The Relationship between Dividends and Equity Acquisition in Banking: Substitutes or Complements?

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This paper offers empirical evidence that dividend payments and external equity acquisitions of commercial banks are generally substitutes (negatively related). However, we observe complementarities (positive relationship) when banks are significantly undercapitalized. This is consistent with the existence of differential signaling incentives that vary with banks' financial condition. Such incentives are relevant to implementation of the Federal Deposit Insurance Corporation Improvement Act of 1991.

INTRODUCTION

Numerous studies have examined the effect of common equity issuance on firm value. The majority of this research finds that the issuance of common equity has a negative effect on stock returns. Other studies have examined the effect of dividend payments on firm value. Most of this research shows a positive relationship between dividend payments and stock returns. A logical extension of these studies is to examine the relationship between dividend policy and equity issuance. Specifically, we address whether, and under what conditions, dividend and equity issuance can be described as complements (positively related) or substitutes (negatively related).

The argument for substitutability is based on financial theory that predicts firms should not simultaneously pay dividends and issue stock (Loderer & Mauer, 1992) since transferring any part of the proceeds of a costly equity issue to shareholders in the form of dividends is value reducing. This view assumes that no informational asymmetries exist between managers and capital markets thereby negating any "signaling" content of either dividend payments or equity issuance.

In contrast, if informational asymmetries do exist between managers and capital markets, the relationship between dividends and equity acquisition could be complementary. Such complementarities are predicated on the existence of signaling benefits. John and Williams (1985) offer a rationale for complementarity in which dividends facilitate equity acquisition.[1] In their model, access to capital markets is improved (*i.e.*, firms can obtain higher prices when selling shares) if external equity issues are timed to coincide with (or follow) dividend payments. In support of this theory are the studies of Charest (1978), Aharony and Swary (1980), Polonchek, *et al.* (1989) and Filbeck and Mullineaux (1993) that find dividends (or

dividend changes) are positively related to changes in stock-price. The latter two studies focus specifically on bank holding companies.

Another approach to complementarity, developed by Easterbrook (1985) and tested by Born and Rimbey (1993), is based on the capacity for equity acquisition to refine the interpretation of dividend signals. Easterbrook contends that dividends are inefficient signaling mechanisms because they fail to distinguish well-managed firms that are growing from poorly managed firms that are disinvesting. However, if equity acquisitions are timed to coincide with (or precede) dividend payments, the signal unambiguously isolates growing firms for which dividends portend prosperity. In Easterbrook's model, dividends are beneficial because they increase reliance on external financing, which subjects firms to outside monitoring by the capital market, and thereby reduces agency costs.

This paper empirically examines the relationship between dividends and external equity acquisition in the commercial banking industry. A key hypothesis of our study is that the relationship between dividends and equity acquisition varies with banks' financial condition. We attempt to incorporate changing financial conditions by analyzing the dividend and financing activities of banks that became undercapitalized (fell below regulatory capital requirements) at some point during the period from 1981 to 1991.

The reason for selecting this sample period is twofold. First, this period occurs prior to the passage of the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), which changed the regulatory framework concerning bank capitalization requirements. Second, unlike the post FDICIA period, this time period allows us to observe banks with varying degrees of capitalization. Due to capital forbearance by regulators, many banks were allowed to operate well below required capital ratios during this time period. FDICIA changed this by mandating that banks with deficient capital ratios be dealt with in a prompt corrective manner. This along with the strong economy since 1991 has resulted in a healthy banking environment where few banks have faced capitalization problems.

The 1981-1991 time period allows us to focus on the same banks prior to and during periods of undercapitalization (below minimum regulatory requirements). We can span a wide spectrum of capital market conditions in which the supply and/or demand for bank equity financing are likely to differ substantially. This isolates situations in which shareholders, potential investors, and regulators are highly sensitive to the "informational content" of capital market activities, particularly dividends (Miller & Modigliani, 1961). It has the advantage, relative to an alternative design comparing different groups of adequately capitalized and undercapitalized banks, in that by observing the same banks as they maintain and fall below required capital levels, we can better hold constant other factors which are likely to influence dividend payments and/or access to capital markets (e.g., managerial philosophy, market definition, ownership structure).

When banks are adequately capitalized, we conjecture that the relationship between equity acquisition and dividends can be characterized by substitutability. Banks should not simultaneously pay dividends and issue stock since transferring any part of the proceeds of a costly equity issue to shareholders in the form of dividends is value reducing. But when these

same banks become undercapitalized, a complementary relationship may be more likely to exist. When banks become undercapitalized, informational effects may be accentuated as pressures for recapitalization intensify and access to capital markets becomes increasingly difficult due to resistance of potential investors. The positive signaling benefit of dividend payments may facilitate access to capital markets (John & Williams, 1985). Filbeck and Mullineaux (1993) provide additional rationale for greater signaling benefits of dividends for undercapitalized banks. They suggest that, given the regulatory scrutiny of banks compared to most other industries, bank shareholders perceive dividends as having been "validated" by regulators. Because undercapitalized banks are more closely monitored by regulators, the informational content of their "validated" dividend signals may be enhanced.

Our study may offer insight into the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), which strongly encouraged banks to maintain adequate capitalization and to quickly remedy undercapitalization. Because acquisition of external equity has been identified as a key factor in capital restoration (Dahl and Shrieves, 1990; Gilbert, 1991a), particularly restorations which are accomplished quickly (Dahl & Spivey, 1995), enactment of FDICIA has heightened interest in the issue of bank access to external capital markets. In this regard, the role of dividends, especially by undercapitalized banks, has been extensively, but inconclusively, debated.

The remainder of the paper is organized as follows. Section 2 discusses our methodology for analyzing bank equity issuance and dividend payments. Section 3 describes the sample. Section 4 presents our results, and Section 5 concludes.

THE MODEL

Theoretical research implies that dividend and financing behavior are jointly determined. If substitutability exists, dividends should decrease (increase) with acquisition (repurchase) of bank equity. If complementarity exists, dividends should coincide with (or precede) equity acquisition (under the John and Williams (1985) rationale) or should coincide with (or follow) equity acquisition (under the Easterbrook (1985) rationale). Given the joint theoretical arguments, we examine the dividend and equity acquisition relationship in a simultaneous equations model.

The Dividend Equation

The equation examining dividends is based on the model used by Mayne (1980a) to examine the dividend policies of independent and affiliated banks. Our dependent variable (DIVIDEND) is defined as the ratio of common and preferred dividends during year t to total assets at the end of year t. (Given that we are concerned with the relative levels of our variables, we follow Mayne and standardize our dividend variable, and other variables, by total assets).[2] Our focus on dividend payments (rather than changes in dividends) is relevant to the unique signaling environment faced by banks during, or prior to, periods of financial distress. In this environment, the maintenance of dividends is likely to constitute a prominent signal to the capital market. For banks with declining capitalization, dividend

"surprises" may be closely related to whether banks can pay a dividend rather than to whether they reduce or decrease dividends.

The key independent variable in the dividend equation is the ratio of external equity acquisitions during year t to total assets at the end of year t (ACQUIRE). Equity acquisitions are defined to include "sale, conversion, acquisition or retirement of capital stock, net," as well as "other transactions with the holding company." ACQUIRE is a continuous variable, since negative "acquisitions," or redemptions, are possible.

The equity acquisitions can be accomplished with issuance of new shares (for independent banks and affiliated banks with less than complete ownership) or without issuance of new shares (for affiliated banks with complete ownership).[3] For subsidiaries of affiliated banks that acquire capital from the parent, the direct signaling benefit of dividends, observed from the point of view of the subsidiary, is eliminated. Even for these banks, however, there may be an indirect benefit. To the extent that dividends of subsidiary banks are used to finance dividends of parent holding companies, they help fund a dividend signal of the parent to its external capital market. In this regard, Mayne (1980) finds that 74 percent of the cash income of bank holding companies is attributable to dividend payments by bank subsidiaries.[4]

Equity acquisition will be negatively correlated with dividend issuance under substitutability. This implies that the coefficient on ACQUIRE is negative. On the other hand, complementary (positive) influences may exist if banks fund dividend payments with the proceeds of equity issues. This would be consistent with implications of the Easterbrook (1985) model. This suggests that the coefficient on ACQUIRE is positive.

The bank's equity capital position at the end of year t-1 (CAPITAL) is defined as the ratio of common stock, perpetual preferred stock, surplus, cumulative foreign currency translation adjustments and undivided profits and capital reserves to total assets. Following Mayne, the expected sign on this variable is positive. The higher the beginning equity level, the more willing the bank is to pay dividends, or, conversely, the less urgency there is to retain profits. Such incentives may be particularly important among banks approaching periods of undercapitalization in which regulatory pressures for dividend reductions are extreme.

Growth is measured as the percentage change in bank total assets during year t (GROWTH). The expected sign on this variable is negative, since growth is financed (at least partially) with internally generated funds that are limited by dividend payments. Profit is measured as the ratio of net income during year t to total assets at the end of year t (PROFIT). The expected sign on this variable is positive, since higher earnings offer the capacity for greater dividends. A total asset variable at the end of year t (SIZE) is included to account for possible impacts of bank size on dividend policy. [5]We also include a variable representing affiliation status in year t (HOLD equals 1 if affiliated, 0 if independent). Because Mayne (among others) finds that affiliated banks pay higher dividends, the expected sign on HOLD is positive.

The overall effect of declining capitalization on dividends is captured with a dummy variable indicating observations on banks during years of adequate capitalization (CAPDUM=0) or

during years of undercapitalization (CAPDUM=1). Undercapitalization is defined as equity divided by total assets less than 3 percent.[6] The hypothesized sign is indeterminate. Compared to when banks are adequately capitalized, banks when significantly undercapitalized are subject to moral hazard incentives, which suggest that bank owners may attempt to drain the bank of its equity by paying dividends (this is particularly true for significantly undercapitalized banks with negligible (or negative) charter values). To the extent that regulators are ineffective in limiting such distributions, a positive sign should be observed on CAPDUM. A negative relationship should be observed if the existence of private incentives for recapitalization, or regulatory pressure, compels banks to lower dividends as their value deteriorates.

The Equity Acquisition Equation

ACQUIRE takes on a zero value for many observations since banks issue equity infrequently. The observations when banks do issue equity are continuous and are standardized by total assets. Given the large number of zero observations, a transformation on the dependent variable is necessary to ensure the proper distributional assumptions are met. Once the transformation of the dependent variable is made, the equation can be estimated by Ordinary Least Squares.[7]

We include as explanatory variables in the equity acquisition equation those which reflect either supply conditions in external capital market (the desire of banks to acquire or repurchase equity) or demand conditions in the external capital market (the desire of current or prospective investors to purchase equity). The key variable is DIVIDEND. If dividends and equity acquisition are substitutes, as is implied by financial theory in the absence of informational effects, the sign on this variable should be negative. But if informational effects exist, the sign could be positive and would offer evidence of complementarity.

To examine the effects of varying capitalization on the relationship between dividends and equity acquisition, we include the variable (CAPDUM*DIVIDEND). It is the interaction of DIVIDEND with the dummy for undercapitalization (CAPDUM). If informational effects are more important for banks during periods of undercapitalization, the sign on this variable should be positive (compared to when banks are adequately capitalized, the role of complementarity is enlarged). A possible offsetting influence, however, is the moral hazard incentive previously discussed, which implies that equity acquisition may decrease with increases in dividends for undercapitalized banks with negligible charter values.

CAPITAL is included to account for impacts of capitalization on equity acquisition. Its hypothesized sign is negative, since the incentive to acquire external capital increases with greater need for recapitalization (Dahl & Shrieves, 1990; Gilbert, 1991a). On the other hand, the demand for bank equity in the external capital market may be positively related to bank capital if decreases in capital—*i.e.*, increases in the risk of bank insolvency—reduce investor demand for that bank's shares. Because this influence is likely to be critical for undercapitalized banks with lower charter values, it can be interpreted in the context of the CAPDUM variable. The hypothesized sign on this variable is negative—*i.e.*, when banks are

significantly undercapitalized, they are less likely to acquire external equity compared to when they were adequately capitalized. This reflects a potential unwillingness (or inability) of undercapitalized banks with the greatest effective need for recapitalization to access the external capital market.

PROFIT has an indeterminate sign. It is an increasing function of external equity acquisition to the extent that higher profitability increases incentives for investment, and it is a decreasing function of issues to the extent that earnings retention, generated by the excess of income over dividends, is a close substitute for increasing capitalization.[8] The hypothesized sign on GROWTH is positive. If asset growth exceeds internal capital generation, external equity acquisition is required to maintain capital ratios. SIZE is included to account for the impact of size on target capital ratios. HOLD accounts for the differential access to equity acquisition for independent and affiliated banks. Its expected sign is positive, since parent holding companies may serve as "sources of strength" for their (undercapitalized) affiliates (Gilbert, 1991a).

Based on the preceding discussion, we estimate the following simultaneous equations model (the hypothesized signs are shown above each independent variable):

$$\underset{\;\;?}{DIVIDEND_{(t)}} = \underset{\;\;+}{ACQUIRE_{(t)}} + \underset{\;\;+}{CAPITAL_{(t-1)}} + \underset{\;\;-}{GROWTH_{(t)}} + \underset{\;\;+}{PROFIT_{(t)}} + \underset{\;\;?}{SIZE_{(t)}} + \underset{\;\;?}{HOLD_{(t)}} + \underset{\;\;?}{CAPDUM} + e_{(t)} \quad (1)$$

$$\underset{\;\;?}{ACQUIRE_{(t)}} = \underset{\;\;?}{DIVIDEND_{(t)}} + \underset{\;\;-}{CAPDUM} + \underset{\;\;?}{CAPDUM*DIVIDEND_{(t)}} + \underset{\;\;-}{CAPITAL_{(t-1)}} + \underset{\;\;?}{PROFIT_{(t)}} + \underset{\;\;+}{GROWTH_{(t)}} + \underset{\;\;+}{HOLD_{(t)}} + \underset{\;\;?}{SIZE_{(t)}} + e_{(t)} \quad (2)$$

In the dividend equation (1), dividends in year t (DIVIDEND) are assumed to be a function of external equity acquisition in the same year (ACQUIRE) and a number of other independent variables. In the equity acquisition equation (2), equity acquisition (ACQUIRE) is assumed to be a function of dividends in the same year (DIVIDEND) and other independent variables.[9]

DATA AND SAMPLE

To conduct our study, we used financial information for all insured commercial banks which became undercapitalized sometime during the period from 1981 to 1991.[10] We observed their dividend and equity financing behavior prior to their becoming undercapitalized and during the time they were undercapitalized.[11] The overall sampling period extended from 1980 (or the year banks came into existence after 1980) until one of the following occurred: 1) the bank recovered to a position of adequate capitalization; 2) the bank failed, merged or otherwise went out of existence as an independent reporting entity; or 3) the end of the sample period in 1992 was reached. This sampling approach assured minimum observations of one year before, and after, the point of undercapitalization.

Undercapitalization occurs if a bank falls beneath a ratio of equity capital (as previously defined) to total assets of 3 percent, a level which, under FDICIA, defines the "significantly undercapitalized" category.[12] This sub sample excludes banks which operated (perhaps continually) at the regulatory minimums. It emphasizes banks which are likely to be subject to severe constraints on external capital market activities under FDICIA.[13] These sanctions include, but are not limited to, required acquisitions of external equity and restrictions on dividends or other capital distributions.

Table 1 presents descriptive information on the banks in the sample for periods in which they were adequately capitalized (ratios of equity to total assets of 3 percent or more) and undercapitalized (ratios of equity to total assets of less than 3 percent). Of the 4,451 observations (number of banks multiplied by number of years of observations per bank), about 70 percent occurred while the banks were adequately capitalized and 30 percent occurred while the banks were undercapitalized. After becoming undercapitalized, the banks experience decreases in profitability (net income/total assets), decreases in size (amount of total assets and rates of growth of total assets), decreases in dividends (dividends/total assets) and decreases in external equity acquisition (equity acquisition/total assets). This is consistent with the existence of behavioral differences among banks which vary by capitalization.

Table 1
Comparison of Bank Characteristics before Versus During Periods of Significant Undercapitalization*

	Before ECAP<3.0	During ECAP<3.0
Number of Bank Years	3092	1449
SIZE	67044.58	60224.33
PROFIT	-0.611	-5.286
CAPITAL	6.830	0.349
GROWTH	14.073	1.382
DIVIDEND	0.294	0.037
ACQUIRE	0.337	0.005

SIZE = total asset at the end of year t.
PROFIT = the ratio of net income during year t to total assets at the end of year t.
CAPITAL = the ratio of common stock, perpetual preferred stock, surplus, cumulative foreign currency translation adjustments and undivided profits and capital reserves/total assets.
GROWTH = the percentage change in bank total assets during year t.
DIVIDEND = the ratio of common and preferred dividends during year t to total assets at the end of year t.
ACQUIRE = the ratio of external equity acquisitions during year t to total assets at the end of year t.
* Undercapitalization is Defined as Equity/Total Assets (ECAP) < 3.0%.

Table 2 provides more complete comparisons of dividend and equity acquisition patterns for the banks in our sample. Note the decline in the ratio of dividends to total assets as banks become undercapitalized (previously observed in Table 1) is reflected in the larger percentages of adequately capitalized banks which pay dividends (column 1, Panel A) and the larger percentages of adequately capitalized banks which increase dividends (column 1, Panel B). Similar reductions in dividends among undercapitalized banks have been observed by Gilbert (1991b) and the U.S. Treasury (1991). The percentage of banks decreasing dividends is similar across the adequately capitalized and undercapitalized bank sub samples (column 1, Panel C).

Table 2

Equity Acquisition and Dividend Practices of Banks Before Versus During Periods of Significant Undercapitalization*

Panel A	Percentage of Banks Paying Dividends	Percentage of Dividend Paying Banks with Equity Acquisition		
		=0	*>0*	*<0*
Before ECAP<3.0	50.47	85.64	11.89	2.47
During ECAP<3.0	10.76	75.44	23.68	0.88
Panel B	**Percentage of Banks with Dividend Increases**	**Percentage of Banks Increasing Dividends with Equity Acquisition**		
		=0	*>0*	*<0*
Before ECAP<3.0	33.57	86.43	11.24	2.33
During ECAP<3.0	5.19	68.63	29.41	1.96
Panel C	**Percentage of Banks with Dividend Decreases**	**Percentage of Banks Decreasing Dividends with Equity Acquisition**		
		=0	*>0*	*<0*
Before ECAP<3.0	28.55	81.02	16.95	2.03
During ECAP<3.0	26.25	77.86	19.29	2.86

Equity Acquisition = 0 if no equity is issued, >0 if equity is issued and <0 if equity is repurchased. Dividend increases (decreases) mean change in dividends/total assets from previous period is positive (negative).

* Undercapitalization is Defined as Equity/Total Assets (ECAP) < 3.0%.

The percentage of banks which simultaneously paid dividends and acquired external equity nearly doubled as banks became undercapitalized, from 11.89 per cent to 23.68 per cent (column 3, Panel A). This offers preliminary evidence that, at least for some banks, the

relationship between financing and dividend activity shifts from substitutability to complementarity under conditions of deteriorating financial health.

RESULTS

The results of our simultaneous models of dividends and equity acquisition are presented in Table 3. The signs on DIVIDEND in the equity acquisition equation and on ACQUIRE in the dividend equation are negative, which indicates that these factors can be characterized as substitutes, at least among banks which have adequate capitalization. As dividends increase (decrease), equity acquisition decreases (increases). This is consistent with general financial theory in the absence of informational effects.

Table 3
Two Stage Least Squares Estimates of Dividend Payments (DIVIDEND) and Equity Acquisitions (ACQUIRE) for Banks During and Undercapitalization**

	Dividend Payments	Equity Acquisition
Intercept	0.001*	0.006*
$SIZE_t$	-1.203	-3.469
$PROFIT_t$	0.014*	-0.111*
$CAPITAL_{t-1}$	0.009*	-0.029*
$GROWTH_t$	0.001	0.001
$HOLD_t$	0.002*	0.004*
$DIVIDEND_t$		-1.386*
$ACQUIRE_t$	-0.032*	
$CAPDUM_t$	-0.002*	-0.007*
$(CAPDUM * DIVIDEND)_t$		0.690*
Number of Bank Years	4541	4541
Adjusted R-Square	.1423	.1157

SIZE = total asset at the end of year t.
PROFIT = the ratio of net income during year t to total assets at the end of year t.
CAPITAL = the ratio of common stock, perpetual preferred stock, surplus, cumulative foreign currency translation adjustments and undivided profits and capital reserves to total assets.
GROWTH = the percentage change in bank total assets during year t.
HOLD = a dummy variable representing affiliation status in year t (HOLD=1 if affiliated, 0 if independent).
DIVIDEND = the ratio of common and preferred dividends during year t to total assets at the end of year t.
ACQUIRE = the ratio of external equity acquisitions during year t to total assets at the end of year t.
CAPDUM = a dummy variable indicating observations on banks during years of adequate capitalization (CAPDUM=0) or during years of undercapitalization (CAPDUM=1).
CAPDUM * DIVIDEND = the interaction of CAPDUM multiplied by DIVIDEND.
* Denotes statistical significance at the 5 per cent level.
** Undercapitalization is Defined as Equity/Total Assets (ECAP) < 3.0%.

The coefficient on CAPITAL is negative and significant in the equity acquisition equation, which confirms the findings of prior research that equity acquisition increases with decreases in prior period capitalization (Dahl & Shrieves, 1990; Gilbert, 1991a). For significantly undercapitalized banks, however, there is a reversal, as indicated by the negative and significant sign on CAPDUM. This implies that the relationship between equity acquisition and capital depletion is mediated by effective capitalization—*i.e.*, a point is reached for undercapitalized banks at which their urgent need for recapitalization is counteracted by investor resistance to what they may perceive as an unacceptable risk of insolvency. This extends existing research on incentives for equity acquisition in banking and suggests that the failure of significantly undercapitalized banks to issue equity identifies them as unworthy of investment by current or prospective owners.

The coefficient on PROFIT in the equity acquisition equation is negative and significant, which indicates that internally generated funds are substitutes for equity acquisition. HOLD is positive and significant, which indicates that affiliated banks have greater access to external capital than independent banks.

In the dividend equation, the coefficient on CAPITAL is positive and significant in the dividend equation, which indicates that higher capital permits higher dividend payments. PROFIT and HOLD are both positive and significant, as hypothesized. They indicate that profitable banks, and banks which are subsidiaries of holding companies, follow a more liberal dividend policy.

The coefficient of our key variable, CAPDUM*DIVIDEND, in the equity acquisition equation is positive and significant. This offers evidence that complementarity exists among financing and dividend policies of banks while undercapitalized (relative to when they were adequately capitalized). It is consistent with the existence of informational effects and indicates that changing capital market conditions, which are isolated on the basis of capitalization, play a role in the relationship between equity acquisition and dividend payments. The observed complementarity between dividends and equity acquisition corresponds generally with the model of John and Williams (1985).[14] Its existence among undercapitalized banks specifically supports the contention of Filbeck and Mullineaux (1993) that investors view the dividend signal as "validated" by regulators. In this scenario, regulatory approval of dividend payments by undercapitalized banks may be viewed as evidence of bank viability (subject to acquisition of external equity).

Our results suggest that, prior to implementation of FDICIA, banks were able to use dividends as signals to improve their access to external capital markets. They support the contention of some bankers that lower dividends make it more difficult for undercapitalized banks to issue equity (Bacon, 1990; U.S. Treasury, 1991) and are consistent with the regulatory emphasis on equity acquisition in encouraging recapitalization. In this regard, the U.S. General Accounting Office (1991), in a study of undercapitalized banks, concluded that regulators "clearly did not want to take an enforcement action they believed would potentially damage the bank's ability to attract capital through injections, stock offerings, mergers, or acquirers."

The regulatory implications of our findings in the post-FDICIA environment must be interpreted with caution. FDICIA prohibits dividend payments (or other capital distributions) by banks which are undercapitalized or which would become undercapitalized as a result of the distributions. Because these restrictions are based on a mandatory capital trigger, and involve minimal regulatory discretion (Carnell, 1992), there appears to be a diminished capacity for signaling—*i.e.*, if all undercapitalized banks are prohibited from issuing dividends, those with superior prospects are unable to identify themselves via dividends.

On the other hand, there are exceptions to the regulations, noted by Carnell (1992), which "create opportunities to delay the application of mandatory provisions." Perhaps more importantly, the dividend restrictions under FDICIA may serve only to shift the signaling mechanism from undercapitalized banks to adequately capitalized banks which would become undercapitalized as a result of dividend payments (*i.e.*, the failure of a bank on the border of undercapitalization to pay dividends may be construed as an inadvertent signal of inferior prospects). Thus, if dividends have signaling value, dividend reductions could constrain access to the external capital market by marginally capitalized banks which, without acquisition of external equity, would become undercapitalized in the future. This implies that regulatory efforts to prevent capital declines among marginally capitalized banks by limiting dividend payments may be counterproductive for some banks. Dividend restrictions may serve as a "wake up call to owners," as stated by Carnell (1992), but they do not necessarily function as a "catalyst" for restoring capital, particularly for those banks that find their access to capital markets impaired by reduced dividend signaling benefits.

CONCLUSIONS

Results of empirical tests on banks observed during the period from 1981 to 1991 indicate that dividend and equity financing practices are simultaneously determined and that, generally, dividends and external equity acquisition in banking can be viewed as substitutes. This is consistent with financial theory in the absence of pervasive information effects. Further analysis offers evidence that the substitutability of dividends and equity acquisition reverses to complementarity when the banks become significantly undercapitalized. This is consistent with the existence of differential signaling incentives for undercapitalized banks.

ENDNOTES

1. Related dividend signaling models are by, among others, Ross (1977), Bhattacharya (1979) and Miller and Rock (1985).
2. We include preferred dividends along with common dividends because of the increased prevalence of preferred stock over our sample period. According to the Historical Statistics on Banking, 1934-1991, published by the Federal Deposit Insurance Corp., preferred stock as a percentage of common stock for all banks increased from less than one per cent in 1981 to nearly five per cent in 1991.
3. See Gilbert (1991a) for further discussion of capital injections.
4. Alternative models using samples, which excluded affiliated banks, generated equivalent results to those reported in Table 3.

5. We estimated our equations using the absolute value of assets (reported in the tables), the natural log of assets and using a categorical variable that grouped banks based on size into quartiles. The sign and significance of the variable was the same for each specification.
6. Alternative levels (3% and 2%) were used as cutoffs. The key findings of the model were not significantly altered when using the different cutoffs.
7. We utilize the following modified logit transformation proposed by Cox (1970):

   $Z_{jt} = \ln(R_{jt} + a)/(n_{jt} - R_{jt} + a)$,

   where Z_{jt} is the transformed equity acquisition variable for bank j during period t, R_{jt} is the equity acquisition for bank j during period t, n_{jt} is the total assets of bank j during period t, and a is a constant that solves the problem of taking the log of zero. Cox has recommended the value of a=.5 as an appropriate value. This allows estimation of the equation in general matrix form $Z = X\_ + u$.
8. Negative earnings, which result in capital deterioration, may exert indirect influence on equity acquisition through its influence on the capital variable.
9. We experimented with alternative models in which dividends precede equity acquisition in equation (2)—*i.e.*, ACQUIRE in year t is modeled as a function of DIVIDEND in year t-1—and in which equity acquisition precedes dividends in equation (1). The results were qualitatively the same as those reported in Table 3.
10. All financial data are obtained from the Federal Financial Institutions Examination Council's Consolidated Reports of Condition and Income (call reports).
11. We do not utilize the time periods after an undercapitalized bank recovers from severe undercapitalization. There were very few observations in our sample where this occurred.
12. As mentioned earlier, we also used an even more extreme level of undercapitalization (2%). We found results similar to the results using 3%. We note that use of a cutoff of 4% and higher failed to produce a significant sign on the interaction variable in the issue equation.
13. We recognize that projecting today's regulatory standards into the past is a potential problem since undercapitalized banks responded to differing capital definitions and levels during our sample period. We discuss this issue in the results section.
14. They also are consistent with the Easterbrook model, which emphasizes the capacity for equity acquisition to refine the underlying dividend signal, thereby reducing agency costs. It appears unlikely, however, that this model is directly relevant to significantly undercapitalized banks for which acquisition of equity is paramount. In this regard, we also note that the coefficient on equity acquisition in the dividend equation was negative (rather than positive, as would be predicted if the Easterbrook model was operational).

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