

Bank Dividend Policy: Explanatory Factors

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This study identifies factors that explain bank dividend policy by adapting the Barclay, Smith, and Watts (1995) model. Our model uses investment opportunities, capital adequacy, size, signaling, ownership, dividend history, and risk to explain dividend payments. Empirical analysis suggests a negative relationship between dividend payments and investment opportunities, signaling, ownership, and risk and a positive relationship to size and dividend history. Our results lead to five guidelines for making dividend payout decisions.

Introduction

The factors explaining dividends should be important because the intrinsic model holds that a stock's price is the present value of its future dividends. Fama and French (1998) find empirical support for such a relationship. Theory also holds that dividends can signal management's view of a firm's condition (Bhattacharya, 1979; Miller and Rock, 1985). If dividends impact firm value, then the factors determining those dividends deserve investigation. One such study is Barclay, Smith, and Watts (1995), which utilizes industrial firms, but excludes banking firms. We adapt their study for banking firms, given their managerial differences relative to industrial firms as well as their vital economic role. From a practical standpoint, identifying factors that explain bank dividends is important simply because so many banks pay dividends.¹

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¹Ninety-two percent of the banks in our pooled sample pay dividends.

We first confirm the usefulness of the Barclay, Smith, and Watts (1995) model in industrial firms and then adapt the model for use in the banking industry. The original model proposes dividends as a factor of four variables: investment opportunity, regulation, size, and signaling.² Barclay, Smith, and Watts (1995) find empirical support for the first three factors. For the banking industry, we keep the investment opportunity, size, and signaling factors, modify the regulation factor, and add ownership, dividend history, and risk factors. We modify the regulation factor from a dichotomous to a continuous variable because all banks face regulatory pressure, although to differing degrees.³

Our results support the adapted model's formulation by finding dividend yields to have a negative relationship with investment opportunities, signaling, ownership, and risk. We also find dividend yields to have a positive relationship to size and dividend history.

Literature Review

Insight to create a bank dividend model comes from the extensive dividend policy literature. Rozeff (1982) and Easterbrook (1984) both propose agency cost models for dividend determination. Rozeff's (1982) model and empirics suggest that investment opportunities, risk, agency problems, and size influence dividend policy. Casey, Anderson, Mesak, and Dickens (1999) provide a recent investigation of the Rozeff model in their examination of changing dividends around the Tax Reform Act of 1986. Barclay, Smith, and Watts (1995) and Noronha, Shome, and Morgan (1996) consider the agency model at a more general level by including the interaction with a firm's capital structure. Both latter studies find general support for the theorized interrelationship—discussed in more detail below. Chen and Steiner (1999) provide a more recent example of the generalized model. Other researchers such as Moh'd, Perry, and Rimbey (1995) and Dempsey and Laber (1992) find support for the agency cost dividend model over time and across industry segments, and an industry relationship effect appears in Michel (1979), Dempsey, Laber, and Rozeff (1993), and Barclay, Smith, and Watts (1995).

Rozeff (1982) does not examine industry differences, but does exclude three industries due to regulation (depository institutions, transportation, and insurance) and one industry (petroleum) because of its peculiar accounting procedures. Studies examining industry differences support Rozeff's (1982) model in general, but only for certain variables. Casey and Theis (1997) study the petroleum industry and find support for dividend policy to be related to agency problems and risk, but not investment opportunities or size. Casey and Dickens (2000) study banks and find

²The Barclay, Smith, and Watts (1995) model considers corporate leverage and dividend policies as being mutually related, in keeping with Ross (1977).

³Our data set consists almost entirely of bank holding companies that are supervised by the Federal Reserve as well as other banking regulatory agencies.

support for investment opportunities and agency problems as determinants for dividend policy, but not risk or size. Their small sample size and focus on the tax and regulatory effects surrounding the Tax Reform Act of 1986 limit their findings' applicability.

Data and Methodology

Our data sources are *Morningstar's Stock Tools* July CD for 1998 and its renamed *Morningstar's Principia Pro* July CDs for 1999 and 2000.⁴ We identify firms by industry using Standard Industrial Classification (SIC) codes and eliminate those not incorporated in the U.S. and those firms with missing data.

We first screen the data to obtain 4,112 industrial firm observations over the three-year period to confirm the regression results of Barclay, Smith, and Watts (1995) using a different data source and examination period. Then we return to our original data source and identify 677 banking firm observations for inspection within our adaptation of the Barclay, Smith, and Watts (1995) model.

The model Barclay, Smith, and Watts (1995) use includes investment opportunities, regulation, size, and signaling factors to explain industrial firms' dividend policy. That paper measures dividend policy with a dividend yield variable. Our dividend policy measure is also a dividend yield variable, which we define as dividends per share divided by recent stock price. We denote the variable *dividend yield*.

The Barclay, Smith, and Watts (1995) measure for a firm's investment opportunities is its market price per share divided by book value per share. We use the same measure and denote it as *market-to-book*. All else equal, a firm with greater investment opportunities should sell for a higher market-to-book ratio. Furthermore, the company may limit dividends as a way to conserve cash to take those investments. Thus, market-to-book, the measure of investment opportunities, should have a negative relationship to dividend yield.

The regulation variable in Barclay, Smith, and Watts (1995) is a dummy variable coded one for a regulated industry and zero otherwise. Their paper considers gas and electric utilities (SIC codes 4900 through 4939) to be regulated. We use this same definition for our variable *regulation dummy*. The variable should have a positive association with dividend yield. Regulation in the industries coded one leads firms to make regular dividend payments and, thus, should be associated with higher dividend yields.

The size factor in Barclay, Smith, and Watts (1995) is the natural log of real sales, while we use the natural log of nominal sales, which we denote *log of revenue*.⁵ Higher revenue firms should have lower bankruptcy probability and, therefore,

⁴In 1998 Morningstar called its company database product *Stocktools*, but by 1999 changed the name to *Principia Pro*.

⁵Because our data are from a few, recent, low-inflation years, we do not transform them into real values.

should be more likely to pay higher dividends. Thus, the log of revenue should have a positive relationship to dividend yield.

The signaling factor in Barclay, Smith, and Watts (1995) is abnormal earnings, which they define as the size of the earnings change over the next year. To be comparable, we define our measure, *future earnings*, as the percentage change in net income over the next year. Bhattacharya (1979) and Miller and Rock (1985) explain how management can use dividends to signal the true value of the firm. In keeping with their work, a higher current dividend may signal greater expected earnings. If true, there will be a positive relationship between future earnings and dividend yield.

Equation (1) summarizes the previous discussion. The mathematical signs in parentheses show the expected relationship of each independent variable to dividend yield.

$$\text{Dividend Yield} = f[\text{Market-to-Book}(-), \text{Regulation Dummy}(+), \text{Log of Revenue}(+), \text{Future Earnings}(+)] \quad (1)$$

We use Tobit regression, as did Barclay, Smith, and Watts (1995), to estimate the coefficients because 51 percent of the firms have a dividend yield of zero; a value of 25 percent justifies Tobit's usage.

After confirming the usefulness of the Barclay, Smith, and Watts (1995) model for our data source and period, we adapt the model for use in the banking industry. We expect banks, like other firms, will restrict dividends if greater investment opportunities exist. Therefore, we use market-to-book in the banking model. We must abandon regulation dummy for use in the banking model, however. All banks face regulation, so a dummy variable is not appropriate. The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 requires the use of the ratio of book value of capital divided by the book value of assets in monitoring bank's capital adequacy. We expect banks with more capital relative to their size to be under less regulatory pressure to curtail dividends. Therefore, in keeping with the FDICIA's requirements, we use the ratio of the book value of equity to total assets as a measure of regulation and denote it *capital-to-assets*. We expect capital-to-assets to have a positive relationship to dividend yield, although that relationship may not be strong given the fact that over 95 percent of banks are judged well-capitalized by the FDIC in the study period.⁶

We use the same last two variables in the Barclay, Smith, and Watts (1995) model. The too-big-to-fail concept leads to the expectation that larger banks will have lower bankruptcy probabilities and, therefore, we expect log of revenue as a measure for size to have a positive relationship with dividend yield. In addition, we expect banking firms' future earnings to be signaled by higher dividend yields, just as is the case for industrial firms in Barclay, Smith, and Watts (1995).

⁶FDIC statistics show only 0.80 percent, 0.77 percent, and 0.95 percent of depository institutions as being on its problem list in 1998, 1999, and 2000, respectively. These numbers suggest more than 99 percent of banking firms have adequate capitalization.

We propose an added variable to account for agency conflicts. Theory holds that inside ownership reduces the agency problem, as Jensen and Meckling (1976) describe. Insiders have less need for dividends, as their ownership spurs efficient management. In addition, insiders also could receive compensation through perks and/or other non-dividend payment forms. Conversely, a firm operated by managers without ownership interest may pay higher dividends for two reasons. First, the managers may be spurred to act in concert with owners' desires if feeling pressure to maintain and improve the dividend payout. Second, the non-owner managers can use dividends as a device to signal the firm's value (Bhattacharya, 1979; Miller and Rock, 1985). In keeping with Moh'd, Perry, and Rimbey (1995), we utilize the percent of stock owned by employees or directors as our measure of the agency problem and denote this measure as *inside ownership*. Based on the discussion above and the empirical results in Moh'd, Perry, and Rimbey (1995), we expect inside ownership will have a negative relationship to dividend yield.

We next add a variable to account for dividend history based on the classic Lintner (1956) and Fama and Babiak (1968) articles. Fama and Babiak report that many firms simply opt for a stable dividend policy and base current dividends on the previous year's dividend. The measure we employ is the previous year's dividend per share divided by the previous year's stock price and we denote it *previous dividend*. In keeping with Fama and Babiak's findings, we expect dividend yield to have a positive relationship to previous dividend.

Finally, we add a risk factor to the Barclay, Smith, and Watts (1995) model. Although our regulation variable, capital-to-assets, may capture some risk, we believe earnings volatility will improve our ability to identify risk. For support for this variable, we turn to Moh'd, Perry, and Rimbey (1995) who present evidence that firms with unstable earnings pay fewer dividends. It is possible that the lower ratio is an attempt to keep dividend payouts stable and/or a way to avoid outside financing. In keeping with their results and arguments, we expect dividend yields will be higher with stable earnings. We denote our earnings stability measure as *earnings volatility*. It is the coefficient of variation using the past five years' net income. We expect earnings volatility will have a negative relationship with dividend yield.

In summary, our model to explain bank dividend policy, adapted from Barclay, Smith, and Watts (1995) is equation (2) where the mathematical signs in parentheses show the expected relationship of each independent variable to dividend yield:

$$\begin{aligned} \text{Dividend Yield} = f[& \text{Market-to-Book}(-), \text{Capital-to-Assets}(+), \\ & \text{Log of Revenue}(+), \text{Future Earnings}(+), \\ & \text{Inside Ownership}(-), \text{Previous Dividend}(+), \\ & \text{Earnings Volatility}(-)] \end{aligned} \quad (2)$$

We use OLS regression in the estimation of equation (2) because only eight percent of the banking firms have zero dividend yields. This amount is well below the 25 percent cutoff required to justify a Tobit estimation process.

Results

Table 1 presents summary statistics and the results from our Tobit regression analysis for equation (1) using 4,112 industrial firm observations from 1998-2000 data. Our findings corroborate those of Barclay, Smith, and Watts (1995). The intercept term, market-to-book, regulation dummy, log of revenue, and future earnings are all consistent in sign with expectations and in level of significance with the results in Barclay, Smith, and Watts (1995). Even our adjusted R-square, 0.23, is the same as theirs. These results confirm the robustness of their findings and support our use of their methodology as a base to explore dividend policy in the banking industry.⁷

Table 1—Factors that Explain Industrial Firm Dividends

Factors that explain industrial firm dividends result from an application of the Barclay, Smith and Watts (1995) model to more recent years. We sort industrial firms with SIC codes 2000-5999 in Morningstar's StockTools July 1998 CD and its renamed Principia Pro CDs of July 1999 and July 2000. We find 4,112 firms with data allowing us to calculate each of the following variables: annual dividend per share divided by stock price (Dividend Yield); market price per share divided by book value per share (Market-to-Book), a dummy variable coded one for regulated firms (SIC code 4900-4939) or zero otherwise (Regulation Dummy), natural log of revenue (Log of Revenue); and the percent change in net income over the next year (Future Earnings). The top portion reports the summary statistics, with Tobit regression results following in the second portion. Tobit results report each variable's coefficient estimate with its t-ratio below

Summary Statistics					
Variable	Mean	Standard Deviation	Minimum	Maximum	N
Dividend Yield	1.20	2.03	0.00	42.40	4,112
Market-to-Book	3.71	13.72	0.00	807.10	4,112
Regulation Dummy	0.07	0.25	0.00	1.00	4,112
Log of Revenue	6.00	1.87	1.13	12.09	4,112
Future Earnings	33.76	113.79	-99.60	999.10	4,112

Tobit Results Using Equation (1)					
Dividend Yield as the Dependent Variable					
Adjusted R ² is 0.23					
Intercept	Market-to-Book	Regulation Dummy	Log of Revenue	Future Earnings	
-3.5798	-0.0710	4.4082	0.5637	-0.0036	
(-18.74)*	(-6.51)*	(22.31)*	(19.21)*	(-6.99)*	

* Significant at the 0.01 level.

While Morningstar utilizes reliable sources to gather its data, it does not guarantee accuracy

Table 2 reports the results from equation (2) and the summary statistics for 677 banking firm observations from 1998-2000 data. The OLS output of equation (2) is similar to equation (1)'s Tobit output. The three variables, market-to-book, log of revenue, and future earnings, are consistent in sign and magnitude across both esti-

⁷We also estimate equation (1) using only one year's data at a time. The results are qualitatively similar across the three estimations. Results are available upon request.

mations. While the future earnings coefficient estimates are consistent, they are also of the unexpected sign. Moh'd, Perry, and Rimbey (1995) note that their results seem to support the idea that firms with higher expected revenue growth tend to set lower dividends. This possible link between the dividend and investment policies would mean lower dividends could be set to allow more internal financing (less external financing) of future growth opportunities. In general, the signs on all three variables support expectations that banking firms pay fewer dividends when more investment opportunities exist and pay more dividends the larger the firm. Thus, lower dividend yields seem to be signs of higher future earnings.

Table 2—Factors that Explain Banking Firm Dividends

Results from extending the Barclay, Smith, and Watts (1995) model to banks. The data source is Morningstar's StockTools July 1998 CD and its renamed Principia Pro CDs of July 1999 and July 2000. We find 677 banks (SIC codes 6000-6099) with complete data sets. Each bank has the data to allow us to calculate: annual dividend per share divided by stock price (Dividend Yield); market price per share divided by book value per share (Market-to-Book); book value of equity divided by total assets (Capital-to-Assets); natural log of revenue (Log of Revenue); percent change in net income over the next year (Future Earnings); percent of stock owned by employees or directors (Inside Ownership); previous year's annual dividend per share divided by previous year's stock price (Previous Dividend); and the five-year coefficient of variation for net income (Earnings Volatility). The top portion reports the summary statistics while the second part reports OLS regression coefficient estimates with their corresponding t-test variables below

Variable	Summary Statistics				
	Mean	Standard Deviation	Minimum	Maximum	N
Dividend Yield	2.08	1.32	0.00	7.20	677
Market-to-Book	1.98	1.18	0.40	12.40	677
Capital-to-Assets	0.02	0.04	0.02	0.36	677
Log of Revenue	4.46	1.82	1.19	10.90	677
Future Earnings	21.10	64.20	-96.30	849.00	677
Inside Ownership	19.00	16.50	0.00	98.00	677
Previous Dividend	1.87	2.56	0.00	40.40	677
Earnings Volatility	0.44	2.96	-46.3	46.20	677

OLS Results using Equation (2)
Dividend Yield as the Dependent Variable
Adjusted R² is 0.215

Intercept	Market-to-Book	Capital-to-Assets	Log of Revenue	Future Earnings	Inside Ownership	Previous Dividend	Earnings Volatility
2.02	-0.430	1.490	0.160	-0.003	-0.006	0.120	-0.020
(8.72)*	(-9.73)*	(1.25)	(5.21)*	(-4.80)*	(-2.05)**	(6.46)*	(-1.51)

* (**) Significant at the 0.01 (0.05) level

While Morningstar utilizes reliable sources to gather its data, it does not guarantee accuracy

The regulation variable in the banking model, capital-to-assets, has a positive relationship to dividend yield as expected, but the coefficient estimate is not significant at normally accepted levels. The relationship's direction suggests the possibility that greater capital adequacy might allow banks to pay greater dividends even in a

period when summary statistics reveal similar capital-to-assets levels among the banks.

The three added variables' estimated coefficients have the expected signs, but with varying significance. The coefficient estimate for previous dividend is positive, as expected, and at the greatest significance level, 0.01, of the three added variables. This result means that dividend history plays a major role in explaining current dividends, with banks' trying to maintain historical dividend yield levels. Also as expected, inside ownership has a negative relationship to dividend yield (significant at the 0.05 level), showing that as the percentage of insiders increases, dividend payout decreases. The final variable, earnings volatility, added to form our banking model has a coefficient estimate that is not significant at the 0.05 level.⁸

To investigate if the low significance possibly could result from multicollinearity, we estimate the correlation matrix for the variables in our model (available upon request). We find no significant correlation between earnings volatility and the other explanatory variables. Thus, the model does not seem to suffer from multicollinearity problems, and risk as measured by the variability of past earnings plays a lesser role than other factors in explaining dividend yield.^{9 10}

Concluding Remarks

This study identifies seven factors believed to influence bank dividend policy, and finds empirical support for five of them. The five empirically supported factors are investment opportunities, size, agency problems, dividend history, and risk. The findings suggest the following guidelines for bank dividend policy:

1. Banks with greater investment opportunities should conserve cash to fund those opportunities and, therefore, pay fewer dividends. Results show banks with higher market-to-book values, and presumably greater investment opportunities, have lower dividend yields.

⁸The coefficient is marginally significant (at the 0.10 level) for a one-tailed test.

⁹We also estimate equation (2) for each year's data as we did for equation (1). All explanatory variables' coefficient estimates maintain the same sign across years, but significance levels vary. The adjusted R-square increases from 0.22 for 1998 data to 0.56 and 0.66 for 1999 and 2000 data, respectively. Results are available upon request.

¹⁰As a final check, we perform a decile analysis of equation (2) variables to unmask any relationships hidden by the linear regression format. We sort the banking firms used to estimate equation (2) by dividend yield into deciles and compute decile means for all the variables. Next, we visually inspect each mean for its level and the direction of any change. The six independent variable means show the same general relationship to dividend yield, increasing or decreasing, as we find in the OLS regression results presented in Table 2. None is perfectly monotonic, however. Thus, the decile analysis, available upon request, is in general agreement with the OLS regression results, but shows that a non-linear transformation might provide a better fit.

2. Banks large in size, and likely subject to lower bankruptcy costs, should be able to pay higher dividends. Support for this guideline comes from findings showing banks with higher total revenues pay higher dividend yields.
3. Banks with fewer agency problems can pay fewer dividends. Empirical results support this guideline by finding a higher percentage of insider ownership, and corresponding fewer agency problems, associated with lower dividend yields.
4. Banks should use their dividend history to set dividend policy. The results support this guideline by showing that the previous year's dividend yield is a useful variable to explain the next year's dividend yield.
5. Banks subject to high risk should pay low dividends. Results support this guideline by showing an association between high risk, measured as high coefficients of variation on earnings for the past five years, and lower dividend yields.

The five guidelines can be useful to bank managers, regulators, and investors when considering bank dividend policy. Of course, while these guidelines stem from factors that seem to explain much about bank dividend policy, further work is necessary to explore the possibility of additional factors that will suggest added guidelines in setting an optimal dividend policy for banking firms. We believe that a more variable economic period may find regulation and risk factors impact bank dividends.

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