability, and size. These equations are estimated using 3SLS and we find that the three corporate policies are not only simultaneously determined, but also behave in a systematic fashion. Consequently, our findings reinforce the notion of simultaneously determined corporate policies.

This paper makes several contributions to the existing literature. First, it contributes to the small but growing number of studies that use 3SLS to efficiently and consistently estimate the simultaneous relationship between ownership, debt policy, and dividend policy. Unlike the previous literature, we also compare our 3SLS results to those generated by OLS. This allows us to determine the magnitude of the simultaneity bias, which in turn allows us to critique previous studies that use OLS. Third, most of the studies that explore the simultaneous relationship between firm ownership and agency costs utilize data from U.S. financial markets. In contrast, we utilize data from South Korean manufacturing firms and explore these relationships in an international setting. Lastly, we investigate the interrelationships between debt policy, dividend policy, and ownership structure using Jensen and Meckling's (1976) convergence of interests theory as well as Morck et al.'s (1988) entrenchment theory. That is, instead of treating these theories as mutually exclusive (as much of the literature has done), we empirically test whether these theories are substitutes, complements, or neither.

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The balance of this paper is organized into four parts. In section two we review the literature and develop testable hypotheses. The third section contains a description of the data and model, while the fourth section includes details of our empirical results. In the final section, we discuss the implications of our findings and present some suggestions for future research.

Literature Review and Testable Hypotheses

In this section we follow a two-step process. First, we review the literature on debt policy, dividend policy, and ownership structure and develop initial testable hypotheses for each of our three variables taken separately. Next, we review the literature examining the interrelationships between these variables, and discuss how these interrelationships impact our testable hypotheses.

Debt Policy

According to Jensen and Meckling (1976), minimal ownership may cause managers to work less vigorously and/or consume more perquisites. Consequently, increasing managerial ownership leads to a convergence of interests between management and ownership, reducing agency costs. On the other hand, too much managerial ownership leads to entrenchment, and thus an increase in agency costs (Morck et al. 1988). Ross (1977) argues that more debt can be used by managers to signal an optimistic future for the firm. In addition, the new debt holders are interested in the firm's financial success and therefore monitor managers. We postulate that debt policy and ownership may be either positively or negatively related. Managerial (or "insider") stock ownership is expected to have a negative effect on leverage if Jensen and Meckling's (1976) convergence of interests theory holds. In this case debt policy and ownership are substitutes—two means of accomplishing the same task. On the other hand, we would expect insider ownership to have a positive impact on leverage if the entrenchment theory of Morck et al. (1988) holds, because new debt policy must be used in conjunction with ownership to ensure that management acts appropriately.

Kalay (1982) investigates the effects of the conflicting interests of bondholders and stockholders on the dividend decisions of leveraged firms. He finds that bond indentures restrict dividend payments both directly and indirectly. Jensen (1986) argues that because both dividends and debt reduce free cash flow (which managers may use to finance their inefficient behavior), these two variables may also be used to reduce agency costs. Although both papers make slightly different arguments, the net conclusion is the same: debt and dividends may be substitutes or complements depending on whether the convergence of interests theory or the entrenchment theory holds. Combining this logic with our previous argument we expect an ambiguous relationship between dividends and debt. Dividend

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payments are expected to have a negative effect on debt if the convergence of interests theory is valid. In this case, managers are acting (or beginning to act) in the interests of the owners. This implies that there is no excess cash flow and/or liquidity. Increases in a firm's debt load must be paid through other means, presumably by allocating fewer resources to dividends. In this case debt and dividends are substitutes. Alternatively, dividends are expected to have positive impact on debt if the entrenchment theory is valid, because both can be used to reduce cash flows and liquidity that would otherwise be misused by management.

According to the pecking order theory of Myers and Majluf (1984), management prefers internal funds (available liquid assets) to leverage, in part because liquid assets can be spent in a more discretionary, and potentially sub-optimal, manner. This increases agency costs, and in turn increases the need for debt financing to reduce the use of internal funds. Consequently, both cash flow and liquidity are expected to have a negative impact on debt. Since more profitable firms have ample stored funds, profitability should exhibit a negative relationship with leverage.

Dividend Policy

Several studies have examined the determinants of dividend policies. Rozeff (1982) found that firms with very little inside (or managerial) stock ownership were more likely to pay dividends than firms with higher levels of inside ownership, ostensibly to reduce agency costs. This implies that the relationship between dividend payout ratios and managerial stock ownership is negative at low levels of inside ownership. However, Schooley and Barney (1994) report that beyond the point of entrenchment, insider stock ownership is positively related to dividend payouts. Combining these findings with our previous discussion, managerial stock ownership is expected to have a negative effect on dividend payout if the convergence of interests theory is effective, and to have a positive impact on dividend payout if the entrenchment theory is effective.

Under information asymmetry, managers are willing to use leverage and/or dividends as a means of providing a positive signal to capital markets (Ross 1977, Miller and Rock 1985). This induces debt and dividends to serve as substitute-signaling forces. Thus, we would expect the impact of debt on dividend policies to be analogous to the impact of dividends on debt policies. That is, debt is expected to have a negative effect on dividends if the convergence of interests theory holds, and to have a positive impact on dividends if the entrenchment theory holds.

According to Miller and Rock's (1985) signaling approach, net operating income and dividend payments can convey the same information. Thus, cash flow is expected to have a positive effect on dividends. Since firms with higher liquidity and profitability tend to have stored funds within the company, both liquidity and profitability are expected to have positive impacts on dividends.

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Ownership Structure

Kim and Sorensen (1986) contend that managers have a larger incentive to reduce agency costs by increasing ownership when debt is increased. Leland and Pyle (1977) argue that an owner's willingness to invest in projects can serve as a signal of project quality, causing firm value to increase with the percentage of stock ownership. This implies that if the firm's value is positively associated with the fraction of the owner's wealth held as stock, then the firm will have greater debt capacity and will use more debt. Thus, leverage is expected to have a negative effect on stock ownership if the convergence of interests theory is valid, and to have a positive impact on stock ownership if the entrenchment theory holds.

Jensen (1986) explicitly argues that debt is an effective substitute for dividends in reducing agency costs. Chen and Steiner (1999) empirically find that leverage and dividends serve as substitutable monitoring forces for managerial ownership, leading to a negative effect from both leverage and dividends to stock ownership. Thus, dividend payout is expected to have a negative effect on stock ownership if the convergence of interests theory is applicable, and to have a positive impact on stock ownership if the entrenchment theory holds.

Firms with more internal funds have less incentive to finance externally. Consistent with Myers and Majluf's (1984) pecking order theory, both cash flow and liquidity are expected to have a positive impact on stock ownership. Prior studies have reported that managerial ownership is much greater in smaller firms than in larger firms. As firms get larger, a relatively lower proportion of stock is owned by managers due to their limited personal wealth and constraints on personal borrowing. Thus, size is expected to be negatively related to stock ownership.

Interrelationships among Variables

Debt policy, dividend policy, and ownership structure might be related directly through information asymmetry and agency theory. For example, Friend and Lang (1988) find that managerial ownership generates debt policy; however, Jensen and Meckling (1976) argue that leverage may generate managerial ownership. This suggests that debt and ownership decisions are simultaneously determined. Additionally, Rozeff (1982) reports that managerial ownership causes dividend policy, whereas Jensen (1986) proposes that dividend policy may cause managerial ownership. This also suggests that dividend and ownership decisions are interdependent. Finally, while Fenn and Liang (2001) find that debt causes dividend payouts, Jensen (1986) suggests that dividend policy may cause leverage. This suggests dividend and debt policies are very likely jointly determined.

Our discussion on the relationship between ownership, debt policy, and dividend policy can be summarized by **Figure 1.** Two general conclusions follow from this figure. First, these studies imply that causality may proceed in either direction between each pair of variables. Consequently, in order to account for this multi-directional causality, we must model these

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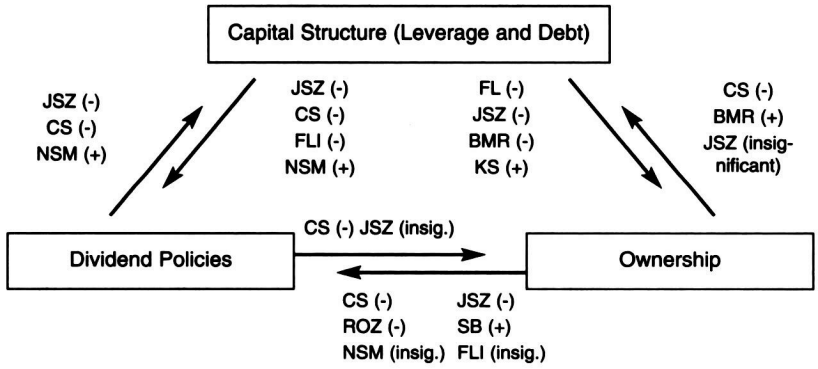
Figure 1
A Summary of the Interrelationship between Capital Structure, Dividend Policies, and Ownership, with a Non-Exhaustive List of Previous Studies



Abbreviation	Authors	Estimation Method
BMR	Bathala, Moon, and Rao (1994)	2SLS
CS	Chen and Steiner (1999)	2SLS
FL	Friend and Lang (1988)	OLS
FLI	Fenn and Liang (2001)	Tobit
JSZ	Jensen, Solberg, and Zorn (1992)	3SLS
KS	Kim and Sorensen (1996)	OLS
NSM	Noronha, Shome, and Morgan (1996)	3SLS
ROZ	Rozeff (1982)	OLS
SB	Schooley and Barney (1994)	OLS

relationships using a simultaneously determined system of equations (Kim et al. 2006).

The use of a system of equations is not unprecedented. Within such a system, Jensen et al. (1992) examined the relationship between debt, dividend, and ownership; Cho (1998) analyzed investment, corporate value, and ownership; Chen and Steiner (1999) examined debt, dividend, ownership, and risk, respectively. However, Jensen et al. (1992) did not consider Morck et al.'s (1988) entrenchment theory. They find that managerial ownership is negatively related to dividend policy. Schooley and Barney (1994) report that ownership structure exhibits a negative/positive association over low/high levels of ownership with dividend policy, a finding that is consistent with the entrenchment theory. Crutchley et al. (1999) estimate a model that allows for the possibility of both entrenchment theory and the convergence of interests theory. However, their results are more consistent with entrenchment theory, rather than the convergence of interests theory.

The second conclusion we can draw from Figure 1 is that many previous studies have found conflicting results, even when controlling for the possibility of simultaneity. To a limited extent, this can be explained by the fact that many of these studies have used data from different economies

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and/or have used data over different periods of time. It may be unrealistic to assume that the relationship between ownership, capital structure, and dividend policies would be the same in the U.S. as in other industrialized countries including, but certainly not limited to, South Korea (Han et al. 1999, Kim 2001, Bobillo et al. 2002, Bae and Kim 2003, Baek 2003).

A more likely cause for the lack of consistency is the manner in which these previous studies have set up and interpreted both their hypotheses and their systems of equations. Many of these studies base their empirical analyses on the assumption that agency costs are a cubic function of ownership, debt policy, and dividend policy (Crutchley et al. 1999). In accordance with standard production theory, these cost functions traditionally exhibit both increasing and diminishing returns to each policy variable (holding the other two constant). If this is the case, then average agency costs (which the three policy variables attempt to minimize) are necessarily U-shaped. This U-shaped average agency cost curve usually forces entrenchment theory and the convergence of interests theory to be substitutes. That is, convergence of interests theory holds if the firm is on one side of the average cost curve, and entrenchment theory holds if the firm is on the other portion of the average cost curve. However, if total agency costs are not cubic (for example, if they are quadratic), it is likely that average agency costs are not U-shaped. If this is the case, it is possible that convergence of interests theory and entrenchment theory may not be diametric substitutes (Abdullah et al. 2002). In fact, depending on how one postulates the total agency cost function, these two theories may be substitutes, complements, both, or neither.

Another concern with the literature is the specification of the systems of equations. Crutchley et al. (1999), for example, postulate U-shaped average agency cost curves consistent with our prior discussion. However, when specifying a system of equations to test their theory, they assume, for example, that debt policy is a *quadratic* function of managerial ownership, but only a *linear* function of dividend policy. Chen and Steiner (1999) make a similar decision by postulating that risk is a quadratic determinant of managerial ownership, while factors such as debt and dividends are only linearly related to ownership. The difficulty with these assumptions is that they may or may not be consistent with their models, depending on the *additional* assumptions one chooses to make about the cross-partials of the cost function with respect to each of the choice variables. It is also possible that these additional restrictions may necessarily force entrenchment theory and the convergence of interests theory to be mutually exclusive substitutes when they may not be.

We extend this area of research by considering an empirical model in which debt policy, dividend policy, and ownership structure are each treated as endogenous, jointly determined variables, and include not only the convergence of interests theory, but also the entrenchment theory. Our analysis postulates a system of three equations, one for each of our three key variables: debt policy, inside ownership, and dividend policy. To

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these, we add control variables that capture the firm attributes discussed in our literature review. We estimate our system using three stage least squares (3SLS), which provides both consistent and efficient parameter estimates in the presence of simultaneity bias. Our goal is to perform a simple exploratory analysis that not only determines the relationship between our three policy variables, but also provides some empirical evidence about whether or not these theories are diametrically opposed.

Data and Empirical Methodology

Data and Variables

The data used in this study consist of all manufacturing firms listed on the Korean Stock Exchange from January of 1997 to December of 2002. This panel of 617 firms was screened for a complete time series for all variables used in this study, leaving a panel of 102 firms. Many firms were deleted because they omitted dividend payments for one or more years during the six-year period, primarily caused by missed dividend payments during the Asian financial crisis (which occurred from the second half of 1997 to the end of 1999).

We define a firm's leverage (LEV) as the ratio of total debt to book value of total assets. Dividends (DIV) are defined as the ratio of cash dividends to operating income. Firm ownership (OWN) is measured by the percentage of stock owned by insiders. Our data also allow for the utilization of several control variables. A firm's cash flow (CF) is calculated as the ratio of net income plus depreciation to total assets. Firm liquidity (CR) is measured as the ratio of current assets to current liabilities. Profitability (PRO) is defined as the ratio of net income to net sales. Finally, a firm's size (SIZE) is characterized by the natural log of market value of equity. All financial and market-related data were collected from fnguide.com, which is comparable to COMPUSTAT annual data for firms in the U.S. and Canada.

Empirical Model

Our simultaneous equations model is estimated using 3 stage least squares (3SLS) methodology. The 3SLS method is preferred over the ordinary least squares (OLS) method as the latter leads to biased and inconsistent parameter estimates when a system has interdependent endogenous variables. This is clearly the situation here, where the debt ratio, investment expenditure ratio, and dividend payout ratio are endogenous to the system. As long as the system of equations is properly specified and contains a different number of regressions in each equation, 3SLS provides estimates that are consistent and also efficient. Moreover, unlike OLS, 3SLS allows us to see how dividend (debt) decisions affect debt (dividend) separately from how debt (dividend) decisions affect dividends (debt). This is accomplished by separating the results into different decision processes, or estimated equations. As Cho (1998) notes, 3SLS is also preferred over alternatives such as

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2SLS, especially when the researcher believes that the system of equations is linked through the disturbance terms in a seemingly unrelated fashion.

Based on our literature review, we develop three simultaneously determined equations with the expected signs for the coefficients. Because we have no preconceived notions about whether entrenchment theory, the convergence of interests theory, both or neither hold (nor any information about the nature of the total agency cost function), we take a parsimonious approach and postulate a system of equations that is linear in each of its arguments.

The debt equation:

$$\begin{array}{l} LEV = a_0 + a_1\,OWN + a_2\,DIV + a_3\,CF + a_4\,CR + a_5\,PRO \\ \qquad\qquad\quad (+/-) \quad (+/-) \quad (-) \quad (-) \quad (-) \end{array}$$

The dividend equation:

$$\begin{array}{l} DIV = b_0 + b_1\,OWN + b_2\,LEV + b_3\,CF + b_4\,CR + b_5\,PRO \\ \qquad\qquad\quad (+/-) \quad (+/-) \quad (+) \quad (+) \quad (+) \end{array}$$

The ownership equation:

$$\begin{array}{l} OWN = c_0 + c_1\,LEV + c_2\,DIV + c_3\,CF + c_4\,CR + c_5\,SIZE \\ \qquad\qquad\quad (+/-) \quad (+/-) \quad (+) \quad (+) \quad (-) \end{array}$$

The following notation is used to define the variables in the empirical model:

LEV:	total debt/total assets
DIV:	dividends/operating income
OWN:	percentage of stocks owned by insiders
CF:	(net income + depreciation)/total assets
CR:	current assets/current liabilities
PRO:	net income/net sales
SIZE:	natural log of market value of equity

Examining the signs and significance of these coefficient estimates allows us to make inferences about both the nature of simultaneity across each of our three policy variables, as well as whether the convergence of interests theory and entrenchment theory are diametrically opposed. For example, significant coefficient estimates for both a_1 and c_1 imply that leverage and ownership exhibit two-way (or simultaneous) causality. On the other hand, if one or both of these estimates are not statistically different from zero, then two-way causality would not exist between these variables. The signs (and significance) of these coefficient estimates also allow us to infer whether or not entrenchment theory is occurring in tandem with the convergence of interests theory. This would be the case, for example, if the estimate for a_1 is significantly positive, while the estimate for a_2 is significantly negative.

It is important to note that this specification, while parsimonious, is not without its drawbacks. By specifying a system of equations that is linear in

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its arguments (and performing what is essentially an exploratory analysis), we will be able to identify whether an overlap between entrenchment theory and the convergence of interests theory exists. However, our analysis will not identify the exact nature of that relationship if it exists. Identifying the exact nature of this relationship would likely entail postulating a system of equations that is flexible enough to encompass most conceivable agency cost equations, and thus might involve higher order terms. We leave this as a suggestion for future research.

A common problem plaguing 3SLS is the presence of multicollinearity (or nearly perfect correlation) among the regressors. This leads to inflated standard error estimates and reduced test statistic values. To check for this possibility, we use variance inflation factors (VIF). A maximum VIF value equal to one indicates that no multicollinearity is present, while maximum values exceeding ten indicate that multicollinearity may be unduly influencing the regression estimates (Neter et al. 1983). All VIFs of the empirical results are close to one, indicating the regression estimates are not distorted by multicollinearity.

Empirical Results

Summary Statistics

Table 1 presents descriptive statistics for all of the variables defined in the data and empirical methodology section. For the average firm, total debt is approximately 46 percent of the size of its total assets. Insiders, on average, own approximately 30 percent of the firm's stock. The average firm also pays about 1.75 percent of its operating income out to stockholders in the form of dividends. The mean level of cash flow is 10.76 percent of the value of its assets, while the average firm's profit equates to 7.5 percent of net sales. All of our variables exhibit a relatively small amount of variation, particularly when adjusting for the scaling (or units of measurement) of the data.

Table 2 reports the Pearson correlation coefficients among the three policy variables and the four control variables. Examining Table 2, we see that the DIV, CF, CR, and PRO variables are significantly and negatively

Table 1
Descriptive Statistics

Variable	Mean	Standard Deviation	Maximum	Minimum
LEV	0.4656	0.1760	0.9277	0.1376
OWN	0.3008	0.1531	0.8680	0.0253
DIV	0.0175	0.0207	0.1428	0.0000
CF	0.1067	0.0628	0.2947	-0.0756
CR	1.5801	1.1830	7.0402	0.1292
PRO	0.0751	0.0734	0.4643	-0.1160
SIZE	6.3543	1.3386	10.4758	3.5187

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Table 2
Pearson Correlation Coefficients

	LEV	OWN	DIV	CF	CR	PRO	SIZE
LEV	1						
OWN	-0.061	1					
DIV	-0.244*	0.047	1				
CF	-0.549*	0.684	0.291*	1			
CR	-0.475*	0.019	0.133	0.192	1		
PRO	-0.490*	0.079	0.450*	0.783*	0.246*	1	
SIZE	0.264*	-0.178	0.004	0.062	-0.324*	0.023	1

* Significant at 5% level or less (two-tail test)

correlated with the LEV variable. The CF and PRO variables have a positive association with the DIV variable. It remains to be seen from the coming 3SLS analysis whether these relationships continue to exist when we control for each of these factors simultaneously.

The Debt Equation Results

Table 3 presents the OLS and 3SLS estimates for the debt equation. As evidenced by the high F-statistic values, the collection of regressors in each equation jointly explains a significant amount of variation in our leverage variable.

Examining the 3SLS results in Table 3, we see that the coefficient estimate for OWN is significantly negative. This finding supports the convergence of interests theory, and is consistent with Friend and Lang (1988), Jensen et al. (1992), and Bathala et al. (1994), but is inconsistent with Kim and Sorensen (1986). Concomitantly, the DIV variable has a significantly positive coefficient estimate—a finding that supports entrenchment theory and conforms to the work of Noronha et al. (1996), but not Jensen et al. (1992) and Chen and Steiner (1999). The negative and statistically significant parameter estimates for CF and CR are also consistent with Myers and Majluf's (1984) pecking order theory. Finally, the coefficient for PRO is not statistically different from zero.

The results from Table 3 allow us to draw several important conclusions. First, comparing the OLS coefficient estimates with those generated via 3SLS, we see some striking differences in sign, magnitude, and significance, particularly with regard to the ownership, dividend, and profitability variables. The coefficient estimate for OWN, which is statistically insignificant in the OLS results, becomes highly significant under 3SLS. For the profitability variable, the opposite is true; the coefficient estimate is significant under OLS, but insignificant when estimated with 3SLS. The dividend coefficient estimate, while significant under both estimation procedures, changes in sign. Thus, our findings support the recent empirical literature, which argues that dividend policy and ownership are simultaneously determined with debt policy. Additionally, we find simultaneous evidence in favor of both entrenchment theory as well as the convergence of interests

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theory. While our results do not conclusively prove our assertion that these two theories need not be diametrically opposed, they do highlight the possibility, and suggest that future work to further investigate this issue is necessary.

The Dividend Equation Results

Table 4 shows the OLS and 3SLS estimates for the dividend equation. As in Table 3, both equations in Table 4 are highly significant, exhibiting F-statistics that exceed their critical values at a five percent level of significance.

Table 3
Results for the Debt Equation (LEV)

	OLS Results		3SLS Results		
Variable	**Estimated Coefficient**	**T-Statistic**	**Estimated Coefficient**	**T-Statistic**	**Expected Sign**
Intercept	0.8462	18.024***	1.0588	7.247***	
OWN	-0.0250	-0.267	-1.4110	-2.337**	+/-
DIV	-1.1542	-1.590*	7.5461	4.934***	+/-
CF	-1.8162	-8.089***	-1.8536	-4.331***	-
CR	-0.0552	-4.198***	-0.0443	-1.954**	-
PRO	-0.0293	-2.397**	-0.0025	-0.181	-
R^2	0.4764		0.2609		
F-Statistic	22.6620***		12.9592***		
Log-Likelihood	57.7522		30.5850		
Observations	102		102		

* 10% significance level (one-tail test)
** 5% significance level (one-tail test)
*** 1% significance level (one-tail test)

Table 4
Results for the Dividend Equation (DIV)

	OLS Results		3SLS Results		
Variable	**Estimated Coefficient**	**T-Statistic**	**Estimated Coefficient**	**T-Statistic**	**Expected Sign**
Intercept	0.0327	2.881***	-0.1259	-3.308***	
OWN	-0.0115	-0.961	0.1712	2.125**	+/-
LEV	-0.0188	-1.590*	0.1200	3.871***	+/-
CF	0.0314	0.875	0.2272	3.358***	+
CR	-0.0007	-0.041	0.0054	1.785*	+
PRO	-0.0033	-2.126**	-0.0001	-0.039	+
R^2	0.0911		0.0723		
F-Statistic	3.3880**		3.01223**		
Log-Likelihood	304.7411		257.4281		
Observations	102		102		

* 10% significance level (one-tail test)
** 5% significance level (one-tail test)
*** 1% significance level (one-tail test)

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Unlike the results of Table 3, the 3SLS coefficient estimates for the dividend equation provide consistent results in favor of entrenchment theory. The OWN and LEV coefficient estimates are both significantly positive, implying that not only are debt and dividend policies complementary, but also that higher ownership levels lead to higher dividends, possibly to prevent entrenched managers from acting in a manner inconsistent with stockholders. As such, our findings support Schooley and Barney (1994), but not those of Rozeff (1982), Jensen et al. (1992) and Chen and Steiner (1999). Our results only partially coincide with Noronha et al. (1996) and Fenn and Liang (2001), who find an insignificant relationship between insider ownership and dividend policy.

One similarity between Tables 3 and 4 is that both provide evidence in favor of the pecking order theory. The 3SLS coefficient estimates for both CF and CR are positive and significant. This supports the notion that, holding managerial ownership constant, higher levels of liquidity lead to higher dividend payouts, presumably to reduce discretionary funds, and thus any incentive for management to act in a manner inconsistent with the firm's stakeholders. As with Table 3, profitability is an insignificant determinant of the dependent variable.

Another similarity between the results in Tables 3 and 4 is that the OLS and 3SLS results differ markedly in sign, magnitude, and significance. In fact, aside from the intercept and debt variables, all of the coefficient estimates in Table 4 change significance when moving from OLS to 3SLS; for the intercept and debt coefficient estimates, the signs change. Again, these empirical results support our proposal that financial policies and ownership structure are interrelated, and that 3SLS is the appropriate estimation technique.

The Ownership Equation Results

Table 5 reports the OLS and 3SLS estimates for the ownership equation. Again, both equations are statistically significant at the five percent level.

The results in Table 5 provide evidence which is consistent with that presented in the previous two tables. In Table 3, we noted that managerial ownership was negatively related to debt policy. The 3SLS results in Table 5 also exhibit a negative relationship between these two variables; however, the causality is reversed. Again, the sign and significance of this coefficient estimate supports the convergence of interests theory. The estimates in Table 4 gave a positive and significant relationship between dividends and ownership—a finding consistent with entrenchment theory. Table 5 provides an analogous result, although again the causality is reversed. Thus, we find additional evidence that entrenchment theory and the convergence of interests theory are not mutually exclusive alternatives to explain agency costs.

Unexpectedly, the CF and CR variables have negative and significant coefficient estimates, implying that liquidity is not a significant determinant of managerial ownership—a finding that goes against the pecking order

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Table 5
Results for the Ownership Equation (OWN)

	OLS Results		3SLS Results		
Variable	**Estimated Coefficient**	**T-Statistic**	**Estimated Coefficient**	**T-Statistic**	**Expected Sign**
Intercept	0.4126	4.504***	0.6648	5.792***	
LEV	0.0431	0.464	-0.5231	-2.956**	+/-
DIV	-0.5904	-0.850	4.1371	3.250***	+/-
CF	0.5131	1.941*	-0.8755	-2.129**	+
CR	0.0057	0.418	-0.0225	-1.480	+
SIZE	-0.0283	-2.538**	-0.0074	-0.592	-
R^2	0.0612		0.0425		
F-Statistic	2.552 **		2.132 **		
Log-Likelihood	61.8104		26.1742		
Observations	102		102		

* 10% significance level (one-tail test)
** 5% significance level (one-tail test)
*** 1% significance level (one-tail test)

theory. Finally, the coefficient for SIZE is not significant, which is inconsistent with previous empirical results.

The OLS results in Table 5 are also different from the 3SLS results. As in Table 4, there is only one (non-intercept) coefficient estimate (CF) that is statistically significant across both estimation procedures; and for that variable, the sign of the coefficient estimate changes from OLS to 3SLS. Again, this supports the use of 3SLS to account for simultaneity bias.

As a summary, we present **Table 6,** which shows not only the lack of consistency across the OLS and 3SLS estimates, but also highlights our

Table 6
Differences between OLS Results and 3SLS Results

Debt Equation (LEV)	**LEV**	**DIV**	**OWN**	**CF**	**CR**	**PRO**	**SIZE**
Expected sign		+/-	+/-	-	-	-	
OLS		- *	insig.	- ***	- ***	- **	
3SLS		+ ***	- **	- ***	- **	insig.	
Dividend Equation (DIV)							
Expected sign	+/-		+/-	+	+	+	
OLS	- *		insig.	insig.	insig.	- **	
3SLS	+ ***		+ **	+ ***	+ *	insig.	
Ownership Equation (OWN)							
Expected sign	+/-	+/-		+	+		-
OLS	insig.	insig.		+ *	insig.		- **
3SLS	- **	+ ***		- **	- *		insig.

* 10% significance level (one-tail test)
** 5% significance level (one-tail test)
*** 1% significance level (one-tail test)

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findings about the relationship between the convergence of interests and entrenchment theories.

CONCLUSIONS

This paper examines the empirical relationship between debt policy, dividend policy, and ownership structure. Like previous studies, our approach allows for the possibility that leverage, dividends, and ownership structures are endogenously determined. Unlike much of the existing literature, which utilizes OLS and finds inconclusive and sometimes conflicting evidence about the nature of these relationships, we show that the use of 3SLS is justified and necessary, since all three variables appear to be simultaneously determined. Our 3SLS regression results suggest that higher levels of ownership and dividends negatively affect leverage. Concomitantly, ownership and leverage both positively impact dividends. Lastly, we find that leverage is negatively associated with ownership, while dividends positively impact ownership.

This study also considers the convergence of interests theory and the entrenchment theory and their abilities to explain the role of managerial stock ownership in lowering agency costs. We show that the prediction of both theories of managerial stock ownership is significantly supported by the empirical relationships between debt, dividends, and ownership structure. Given these results, our findings call for new work in this area to identify the nature of the relationship between these theories. We suggest that researchers examine this issue both theoretically as well as empirically, since this relationship may be due to an improper specification of the agency cost function. This, in turn, may lead to a mis-specified empirical model and biased empirical results.

While our findings are interesting, we intend them only as a first step and encourage future work that extends our study. One interesting extension would be to replicate the study utilizing data from other financial markets. We have utilized data on Korean manufacturing firms; therefore our findings may be limited to this population. Studies using data from other industries and/or from other countries may find disparate results, or may uncover some universality among these relationships.

While we find evidence in support of both the convergence of interests and entrenchment theories, we utilize a very limited system of equations that do not contain higher order terms. Thus, while our simple model has identified a problem that has been largely overlooked in the literature, it has little to say about the nature of the relationship between the two theories. Future work that investigates this issue would provide an invaluable contribution to our knowledge of agency costs.

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