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## **Bank Dividends: Increasing, Decreasing, and Unresponsive**

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### **ABSTRACT**

*We investigate the evolution of dividend policy in the banking sector over the period 1984-2003. We find evidence of the “disappearing dividends” phenomenon previously documented for non-financial firms. Unlike non-financial firms, there are positive catering incentives for banking firms to pay dividends. Yet we find no sensitivity of dividend policy to these incentives, a finding that we attribute to the low pay-for-performance sensitivities of bank CEOs.*

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## 1. INTRODUCTION

Cash dividends paid by banks have become an increasingly large portion of all dividends paid, doubling over the period 1984-2003. Yet little is known about bank dividend policy and its evolution over time. One purpose of this paper is to examine whether the “disappearing dividends” phenomenon of Fama and French (2001) and DeAngelo, DeAngelo, and Skinner (2004) exists in the banking sector. We also investigate whether there is evidence of dividend catering (Baker & Wurgler, 2004) in banks. Our findings thus provide a test of the generality of the disappearing dividends phenomenon and an independent test of catering theory. The paper contributes to our understanding of the determinants of payout policy by examining an industry with unique characteristics.

Banks merit a separate study of dividend policy for (at least) two reasons. First, banks are excluded from prior studies of dividend policy, and yet are an increasingly important component of aggregate dividends. Second, banks are regulated and have high leverage. John and Qian (2003) argue that these characteristics result in lower pay-for-performance sensitivities for bank managers than for managers of manufacturing firms. These factors could influence the dividend policy of banks; hence, banks might not exhibit disappearing dividends or responsiveness to catering incentives. These are the primary empirical questions that we address in this paper.

Fama and French (2001) show that the proportion of industrial firms that pay cash dividends decreases over the period from 1978 to 1999, and call this phenomenon “disappearing dividends.” They ask whether this trend is attributable to changing firm characteristics or a lower propensity of firms to pay, and find evidence that supports both explanations. DeAngelo et al. (2004) show that the aggregate real dividends paid by

industrial firms actually increase over the timeframe of the Fama and French study. Baker and Wurgler (2004) show that changes in the proportion of firms paying dividends can be explained by what they term “catering incentives,” a measure of the market’s desire for dividend-paying stocks

Our paper builds on these works to provide insights into the “disappearing dividend” phenomenon in banks, firms that have been largely ignored in previous studies. We document a doubling of bank dividends as a proportion of all dividends paid, a decline in the proportion of banks paying dividends, and a substantial increase in the aggregate dividends paid by banks over our sample period. We also show that catering incentives present in the banking sector and the overall market play no significant role in the decision of banks to pay dividends, even after controlling for changes in capital requirements.

The paper is organized as follows. In Section 2, we review studies of industrial firms’ propensity to pay, aggregate dividend payment, and catering incentives. Section 3 details our data sources and sample selection criteria. Section 4 examines the time-series patterns in bank dividend payment over our sample period. Section 5 discusses the characteristics of dividend-paying banks. Section 6 documents the changing propensity to pay dividends among banks. Section 7 discusses the impact of share repurchases on the propensity of banks to pay dividends. Section 8 documents trends in aggregate dividend payment among banks. Section 9 explores the impact on banks of catering incentives to pay dividends. Section 10 concludes.

## 2. RELEVANT LITERATURE

Fama and French (2001) document the “disappearing dividend” phenomena using a sample that excludes financial firms and utilities. They show that the proportion of U.S. industrial firms paying dividends falls from 66.5% to 20.8% between 1978 and 1999, and that part of this decline is attributable to changes in the characteristics of publicly-traded firms. New firms listed during this period tend to be smaller and less profitable, but have higher growth opportunities than new firms in prior periods. Firms with these characteristics tend not to pay dividends, but changing firm characteristics are only partially responsible for the reduction in the proportion of dividend-paying firms. Fama and French show that regardless of characteristics, firms have become less inclined to pay dividends. However, they exclude financial firms from their analysis.

Fama and French (2001) also perform a univariate analysis that indicates that dividend-paying firms are larger, more profitable, and have fewer growth opportunities than firms that do not pay dividends. They use a logistic regression to confirm the findings of their univariate analysis, regressing an indicator variable for dividend payment on measures of firm size, market-to-book ratio, asset growth, and profitability. They find significant coefficients on all independent variables for all subperiods examined, confirming the univariate findings.

Fama and French (2001) then use data from 1963 to 1977 to develop a logit model of the probability of firm dividend payment. They use this model to develop an expected probability of payment for each firm in each year in the 1978 to 1999 period of interest. Fama and French subtract the actual probability of payment by year from the expected probability to pay by year to obtain a measure of the propensity of firms to pay dividends

after controlling for firm characteristics. A positive difference implies a decline in propensity to pay. For all years between 1980 and 1998, the difference is positive and increases over time, reflecting a decline in the propensity to pay dividends.

DeAngelo et al. (2004) examine the trend in dividend payment from the different perspective of aggregate dividend payment, and find that real dollar payments of dividends actually increase over the period examined by Fama and French (2001). DeAngelo et al. (2004) show that the majority of firms that cease paying dividends are small payers, and that the increased payments of large dividend payers outweigh the modest dividend loss attributable to the elimination of small payers.

Baker and Wurgler (2004) find a close link between the propensity to pay dividends and catering incentives. They create a variable called the “dividend premium,” which they use as a proxy for the value that the market places on dividends. They show a positive, significant relation between the catering incentives represented by the dividend premium and the change in firms’ propensity to pay dividends. We note that Baker and Wurgler define propensity to pay as the difference between the actual and expected percentage of payers, so their values are equal to the negative of the Fama and French (2001) values. We follow Baker and Wurgler by using this more intuitive calculation of propensity to pay.

### **3. DATA DESCRIPTION AND SAMPLE CONSTRUCTION**

We examine firms with SIC codes 6020-6022, 6029, and 6712, which represent various types of commercial banks and bank holding companies. For the remainder of the paper we refer to all of these institutions as “banks.” To be included in our sample, a bank must have data available in Compustat and CRSP. Although we use data from 1983 to 2003, we report results only for 1984 to 2003, because we need prior-year data to calculate some variables.

We use only common stock banks (CRSP share code 10 or 11) in the sample. We consider a bank to be a new list in the first year it appears in CRSP. We follow Fama and French (2001) in calculating all financial ratios, with the following exceptions: 1) we do not use the ratio of research and development (R&D) costs to assets in our analysis, because R&D plays a minimal role in commercial banking; 2) we do not follow Fama and French in adding back interest expense when calculating earnings, because interest for banks is more appropriately considered a “cost of goods sold;” and 3) we eliminate banks that appear in the bottom percentile of total assets.

### **4. TIME-SERIES EXAMINATION OF DIVIDEND PAYMENT BY PUBLICLY HELD BANKS**

Figure 1 shows trends in dividend payments by publicly held banks during our sample period. This figure depicts the percentage of sample banks that pay dividends, and the percentage of non-paying sample banks. We further divide non-payers into former payers and banks that have never paid dividends. We note the gradual decline in the percentage of sample banks paying dividends, decreasing from 96.55% in 1984 to 85.01% in 2003. Although this decline is not as dramatic as the decline in the proportion of payers among industrial firms found by Fama and French (2001), the decline is especially steep,

given that the proportion of Compustat banks paying dividends does not fall below 95.9% for the entire 1962 to 1983 period.

Table 1 illustrates the increasing proportion of total dividends being paid by banks. Banks' proportion of all dividends rises from 8.55% in 1983 to 17.15% in 2001. Table 1 also provides additional insights into the disappearing dividends phenomenon among banks. A steady, although not monotonic, increase in the percentage of banks that have never paid dividends is responsible for most of the decline.

Table 1 also shows that banks tend to stop paying dividends during times of distress in the banking industry, then to resume payment when conditions improve. We see elevated percentages of former payers in the years 1987, 1988, 1991, and 1992. According to McFadyen (1998), U.S. commercial bank failures peak in 1988 and FDIC disbursements attributable to bank failures peak in 1991. To conserve capital during turbulent times, banks in danger of insolvency suspend dividend payments. A final point of interest in Table 1 is that newly listed banks pay dividends in smaller proportions than do banks already in the sample. Non-paying new lists are the primary source of non-paying banks in the sample.

**Figure 1. Time-series of publicly held banks by dividend group**

Banks classified as payers pay dividends in the given year, non-payers do not pay dividends. Non-payers fall into two groups: former payers and those banks that have never paid a dividend. Banks classified as “never paid” are those that do not pay in the current period and have not paid in any previous period. Former payers do not pay in the current period, but have paid in at least one prior period in our sample.

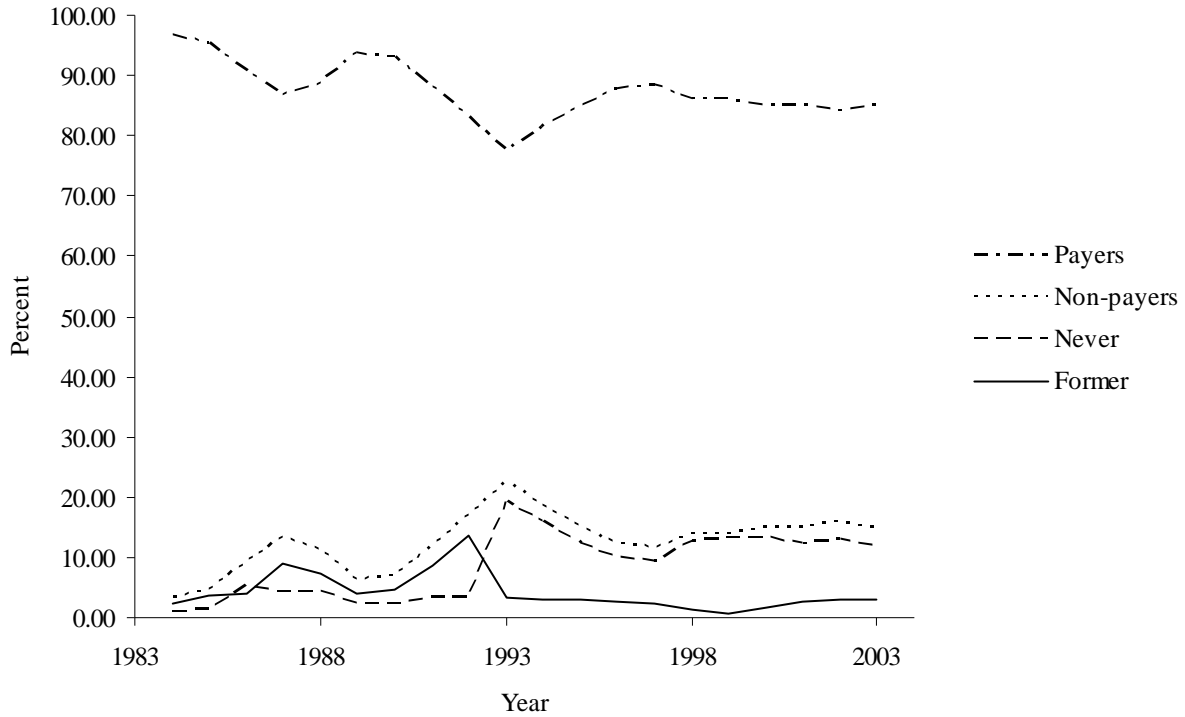


Table 2 shows the year  $t$  activities of payers and non-payers in year  $t-1$ . Throughout the sample period, banks that pay dividends in a given year tend to pay dividends in the following year. Consistent with the evidence in Table 1 that shows an increase in the percentage of former payers during periods of distress in the banking industry, we find a drop in the proportion of banks that continue to pay dividends in 1987, 1991, and 1992. Mergers are the primary cause for banks' cessation of dividend payments. We also note that dividend-paying banks, in general, do not delist. Consistent with our earlier finding of increased dividend cessation during times of distress, most banks stop paying dividends prior to the period in which they delist.

**Table 1. Time-series distribution of dividend policies of publicly traded banks**

All values are percentages. Banks classified as “payers” pay dividends in the given year, non-payers do not. Non-payers fall into two groups: former payers and those banks that have never paid a dividend. Banks classified as “never paid” are those that do not pay in the current period and have not paid in any previous period. Former payers do not pay in the current period, but have paid in at least one prior period in our sample. New lists information is from CRSP. We classify a bank as a new list in the first year it appears in the CRSP database. We calculate the bank percentage of total dividends paid using U.S. cash dividends data from CRSP for firms traded on the NYSE, AMEX or Nasdaq that have a share code of 10 or 11.

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	1984-2003
<i>A. Bank dividend share</i>																					
Percent of all dividends	8.55	8.56	8.66	8.91	8.78	8.97	9.45	9.26	9.61	10.61	11.99	12.77	13.64	14.25	14.73	16.18	16.33	15.96	16.42	17.15	12.99
<i>B. Bank by dividend group</i>																					
Payers	96.55	95.27	90.64	86.75	88.57	93.78	92.89	88.15	83.01	77.26	81.32	84.90	87.63	88.34	86.03	86.01	84.91	85.19	83.94	85.01	86.18
Non-payers	3.45	4.73	9.36	13.25	11.43	6.22	7.11	11.85	16.99	22.74	18.68	15.10	12.37	11.66	13.97	14.00	15.09	14.82	16.06	14.99	13.82
Never paid	1.15	1.18	5.26	4.22	4.29	2.39	2.37	3.32	3.40	19.32	15.84	12.13	9.85	9.33	12.50	13.32	13.29	12.27	13.12	11.86	10.31
Former payers	2.30	3.55	4.09	9.04	7.14	3.83	4.74	8.53	13.59	3.42	2.84	2.97	2.53	2.33	1.47	0.68	1.80	2.55	2.94	3.13	3.51
<i>C. New lists</i>																					
New lists that pay	0.00	75.00	33.33	100.00	42.86	100.00	100.00	57.14	66.67	61.82	61.54	45.00	68.18	77.78	54.05	66.67	70.83	68.00	40.00	46.67	60.34
New lists that do not pay	100.00	25.00	66.67	0.00	57.14	0.00	0.00	42.86	33.33	38.18	38.46	55.00	31.82	22.22	45.95	33.33	29.17	32.00	60.00	53.33	39.66

**Table 2. What happens in year  $t$  to publicly-held banks that do and do not pay dividends in year  $t-1$**

All values are percentages of sample banks. Banks that continue to pay are those that pay dividends in years  $t-1$  and  $t$ . Banks that stop paying are those that pay in year  $t-1$  but not in year  $t$ . We obtain merge and delist information from CRSP.

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	1984-2003
<i>A. What happens in year <math>t</math> to banks that pay dividends in year <math>t-1</math>?</i>																					
Continue to pay	92.90	91.25	90.67	88.89	96.32	98.37	93.81	89.84	88.83	93.37	90.88	92.43	91.05	88.58	88.50	92.19	92.14	94.97	94.74	91.46	92.00
Stop paying	1.18	1.88	2.00	5.56	1.47	0.00	1.03	5.35	6.70	0.60	1.01	1.26	0.31	0.62	0.00	0.00	0.54	1.68	1.39	1.38	1.42
Merge	5.92	6.25	7.33	5.56	2.21	1.09	3.61	4.28	3.35	6.02	8.11	6.31	8.64	10.19	11.50	7.81	6.78	3.07	3.32	7.16	6.28
Delist	0.00	0.63	0.00	0.00	0.00	0.54	1.55	0.53	1.12	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.54	0.28	0.55	0.00	0.30
<i>B. What happens in year <math>t</math> to banks that do not pay dividends in year <math>t-1</math>?</i>																					
Start paying	0.00	22.22	9.52	18.18	5.41	24.00	5.88	4.17	18.52	4.53	16.54	18.39	16.67	17.74	4.21	8.13	8.00	12.16	9.88	19.05	11.06
Do not pay	100.00	66.67	90.48	77.27	87.84	76.00	88.24	87.50	70.37	87.24	70.87	67.82	76.39	72.58	88.42	89.43	82.67	77.03	85.19	72.62	80.92
Merge	0.00	0.00	0.00	0.00	2.70	0.00	0.00	8.33	11.11	6.58	11.02	13.79	6.94	9.68	6.32	2.44	6.67	9.46	3.70	8.33	6.76
Delist	0.00	11.11	0.00	4.55	4.05	0.00	5.88	0.00	0.00	1.65	1.57	0.00	0.00	0.00	1.05	0.00	2.67	1.35	1.23	0.00	1.26
<i>C. What is the status of banks in year <math>t-1</math> that start paying dividends in year <math>t</math>?</i>																					
Never paid	n/a	50.00	50.00	50.00	50.00	33.33	100.00	100.00	40.00	27.27	80.95	93.75	75.00	81.82	50.00	90.00	100.00	100.00	87.50	81.25	74.50
Former payers	n/a	50.00	50.00	50.00	50.00	66.67	0.00	0.00	60.00	72.73	19.05	6.25	25.00	18.18	50.00	10.00	0.00	0.00	12.50	18.75	25.50

## 5. CHARACTERISTICS OF DIVIDEND PAYERS

Table 3 presents the financial characteristics of sample banks.  $E_t/A_t$  represents earnings at time  $t$  divided by assets at time  $t$ . Following Fama and French (2001), we use  $E_t/A_t$  as a proxy for profitability. Panel A shows that dividend payers are more profitable than banks that do not pay. The data show a general increase in  $E_t/A_t$ . Since more profitable banks are more likely to pay dividends, we would expect this increased profitability to lead to a higher proportion of dividend payers, but we observe the opposite.

Fama and French (2001) use three different proxies for growth opportunities, including the change in assets divided by assets ( $dA_t/A_t$ ), the market value of the firm divided by assets ( $V_t/A_t$ ), and R&D spending divided by assets ( $RD_t/A_t$ ). Since R&D is not an integral part of banking, we do not examine the last ratio. Fama and French find that payers have lower growth opportunities than do non-payers.

When we examine our two growth opportunity proxies, an inconsistent picture emerges. In Table 3, Panel B, we see that  $dA_t/A_t$  is generally higher for payers prior to 1996, and higher for non-payers thereafter. Panel C shows that  $V_t/A_t$  is consistently higher for payers than for non-payers. Fama and French (2001) point out that  $V_t/A_t$ , which is basically the market-to-book ratio, can serve as a proxy for many things, and might be a noisy measure of growth opportunities. Therefore, we focus on the change-in-assets results, which suggest that during periods of distress in the banking industry, more profitable (and presumably safer) dividend-paying banks have higher growth opportunities and that during periods of economic prosperity, non-dividend-paying banks have higher growth opportunities.

Our review of bank assets ( $A_t$ ) in Table 3, Panel D, shows that on average, dividend-paying banks are eight times larger than non-payers. We note that the size gap between payers and non-payers grows over the sample period. In Panel E of Table 3, leverage ( $L_t/A_t$ ) is generally uninteresting for banks, since it is largely controlled through regulation. This value varies only between 0.87 and 0.97 for any subset of our sample, with de novo banks (new lists) and distressed banks (former payers) accounting for the extreme low and high values, respectively. Prior to 1996, non-payers tend to exhibit higher leverage, consistent with distressed banks in need of boosting their capital ratios not paying dividends. In the relative prosperity that follows, leverage is identical for payers and non-payers.

In addition to the variables examined by Fama and French (2001), we examine capital ratio and change in capital ratio for each year. We calculate each bank's capital ratio  $BE_t$  (Compustat data 216) over  $A_t$ . Note that this variable, which we call  $BE_t/A_t$  and report as a percentage in Panel F, is merely one minus the leverage variable displayed in Panel E. We also calculate  $\Delta(BE_t/A_t)$ , the change in capital ratio, as  $BE_t/A_t$  minus  $BE_{t-1}/A_{t-1}$  normalized by  $BE_t/A_t$ . This variable captures changes in bank capital ratios due to changing regulation and changing market conditions. Over the entire sample period this variable is higher for non-payers than for payers, consistent with troubled banks increasing capital while withholding dividends. Specifically, banks that cease paying dividends increase their capital ratios at a greater pace than those which have never paid dividends and those that do pay dividends.

**Table 3. Financial characteristics of banks according to dividend group**

We calculate annual financial ratios for each bank. We then average these annual values for each bank over the subperiod of interest and then report the medians of the cross-sectional means for each subperiod. The table shows the results for all banks and for banks grouped according to dividend status. Depending on data availability, we also report results separately for all new lists and for new lists according to dividend status.  $E_t/A_t$  and  $dA_t/A_t$  are earnings and change in assets normalized by assets and expressed as percentages.  $A_t$ ,  $BE_t$ ,  $ME_t$ ,  $L_t = A_t - BE_t$  and  $V_t = L_t + ME_t$  are assets, book common equity, market value of equity, book liabilities, and total market value at the end of fiscal year  $t$ .  $BE_t/A_t$  is capital ratio, and  $\Delta(BE_t/A_t)$  is the change in capital ratio normalized by current capital ratio and expressed as a percentage.

A. $E_t/A_t$ (pct)	1984- 2003	1984- 1986	1987- 1989	1990- 1992	1993- 1995	1996- 1998	1999- 2001	2002- 2003	1984- 1993	1994- 2003
All banks	0.88	0.68	0.48	0.61	0.92	1.07	0.98	0.99	0.63	1.00
Payers	0.99	0.75	0.77	0.73	1.06	1.13	1.05	1.08	0.80	1.08
Non-payers	0.21	-0.40	-2.09	-0.26	0.30	0.63	0.58	0.47	-0.58	0.54
Never paid	0.56	0.55	-0.82	0.66	0.47	0.73	0.64	0.66	0.10	0.68
Former payers	-0.81	-1.13	-2.79	-0.57	-0.54	0.13	0.09	-0.30	-1.31	-0.18
All new lists	0.80	0.60	-1.72	0.92	0.94	0.91	0.97	0.57	0.55	0.89
Payers	1.01	0.85	0.74	1.11	1.00	1.13	1.06	0.73	1.01	1.01
Non-payers	0.47	0.42	-6.02	0.45	0.86	0.50	0.76	0.43	-0.16	0.69
B. $dA_t/A_t$ (pct)	1984- 2003	1984- 1986	1987- 1989	1990- 1992	1993- 1995	1996- 1998	1999- 2001	2002- 2003	1984- 1993	1994- 2003
All banks	10.70	13.08	6.79	6.11	9.88	14.26	11.38	10.30	8.44	11.74
Payers	11.08	13.76	9.10	7.71	10.96	14.11	10.55	9.89	10.04	11.57
Non-payers	7.96	-2.96	-13.24	-6.48	2.97	15.51	16.64	12.62	-8.05	12.82
Never paid	15.54	12.69	5.66	13.44	6.73	17.34	18.85	18.80	8.54	16.12
Former payers	-7.95	-5.72	-21.19	-10.75	-6.04	8.35	1.93	-10.71	-12.83	-1.71
All new lists	17.96	51.55	-12.21	34.90	-25.26	17.58	15.90	23.01	17.09	18.02
Payers	16.93	51.55	12.30	50.91	-25.26	17.34	12.66	23.19	41.42	15.53
Non-payers	19.97	n/a	-24.47	2.90	n/a	18.55	25.60	22.89	-15.35	23.00
C. $V_t/A_t$	1984- 2003	1984- 1986	1987- 1989	1990- 1992	1993- 1995	1996- 1998	1999- 2001	2002- 2003	1984- 1993	1994- 2003
All banks	1.05	1.01	1.02	1.01	1.04	1.10	1.06	1.08	1.02	1.07
Payers	1.06	1.01	1.02	1.02	1.04	1.11	1.06	1.08	1.02	1.08
Non-payers	1.03	0.99	1.00	0.99	1.01	1.07	1.02	1.05	1.00	1.04
Never paid	1.03	1.00	1.01	0.99	1.01	1.07	1.02	1.05	1.00	1.04
Former payers	1.01	0.99	0.99	0.99	1.01	1.06	1.01	1.03	1.00	1.03
All new lists	1.05	1.01	1.04	1.02	1.03	1.09	1.05	1.06	1.03	1.06
Payers	1.06	1.04	1.03	1.03	1.03	1.10	1.06	1.07	1.03	1.06
Non-payers	1.04	0.99	1.05	0.98	1.03	1.06	1.04	1.05	1.01	1.05
D. $A_t$	1984- 2003	1984- 1986	1987- 1989	1990- 1992	1993- 1995	1996- 1998	1999- 2001	2002- 2003	1984- 1993	1994- 2003
All banks	13089.6		11256.3	13542.4		13109.3	14685.2	18891.2	10989.5	14151.3
Payers	6	9656.23	7	0	9260.58	8	7	1	7	8
Non-payers	14904.6		11772.1	14858.2	11225.8	14870.0	17040.9	22141.3	11979.7	16429.9
Never paid	2	9860.80	2	8	6	2	5	4	2	9
Former payers	1770.37	6355.81	6658.30	3839.96	800.56	994.78	941.77	1203.93	3750.32	952.29

Never paid	760.00	1034.80	3775.79	724.43	497.13	521.86	902.54	675.87	1208.01	647.14
Former		10424.8								
payers	4742.59	1	8251.26	4897.02	2357.64	3378.29	1246.67	3374.83	6434.99	2583.91
			41675.0							
All new lists	5401.59	3173.55	0	5005.77	1691.32	6164.19	5180.93	5993.26	7431.91	4675.36
			54783.3					13004.2	10120.6	
Payers	8011.41	5650.39	6	6618.39	2135.65	9205.77	6891.07	7	7	7259.06
Non-			18735.3							
payers	1430.93	1404.38	7	974.22	1074.69	644.29	1333.11	384.45	3362.43	737.09

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**Table 3. continued**

<i>E. <math>L_t/A_t</math></i>	<b>1984- 2003</b>	<b>1984- 1986</b>	<b>1987- 1989</b>	<b>1990- 1992</b>	<b>1993- 1995</b>	<b>1996- 1998</b>	<b>1999- 2001</b>	<b>2002- 2003</b>	<b>1984- 1993</b>	<b>1994- 2003</b>
All banks	0.92	0.94	0.93	0.93	0.91	0.91	0.91	0.91	0.93	0.91
Payers	0.92	0.94	0.93	0.92	0.91	0.91	0.91	0.91	0.93	0.91
Non-payers	0.92	0.95	0.96	0.94	0.92	0.91	0.91	0.91	0.94	0.91
Never paid Former payers	0.91	0.94	0.94	0.94	0.91	0.90	0.91	0.91	0.93	0.91
All new lists	0.91	0.93	0.95	0.92	0.91	0.89	0.90	0.91	0.92	0.90
Payers	0.91	0.93	0.93	0.92	0.90	0.90	0.91	0.91	0.92	0.90
Non-payers	0.90	0.93	0.99	0.94	0.91	0.87	0.89	0.91	0.93	0.89
<i>F. <math>BE_t/A_t</math> (pct)</i>	<b>1984- 2003</b>	<b>1984- 1986</b>	<b>1987- 1989</b>	<b>1990- 1992</b>	<b>1993- 1995</b>	<b>1996- 1998</b>	<b>1999- 2001</b>	<b>2002- 2003</b>	<b>1984- 1993</b>	<b>1994- 2003</b>
All banks	8.22	6.11	6.50	7.32	8.73	9.08	8.63	8.73	7.04	8.82
Payers	8.25	6.16	6.76	7.56	8.78	9.08	8.60	8.75	7.15	8.81
Non-payers	8.06	5.39	4.25	5.54	8.49	9.12	8.84	8.66	6.19	8.84
Never paid Former payers	8.70	6.46	5.70	6.15	8.69	9.51	8.97	8.67	7.44	9.02
All new lists	9.43	6.83	4.80	7.61	9.40	10.83	9.70	9.02	7.81	10.00
Payers	9.25	6.70	6.75	8.26	9.56	9.85	9.32	8.54	8.32	9.58
Non-payers	9.69	6.92	1.39	5.97	9.18	12.62	10.56	9.40	7.04	10.65
<i>G. <math>\Delta(BE_t/A_t)</math> (pct)</i>	<b>1984- 2003</b>	<b>1984- 1986</b>	<b>1987- 1989</b>	<b>1990- 1992</b>	<b>1993- 1995</b>	<b>1996- 1998</b>	<b>1999- 2001</b>	<b>2002- 2003</b>	<b>1984- 1993</b>	<b>1994- 2003</b>
All banks	-0.62	-0.07	5.09	0.71	0.58	-2.01	-4.06	0.04	2.28	-1.94
Payers	-0.76	-0.27	-0.36	1.87	1.35	-2.32	-3.32	0.13	0.98	-1.60
Non-payers	0.45	4.68	52.21	-8.45	-4.37	0.44	-8.71	-0.45	15.62	-4.16
Never paid Former payers	-5.26	-7.31	4.35	5.88	-4.89	-3.09	-11.15	-2.02	2.07	-5.87
All new lists	12.43	6.80	72.37	-11.52	-3.12	14.31	7.49	5.47	19.52	3.39
Payers	0.78	-6.51	105.34	-23.64	1.96	-1.56	-2.55	0.17	34.09	-1.44
Non-payers	-2.89	-6.51	-13.93	-2.57	1.96	-3.10	-1.76	-4.83	-6.39	-2.69
Never paid Former payers	7.92	n/a	164.98	-65.78	n/a	4.59	-4.89	3.51	88.06	1.05

We perform regressions to confirm the conclusions from our univariate analysis. However, because of the scarcity of non-payers in the banking industry during our benchmark period we use a probit model instead of a logit model. Greene (2003) states that the logit distribution produces fat tails when used with samples containing very few responses or non-responses, so we use the probit model for our analysis. Our dependent variable equals one for dividend-paying banks and zero for non-payers.

Fama and French (2001) create an independent size variable,  $NYP_t$ , based on the percentage of firms with the same or lower market equity on the NYSE. They examine a broad cross-section of firms that covers the majority of the NYSE. Because our study is limited to banks, we create a size variable equal to the natural log of  $A_t$ . Fama and French use three other independent variables;  $V_t / A_t$ ,  $dA_t / A_t$ ,

and  $E_t/A_t$ . Because banks are unique among all firms, we create a probit more appropriate to banks with using five independent variables;  $\ln(A_t)$ ,  $V_t/A_t$ ,  $E_t/A_t$ ,  $BE_t/A_t$  and  $\Delta(BE_t/A_t)$ .

We run probit regressions for each fiscal year. We then use the Fama and MacBeth (1973) method to create models for the following five periods: 1984-2003, 1984-1988, 1989-1993, 1994-1998, and 1999-2003. Table 4 presents descriptive statistics for the variables in each subperiod. Table 5 shows the results from our probit regressions.

**Table 4. Descriptive statistics for independent variables**

$\ln(A_t)$  is the natural log of the book value of assets.  $V_t/A_t$  represents the market equity divided by the book value of assets.  $E_t/A_t$  represents earnings divided by the book value of assets.  $BE_t/A_t$  (capital ratio) is the book value of equity divided by the book value of assets.  $\Delta(BE_t/A_t)$  represents the change in capital ratio from the previous period divided by the current capital ratio.

Period	Bank-Years	$\ln(A_t)$		$V_t/A_t$		$E_t/A_t$		$BE_t/A_t$		$\Delta(BE_t/A_t)$	
		mea	std	mea	std	mea	std	mea	std	mea	std
		n	dev	n	dev	n	dev	n	dev	n	dev
1984-2003	6,361	7.55	1.74	1.05	0.08	0.01	0.01	0.08	0.03	-0.01	0.46
1984-1988	890	8.41	1.28	1.01	0.09	0.01	0.02	0.06	0.02	0.03	0.67
1989-1993	1,246	7.93	1.67	1.02	0.06	0.01	0.01	0.08	0.04	0.01	0.86
1994-1998	2,017	7.22	1.79	1.08	0.08	0.01	0.01	0.09	0.03	-0.01	0.20
1999-2003	2,208	7.31	1.74	1.07	0.07	0.01	0.01	0.09	0.03	-0.02	0.15

**Table 5. Probit regressions that explain which banks pay dividends**

Following Fama and French (2001), we estimate probit regressions for each year  $t$  of the 1984-2003 period. The dependent variable is one in year  $t$  if a bank pays dividends, zero otherwise. The explanatory variables are as follows:  $\ln(A_t)$  is the natural log of the book value of assets;  $V_t/A_t$  represents the market equity divided by the book value of assets;  $E_t/A_t$  represents earnings divided by the book value of assets;  $BE_t/A_t$  (capital ratio) is the book value of equity divided by the book value of assets and  $\Delta(BE_t/A_t)$  represents the change in capital ratio from the previous period divided by the current capital ratio. We estimate the year  $t$  regressions for all Compustat firms in SIC codes 6020, 6021, 6022, 6029, and 6712 with the required data items. The table shows means (across years) of the regression intercepts and slopes, and  $t$ -statistics for the means, which we define as the mean divided by its time-series standard error, as in Fama and MacBeth (1973). For each variable we present elasticities that represent the percentage point change for a shift from one standard deviation below the mean to one standard deviation above the mean, holding all other variables at their mean values and for the same shift of all variables simultaneously.

Panel A. Probit regression results for the sample period and sub-periods

Period	Intercep t	t - stat	ln( $A_t$ )	t - stat	$V_t/A_t$	t - stat	$E_t/A_t$	t - stat	$BE_t/A_t$	t - stat	$\Delta(BE_t/A_t)$ )	t - stat
1984- 2003	-24.44	-3.23	0.51	11.97	19.54	2.71	51.64	4.79	32.47	4.43	-1.56	-3.73
1984- 1988	-57.77	-2.28	0.67	7.28	50.87	2.08	74.45	3.28	54.90	3.07	-2.52	-3.73
1989- 1993	-25.11	-6.28	0.47	6.54	18.44	4.54	32.34	1.01	61.88	26.33	-2.11	-1.52
1994- 1998	-9.27	-3.38	0.57	15.05	5.08	1.78	45.06	3.07	11.49	5.52	-1.32	-4.02
1999- 2003	-5.60	-3.86	0.31	13.11	3.76	2.66	54.70	3.66	1.60	1.49	-0.29	-0.93

Panel B. Probit regression elasticities for the sample period and sub-periods

Period	ln( $A_t$ )	$V_t/A_t$	$E_t/A_t$	$BE_t/A_t$	$\Delta(BE_t/A_t)$	All
1984-2003	1.34	5.85	0.50	1.71	-0.88	53.66
1984-1988	0.85	88.47	2.77	1.07	-6.04	99.59
1989-1993	6.23	9.98	2.00	62.64	-31.32	73.81
1994-1998	20.27	6.11	5.27	4.24	-4.00	47.52
1999-2003	17.76	8.75	12.09	1.27	-1.38	42.46

Over the entire sample period and during each subperiod, the coefficient on our proxy of relative bank size ( $\ln(A_t)$ ) is positive and significant, indicating that larger banks are more likely to pay dividends than smaller banks. Ceteris paribus, using the model for the entire sample period, an increase in  $\ln(A_t)$  from one standard deviation below its mean to one standard deviation above is associated with a 1.34% increase in the probability that a bank will pay dividends. The importance of size in predicting dividend payment increases over the sample period, as the size gap between payers and non-payers grows.

Consistent with our univariate results, the coefficient on  $V_t / A_t$  is significant and positive for all but one period. However, the magnitude of the coefficient drops monotonically across periods, although the mean of  $V_t / A_t$  remains stable. Ceteris paribus, using the model for the entire sample period, an increase in  $V_t / A_t$  from one

standard deviation below its mean to one standard deviation above is associated with a 5.85% increase in the probability that a bank will pay dividends.

The coefficient on our proxy for profitability,  $E_t / A_t$ , is positive and significant in all but one period, indicating that more profitable banks are more likely to pay dividends than are less profitable banks. Ceteris paribus, using the model for the entire sample period, an increase in  $E_t / A_t$  from one standard deviation below its mean to one standard deviation above is associated with a 0.50% increase in the probability that a bank will pay dividends.

Consistent with our univariate results, the coefficient on  $BE_t / A_t$  is positive and significant in all but one period, indicating that banks with higher capital ratios are more likely to pay dividends. This result could also be interpreted as banks with low capital ratios withholding dividends in an attempt to raise their capital ratios. The coefficient on  $\Delta(BE_t / A_t)$  for the whole period is negative and significant, which confirms the latter interpretation. Banks that are replenishing their capital are less likely to pay dividends.

## **6. CHANGING PROPENSITY TO PAY DIVIDENDS**

Following Fama and French (2001) and Baker and Wurgler (2004), we develop a model of the probability of dividend payment based on bank characteristics. Because of the lack of information for financial firms in Compustat in earlier periods, we use a benchmark period of 1984-1993 to examine propensity to pay over the period of 1984-2003. We perform a probit regression for each year in the benchmark period and combine the coefficients by using the technique pioneered by Fama and MacBeth (1973).

Using the probit model, we estimate the probability of dividend payment for each bank in each year of our sample period. Following Baker and Wurgler (2004), we define our propensity to pay proxy as the difference between the actual and expected percentage of payers per year. This proxy differs only in sign from the Fama and French (2001) specification.

Panel A of Figure 2 shows the actual and expected percentage of dividend-paying banks by year. Panel B shows the banks' propensity to pay dividends. We note the general downward trend, which is consistent with the industrial firms studied by Fama and French (2001). After we control for changes in bank characteristics, the decrease is evidence that banks experience a declining propensity to pay. Panel C shows the change in propensity to pay, which we define as the current propensity to pay minus the previous propensity to pay.

**Figure 2. The propensity of banks to pay dividends: 1983-2001**

Panel A shows the actual percent (solid) and expected percent (dashed) of bank dividend payers in Compustat. Panel B shows the banks' propensity to pay dividends, defined as the difference between the actual and expected percent. Panel C shows changes in the propensity to pay dividends. Actual percent is the number of bank dividend payers divided by the number of banks in the sample that year. Expected percent is the expected percent of dividend payers based on prevailing sample characteristics and calculated using a probit model estimated over the period from 1965-1982. Propensity to pay is the difference between the actual and expected percent of payers per year.

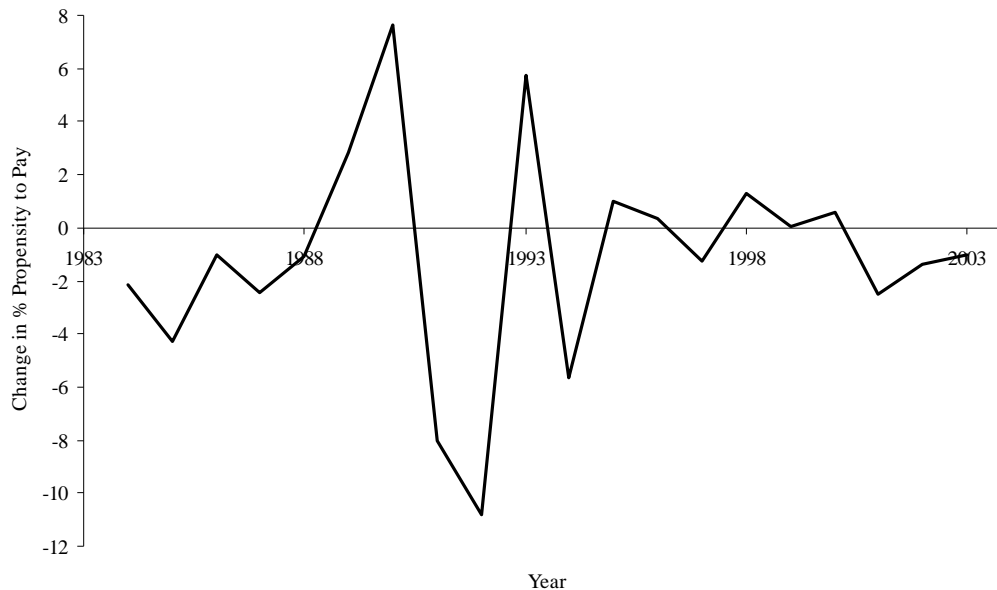
*Panel A: Actual and expected percent payers*



*Panel B: The propensity to pay dividends*



Panel C: Changes in the propensity to pay



## 7. SHARE REPURCHASES

By examining the annual change in treasury stock for both payers and non-payers, Fama and French (2001) show that share repurchases are not responsible for the declining propensity of industrial firms to pay dividends. We show that the same is true for banks. We use data on share repurchase authorizations from SDC Platinum to examine the proportion of banks that pay dividends in the fiscal year in which a repurchase is authorized.

We also examine the proportion of banks that pay dividends in the fiscal year following a repurchase authorization. We find that 95.1% of sample banks whose boards issue a repurchase authorization pay dividends in the same fiscal year. We also find that 93.7% of these banks continue to pay dividends in the year following the authorization, compared to 92.0% payers in the overall sample population.

Furthermore, we find that the non-dividend-paying sample banks whose boards authorize repurchases are overwhelmingly (83.9%) those banks that have not paid dividends prior to the authorization. We conclude that bank share repurchases are not related to the declining propensity of banks to pay dividends.

## **8. AGGREGATE DIVIDEND PAYMENT BY PUBLICLY HELD BANKS**

DeAngelo et al. (2004) find an increase in the aggregate dividends paid by industrial firms for the period from 1978 to 2000. We find a similar trend among banks. Table 6 shows the aggregate dividends paid by sample banks during the 1984 to 2003 period. Column 1 gives nominal figures for the full sample. Column 2 displays full sample aggregate dividends stated in terms of 1984 dollars, deflated using the Consumer Price Index (CPI). The growth in dividends remains qualitatively similar.

Because our sample grows from 174 banks in 1984 to 447 banks in 2003, the growth in aggregate dividends could be an artifact of additional banks paying dividends. To examine the robustness of our results to sample growth, we calculate the dividends paid by banks that exist in 1984 for each year of the sample period. Column 3 of Table 6 shows the nominal aggregate dividends paid by 1984 banks. Although the growth rate of aggregate dividends using this method is lower than the growth rate using all banks, a similar pattern of growth occurs. Of the 174 banks in our sample in 1984, only 43 remain in 2003. However, these 43 banks are responsible for paying 59.7% of the aggregate dividends paid in 2001.

Column 4 shows the real aggregate dividends paid by 1984 banks and exhibits a qualitatively similar pattern of growth without the possible noise induced by inflation and sample growth. Aggregate dividend growth in all four series is monotonic, except for a decline between 1990 and 1991, which coincides with a period of distress in the U.S. banking industry.

**Table 6. Aggregate bank dividend payment by year**

We determine dividend payment per bank by multiplying common shares outstanding (Compustat item 25) by dividends per share by ex date (Compustat item 26). We calculate aggregate bank dividend payment by year as the sum of dividend payment per bank for all banks in each fiscal year. Columns (1) and (2) contain aggregate nominal and real dividends for the full sample of banks. Columns (3) and (4) contain aggregate nominal and real dividends for only banks in existence in 1984. Deflated dividends are reported in 1984 dollars. All amounts are in millions of dollars.

	Full Sample		1984 Banks	
	(1) Nominal	(2) Deflated	(3) Nominal	(4) Deflated
1984	3,216.78	3,216.78	3216.78	3,216.78
1985	3,652.12	3,526.54	3574.15	3,451.25
1986	3,992.66	3,785.01	3871.1	3,669.77
1987	4,479.05	4,096.60	4293.86	3,927.22
1988	5,369.84	4,716.20	4845.74	4,255.90
1989	6,811.30	5,707.21	5700.27	4,776.27
1990	7,607.28	6,047.41	6061.78	4,818.81
1991	7,017.56	5,353.34	5556.88	4,239.06
1992	7,743.73	5,734.67	6134.58	4,543.00
1993	9,478.80	6,815.55	7538.57	5,420.47
1994	12,477.79	8,747.92	9195.42	6,446.72
1995	13,831.93	9,430.04	10719.86	7,308.36
1996	15,848.82	10,495.17	12073.23	7,994.96
1997	18,637.30	12,064.89	13457.91	8,712.01
1998	22,498.11	14,340.82	16672.28	10,627.30
1999	24,887.58	15,521.13	17795.97	11,098.45
2000	26,884.07	16,220.99	18862.36	11,380.95
2001	29,747.96	17,452.36	18582.13	10,901.66
2002	31,976.02	18,467.53	19239.21	11,111.47
2003	35,942.30	20,295.68	21448.97	12,111.67

## 9. CATERING INCENTIVE EFFECTS

Baker and Wurgler (2004) find a link between the propensity to pay dividends and catering incentives. They create a variable called the “dividend

premium,” which they use as a proxy for the value the market places on dividends. They calculate the dividend premium by taking the difference of the logs of the book-value-weighted average market-to-book ratio for dividend payers and the book-value-weighted average market-to-book ratio for non-payers. They show a positive, significant relation between the catering incentives represented by the dividend premium and the change in firms’ propensity to pay dividends.

We use two separate measures of propensity to pay, one formed by using the independent variables detailed in Table 4 in the probit model, and one that excludes  $V_t / A_t$ , the market-to-book ratio. Baker and Wurgler (2004) exclude market-to-book as a robustness test, given the many different meanings ascribed to it.

We use the benchmark sample period of 1984 to 1993 to develop the probit models. Yearly probits from earlier periods tend to display a complete separation of data points, meaning that there exists a vector of regression coefficients that correctly allocates all observations to their response groups. This issue arises because of the relative scarcity of non-payers in years prior to our sample period. Therefore, we use the Fama and MacBeth (1973) methods to develop our two probit models, using data from 1984 to 1993 to create two series of propensity to pay for the latter half (1994 to 2003) of our sample period.

We also calculate two separate dividend premiums. One uses only the sample of banks and the other uses the set of all firms during our sample period. We regress changes in the propensity to pay dividends, *PTP*, on the lagged value-weighted dividend premium determined by using our two different sample populations:

$$\Delta PTP_t = a + bP_{t-1}^{D-ND} + \varepsilon_t \quad (1)$$

We standardize the dividend premium,  $P^{D-ND}$ , to have unit variance. To show that our results are robust to changes in tax policy, we also perform the following regression:

$$\Delta PTP_t = a + bP_{t-1}^{D-ND} + cDTP_t + \varepsilon_t$$

(2)

where  $DTP_t$  is the current period dividend tax penalty, calculated as

$$\frac{t_d - t_g}{1 - t_g} \quad (3)$$

where  $t_d$  is the tax rate on dividends and  $t_g$  is the tax rate on capital gains for individual investors.

Table 7 presents our regression results. The coefficient on the dividend premium is not statistically significant in any of the regressions at conventional levels. Thus, our evidence suggests that banks are not influenced by the incentives to pay dividends that are present for firms in either their own industry or in the overall market. This finding contrasts with the findings of Baker and Wurgler (2004) for industrial firms. We interpret this result as reflective of the relatively low pay-for-performance sensitivities for bank CEOs documented by John and Qian (2003). The finding is robust to changes in tax policy.

**Table 7. Baker and Wurgler (2004) catering incentive regressions**

This table presents regressions that explain changes in the propensity of banks to pay dividends. We regress these changes on the lagged value-weighted dividend premium, which we determine by using two different sample populations, banks and all firms:

$$\Delta PTP_t = a + bP_{t-1}^{D-ND} + \varepsilon_t$$

We also perform similar regressions which include the dividend tax penalty to control for changes in tax policy:

$$\Delta PTP_t = a + bP_{t-1}^{D-ND} + cDTP_t + \varepsilon_t$$

We standardize the dividend premium  $P^{D-ND}$  to have unit variance. The  $V_t / A_t$  *included* column reports regressions in which we estimate  $PTP$  by using a firm-level model of dividend payment that includes market-to-book as a relevant firm characteristic. The  $V_t / A_t$  *excluded* column reports regressions in which we do not include market-to-book. t-statistics use standard errors that are robust to heteroskedasticity and serial correlation.

*Panel A. Baseline Probit regression results with and without market-to-book (1984-1993)*

Model	Intercept	t - stat	ln( $A_t$ )	t - stat	$V_t/A_t$	t - stat	$E_t/A_t$	t - stat	$BE_t/A_t$	t - stat	$\Delta(BE_t/A_t)$	t - stat
$V_t / A_t$ included	-41.44	-3.13	0.57	8.77	34.66	2.69	53.39	2.70	58.39	6.80	-2.32	3.16
$V_t / A_t$ excluded	-5.34	-9.07	0.47	10.81			84.67	4.84	41.51	6.46	-2.54	3.34

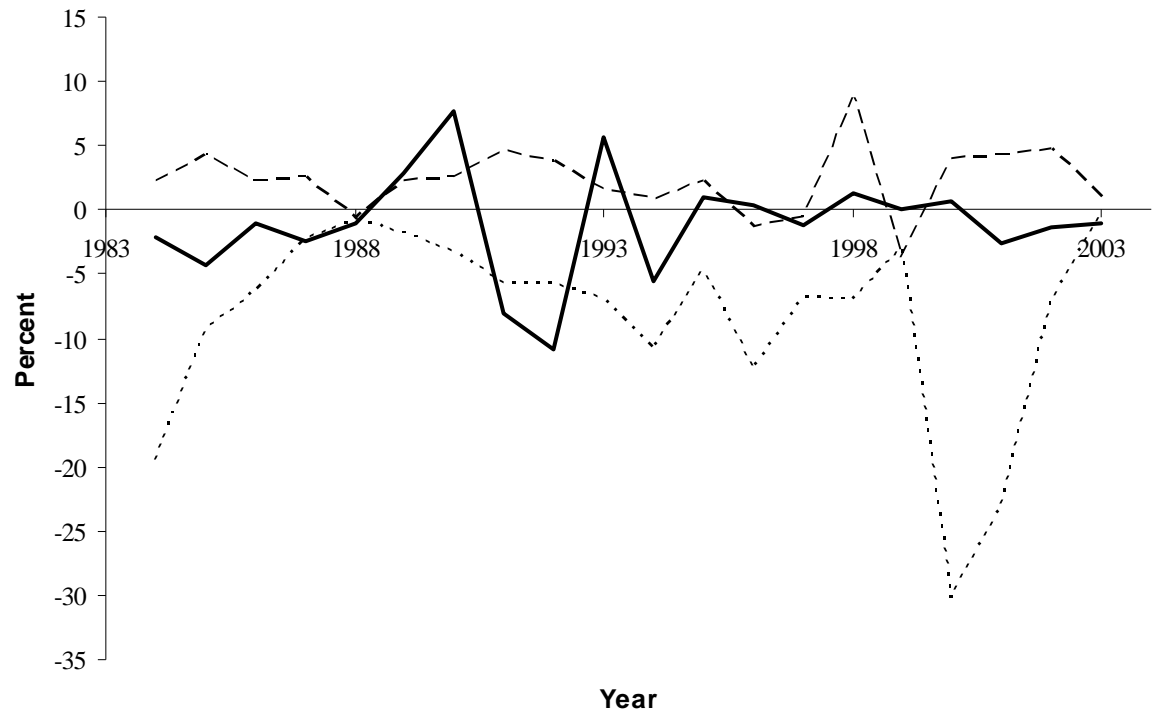
*Panel B. Catering incentive regression results with and without market-to-book using catering incentives for banks only and all firms (1994-2003)*

	$V_t / A_t$ included				$V_t / A_t$ excluded							
	a	t	b	t	c	t	A	t	b	t	c	t
Banks only no tax	-	-	-	-			-	-	-	-		
	0.008	1.19	0.003	0.48			0.006	0.84	0.002	0.26		
Banks only with tax	-	-	-	-	0.027	0.52	-	-	-	-	0.010	0.21
	0.013	0.99	0.002	0.71			0.008	0.51	0.001	0.69		
All firms no tax	-	-					-	-				
	0.008	1.13	0.001	0.22			0.006	0.77	0.002	0.27		
All firms with tax	-	-			0.053	1.04	-	-				
	0.018	1.35	0.003	0.57			0.012	0.80	0.003	0.86	0.032	0.69

Figure 3 displays dividend premia and propensities to pay. Although the dividend premium for the sample of all firms is negative throughout the period, the premium for banks is positive in all but two years. The market, in general, provides positive incentives for banks to pay dividends. *Ceteris paribus*, paying dividends increases a bank's market value. We note that required changes in capital are not to blame for banks' failure to respond to these incentives, as we calculate propensity to pay using a probit model with both the capital ratio and the change in capital ratio as independent variables.

**Figure 3. Dividend premia and changes in propensity to pay: 1984-2003**

This figure shows dividend premium calculated using all stocks (dotted line), dividend premium calculated using banks (dashed line), and change in propensity to pay (solid line). We calculate the dividend premium by taking the difference of the logs of the book-value-weighted average market-to-book ratio for dividend payers and the book-value-weighted average market-to-book ratio for non-payers. Propensity to pay is the difference between the actual and expected percent of payers per year.



## 10. CONCLUSIONS

We show that bank dividends represent an increasing proportion of all dividends over our sample period, rising from 8.55% in 1984 to 17.15% in 2003. Consistent with Fama and French (2001), we find a “disappearing dividends” trend in our sample of commercial banks. In 1984, 96.55% of sample banks pay dividends. In 2003, only 85.01% of sample banks pay dividends. Although this decline is not as pronounced as the one documented by Fama and French, it is noteworthy for an industry dominated by dividend payers in previous periods. For

the period 1966 to 1983, in a sample of banks selected using the same criteria, the percentage of payers does not drop below 95.9%. Also consistent with Fama and French (2001), we document a declining propensity to pay dividends. We show that share repurchases are not responsible for the decreasing propensity of banks to pay dividends.

We find an increase in the aggregate dividends paid by banks over the sample period. This increase remains after we deflate figures using the CPI and after we control for sample growth over time. Banks present in 1984 account for 59.7% of dividends paid in 2003, even though they represent only 10.4% of the sample in that year. Aggregate dividend growth is monotonic, with the exception of a decline between 1990 and 1991, which coincides with a period of distress in the U.S. banking industry.

In contrast to the findings of Baker and Wurgler (2004) for industrial firms, we find no bank response to market-provided catering incentives to pay dividends. This finding is robust to a propensity-to-pay model that excludes market-to-book ratio, and whether we develop the dividend premium – the proxy for catering incentives – by using the sample of bank firms or a sample of all firms. Our results are not attributable to mandatory increases in capital, since we create our propensity to pay using a probit model with both capital ratio and change in capital ratio as independent variables. Our results are also robust to consideration of changes in dividend tax policy. The market provides positive incentives for banks to pay dividends. *Ceteris paribus*, paying dividends increases a bank's market value.

We posit that the lack of responsiveness to catering incentives is attributable to the relatively low pay-for-performance sensitivities of bank CEOs (John & Qian, 2003).

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## **FINANCIAL RISK-RETURN CHARACTERISTICS CONSISTENT WITH THOSE FIRMS RANKED HIGHEST FOR PRICE GROWTH PERSISTENCE BY VALUE LINE**

by

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***ABSTRACT***

*The price growth persistence measures of common stock, as reported by rating services, have long been of interest to investors, investment counselors, financial managers, and academicians. It is an important factor in the calculation of Value Line's proprietary rating for the timeliness of an investment in any company, and measures growth in terms of consistency rather than magnitude. Other than the actual prices, historical data, and time periods that Value Line uses to calculate the price growth persistence index of a firm, there have been no studies that identified the risk-return profile of financial characteristics for those firms rated by Value Line as having the strongest price growth persistence in their database. The purpose of this study is to determine whether those firms have unique financial profiles. As in previous studies of this type multiple discriminant analysis is used to separate the group of firms with the strongest ratings for price growth persistence, and firms chosen at random, on the basis of their respective risk-return profiles.*

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**INTRODUCTION**

The persistence of growth in the value of common stocks has long been of interest to investors, investment counselors, financial managers, and academicians. In addition, the persistence rather than the magnitude of growth has become of primary importance to the selection of securities by both institutional investors, and inside traders (Payne 2004, Meisheri 2006, Damodaran 2002, Payne and Wong 2004). The *Value Line* proprietary measure of price growth persistence (PGP) rewards a company for the consistency with which it outperforms the broader universe of equity offerings over an extended period of time (Value Line Educational Series Program 20, 2006). It is calculated as follows: Using each year of the past ten years (or fewer if 10 are not available), a count is made of the number of subsequent years in which the relative price of the stock was higher than it was in the base period. The sum of these counts is the basis for the index. The growth persistence index ranges from 100 (highest) to 5 (lowest). Scores of 50 and 55 are average (Value Line Educational Series Program 20, 2006). The index may be risk adjusted by dividing a fund's three-year total index by the standard deviation of that index (*Value Line*, 2006). The persistence rating is reported, and updated for all companies in the *Value Line* database every thirteen weeks.

It has long been known that the greatest single factor in the calculation of the *Value Line* ranking for the timeliness of investments (another subject of their ranking systems) is growth, and the persistence of that growth over time is given greater

weight than the magnitude of growth. Thus, the persistence of growth has become an important topic in financial research (Meisheri 2006). Since PGP is a measure of the consistency of growth, and since growth is an important element of the total return on investment, a fair question may be: What, if anything, does a company trade off to achieve a high PGP rating? A fundamental truth in financial management is that there is a risk-return tradeoff in every investment, and every portfolio. Thus, a superficial answer may be that the companies have to assume some sort of risk to achieve the high growth consistency ratings. Despite the interest of scholars, and the growing attention of investors, there have been no studies that have examined the profiles of financial variables that measure risk, return, and other financial characteristics of firms rated with the strongest ratings for PGP.

The purpose of this study is to analyze empirically observed financial measures of risk and return associated with those firms identified by *Value Line* as having the strongest PGP ratings in their database. More specifically, the aforementioned groups of investors, investment counselors, financial managers, and academicians are concerned with those variables that are indicators of a firm's risk-return tradeoff, and how that tradeoff is perceived by professional analysts and investors at the margin (those willing and able to buy). It is the action of those investors in buying and selling that determine the value of the firm. Moreover, if it is found that the firms, possessing those strongest ratings have unique financial profiles, and if the classification process can be validated as being without bias, it may be possible to forecast, by use of those financial profiles, those firms that may develop strong PGP ratings. The identification

of such a profile will have implications for all investors, and particularly financial managers that are interested in consistent performance for their firms.

## **METHODOLOGY**

The issues to be resolved are first, classification or prediction, and then evaluation of the accuracy of that classification. More specifically, can firms be assigned, on the basis of selected variables, to one of two groups: (1) firms identified by *Value Line* that had the strongest PGP rankings in their database as of August 2006, and referred to here as (SPGP), or (2) firms chosen at random from the same database. Those firms are referred to here as firms randomly chosen (FRC). Multiple discriminant analysis (MDA) provides a procedure for assigning firms to predetermined groupings based on variables or attributes whose values may depend on the group to which the firm actually belongs.

If the purpose of the study were simply to establish a financial profile of each group of firms, simple ratios would be adequate. As early as 1968, in a seminal paper on the use of MDA in finance, Altman showed that sets of variables used in multivariate analysis were better descriptors of firm's characteristics, and had more predictive power than individual variables used in univariate tests.

The use of MDA in the social sciences for the purpose of classification is well known. MDA is appropriate when the dependent variable is nominally or ordinally measured and the predictive variables are intervally measured. In addition to its use in the Altman study to predict corporate bankruptcy, other early studies used MDA to,

predict financially distressed property-liability insurance firms (Trieschmann and Pinches, 1973), growth (Payne, 1993), and the failure of small businesses (Edmister, 1982). This study also employs nominally measured dependent variables and intervally measured predictive variables. The nominally measured dependent variables are the group of SPGP firms and the group of FRC firms. The computer program used to perform the analysis is SPSS 11.5.0 Discriminant Analysis (SPSS Inc., 2002). Since the objective of the analysis is to determine the discriminating capabilities of the entire set of variables without regard to the impact of individual variables, all variables were entered into the model simultaneously. This method is appropriate since the purpose of the study is not to identify the predictive power of any one variable, but instead the predictive power of the entire set of independent variables (Hair et al, 1992, 99).

#### **SELECTION OF SAMPLE AND INDEPENDENT VARIABLES**

All data used in the analysis were gathered from *Value Line Ratings and Reports* 2006). The sample selected for this study consists of two groups of one hundred firms. The first group of one hundred firms is identified by *Value Line* as having the strongest price growth persistence ratings in their database. The second group is a group of one hundred firms randomly selected from the *Value Line* database, but from the same industries as the first group.

By their very nature, all industries are not homogenous. Ratings of strong price growth persistence in one industry may be regarded as an average situation in another industry. It follows that for an unbiased study the effects of industry must be held constant. This was accomplished by matching the companies in the SPGP group with companies from the same industry in the FRC group.

For example, from the restaurant industry, Outback Steakhouse is in the SPGP group and Bob Evans Farms is in the FRC group, from the toiletries/cosmetics industry, Avon Products is in the SPGP group, and Gillette is in the FRC group. Coca Cola is in the SPGP group from the beverages industry, and Pepsi Bottling Group is in the FRC group. In this manner, each company selected randomly from the group identified with SPGP was matched with a randomly chosen company from the same industry. Thus, the matching method of randomly choosing companies eliminates any bias due to differences in industry listings.

Previous studies using this and other statistical methods have chosen explanatory variables by various methods and logical arguments. In this study the group of explanatory variables chosen for analysis includes a measure of the relative size of the firms, a measure of financial strength, a measure of return to all investors, two measures of risk, and a rough measure of the market's perception of value that includes the market's perception of potential growth. An explanation, and then an evaluation of these measures are needed to accomplish the purpose of this study.

It is possible that some investors perceive that price growth persistence, or any measure of stability is in some way associated with the size of the firm. That is, it may be that a significant number of investors believe that there is stability and strength in size. It would not be difficult to list exceptions to that proposition. However, there has thus far been no published empirical evidence on this subject. Consequently, it will be informative to include a measure of size. The measure of size used in this study is the log of sales.

The financial strength of any company has become one of the most important characteristics considered by potential investors, and creditors. Companies do extensive research into the financial background of potential contractors and subcontractors. In addition, U.S. government procurement agencies are primarily concerned with the financial strength of companies that are potential contractors. Value Line awards every firm in their database a rating for financial strength. It may be expected that this rating will have a strong relationship to price growth persistence. Thus, the Value Line rating for financial strength is included.

The measure of return is to total capital. This ratio includes a return to creditors as well as owners, and recognizes that value is affected by the cost of debt. A measure of return to equity could be used, but it would ignore the cost of debt and the fact that debt as well as equity finances assets.

Sharpe's beta coefficients contain the effects of both operating and financial leverage, and thus reflect both operating and financial risk. There are simply no a priori expectations on whether the SPGP firms may have assumed more of one kind of risk or another to achieve the SPGP ratings. Separate measures of financial and operating risk will identify any differences. The separation is accomplished by "unlevering" published betas, and using the debt to total capital ratio as the measure of financial risk, and the unlevered beta as a measure of operating risk (Hamada 1969).

The ratio of market price to earnings (P/E) has been used for years as a rough measure of how the market values a firm. Indeed, the P/E multiple, and dividend yield are the only ratios reported every day on the financial pages of newspapers, and it has been

argued that in efficient markets the multiple reflects the intrinsic value of the stocks, (Scripto, 1998, Payne and Tyler 2002). More recently, the price earnings growth ratio (PEG) has grown in popularity. The price earnings growth multiple adjusts the P/E ratio for potential growth, and it is suggested that the price earnings multiple (P/E) used without the adjustment for growth has a high potential for undervaluing a company. Damodaran, (2002) writes that the PEG ratio is a better measure of a company's potential future value, and was developed to address the shortcomings of the P/E multiple. He further writes that many analysts have abandoned the P/E ratio, not because of any perceived shortcomings, but simply because they desire more information about a stock's potential. Thus, the use of the PEG ratio is used here as a measure of a company's potential long term value to investors.

In sum, there are six explanatory variables in the multiple discriminant model.

They are as follows:

- X1 - The Logarithm of Sales (Size)
- X2 - Value Line's Rating for Financial Strength
- X3 - Return to Total Capital.
- X4 - Long-Term Debt to Total Capital
- X5 - Sharpe's Unlevered Beta Coefficient
- X6 - The Price Earnings Growth Ratio

The explanatory variable profile contains basic measures of common financial variables. They were chosen, as in any experimental design, because of their consistency with theory, adequacy in measurement, the extent to which they have been used in previous studies, and their availability from a reputable source.

## TESTS AND RESULTS

The discriminant function used has the form:

$$Z_j = V_1X_{1j} + V_2X_{2j} + \dots + V_nX_{nj} \quad (1)$$

where:

$X_{ij}$  is the firm's value for the  $i$ th independent variable.

$V_i$  is the discriminant coefficient for the firm's  $i$ th variable.

$Z_j$  is the  $j$ th individual's discriminant score.

The function derived from the data in this study and substituted in equation 1 is:

$$Z_j = -4.230 - .029X_1 + .572X_2 + 4.592X_3 + .465X_4 - .095X_5 + .038X_6 \quad (2)$$

Classification of firms is relatively simple. The values of the six variables for each firm are substituted into equation (2). Thus, each firm in both groups receives a Z score. If a firm's Z score is greater than a critical value, the firm is classified in group one (SPGP). Conversely, a Z score less than the critical value will place the firm in group two (FRC). Since the two groups are presumed heterogeneous, the expectation is that SPGP firms will fall into one group and the FRC firms will fall into the other.

Interpretation of the results of discriminant analysis is usually accomplished by addressing four basic questions:

1. Is there a significant difference between the mean vectors of explanatory variables for the two groups of firms?
2. How well did the discriminant function perform?
3. How well did the independent variables perform?
4. Will this function discriminate as well on any random sample of firms as it did on the original sample?

To answer the first question, SPSS provides a Wilk's Lambda - Chi Square transformation (Cooper and Schindler, 2001, 581). The calculated value of Chi-Square is 36.60. That exceeds the critical value of Chi-Square of 12.59 with 6 degrees of freedom at the five percent level of significance. The null hypothesis that there is no significant difference between the financial profiles of the two groups is therefore rejected, and the first conclusion drawn from the analysis is that the two groups have significantly different financial characteristics. This result was of course, expected since one group of firms was identified as having the highest ranking for price level persistence and, the other was chosen randomly from the same industries.

The discriminant function thus has the power to separate the two groups. However, this does not mean that it will in fact separate them. The ultimate value of a discriminant model depends on the results obtained. That is what percentage of firms as classified correctly and is that percentage significant?

To answer the second question a test of proportions is needed. Of the 100 firms in the SPGP group, 67 were classified correctly. Of the 100 firms in the FRC group, 59 were classified correctly. That is, a total of 126 firms or 63 percent were classified correctly. The results are shown in Table 1.

**TABLE 1**

**SPGP-FRC CLASSIFICATION**

	Predicted Results	
	<u>SPGP</u>	<u>FRC</u>
SPGP	67	33
FRC	41	59

Sixty three percent may or may not be significant. Formal research requires the proof of a statistical test. To test whether or not that 63 percent correct classification rate is statistically significant, the Press's Q test is appropriate (Hair et al, 1992, 106). Press's Q is a Chi-square random variable:

$$\text{Press's Q} = [N - (n \times k)]^2 / N(k-1) \quad (3)$$

where:

N = Total sample size  
n = Number of cases correctly classified  
k = Number of groups

In this case:

$$\text{Press's Q} = [200 - (126 \times 2)]^2 / 200(2-1) = 13.528 > \text{Chi Square } .05 \text{ } 3.84 \text{ with one d.f.}$$

(4)

Therefore, the null hypothesis that the percentage classified correctly is not significantly different from what would be classified correctly by chance is rejected. The evidence suggests that the discriminant function performed very well in separating the two groups. Again, given the disparity of the two groups, it is not surprising that the function classified sixty three percent correct.

The arithmetic signs of the adjusted coefficients in Table 2 are important to answer question number three. A positive sign indicates that the greater a firm's value for that variable, the more likely it will be in the SPGP group. Conversely, a negative sign for an adjusted coefficient signifies that the greater a firm's value for that variable, the more likely it will be classified in the FRC group. Thus, according to Table 2: the stronger a firm's financial strength, return to total capital, price

earnings growth ratio, and the larger the company is in size, the more likely the firm would be identified as having attained a strong price growth persistence rating. However, the greater the levels of both operating and financial leverage, the less likely the firm would have been identified as having attained a strong price growth persistence rating. The relative contribution of each variable to the total discriminating power of the function may be obtained by standardizing (pooled within group variances) the canonical coefficients of the discriminant function. These coefficients are given in the output of the SPSS 11.5.0 program. The standardized canonical coefficients are shown in Table 2.

**TABLE 2**

**RELATIVE CONTRIBUTION OF THE VARIABLES**

<b>Adjusted Variables</b>	<b>Coefficient</b>	<b>Rank</b>
X1 - The Logarithm of Sales (Size)	0.343	4
X2 - Financial Strength	0.852	1
X3 - Return to Total Capital.	0.496	2
X4 - Long-Term Debt to Total Capital	-0.218	5
X5 - Sharpe's Unlevered Beta Coefficient	-0.101	6
X6 - The Price Earnings Growth Multiple	0.425	3

Table 2 reveals that *Value Line's* measure of financial strength made the greatest contribution to the overall discriminating function. It is followed respectively by the measure of return to total capital, the price earnings growth ratio, the proxy for the size of the firm, the level of financial leverage, and finally the level of operating leverage. Some multicollinearity may exist between the variables, because return

growth, and earnings may be a partial function of risk and leverage, and the potential growth in the PEG ratio may be related to the historical growth in the price earnings persistence rank. Hair, et al (1992) wrote that this consideration becomes critical in stepwise analysis and may be the factor determining whether a variable should be entered into a model. However, when all variables are entered into the model simultaneously, the discriminatory power of the model is a function of the variables evaluated as a set and multicollinearity becomes less important.

## **VALIDATION OF THE MODEL**

Before any general conclusions can be drawn, a determination must be made on whether or not the model will yield valid results for any group of randomly drawn firms. The procedure used here for validation is referred to as the Lachenbruch or, more informally, the "jackknife" method. In this method, the discriminant function is fitted to repeatedly drawn samples of the original sample. The procedure estimates  $(k - 1)$  samples, and eliminates one case at a time from the original sample of "k" cases (Hair et al, 1992, 98). The expectation is that the proportion of firms classified correctly by the jackknife method would be less than that in the original sample due to the systematic bias associated with sampling errors. However, the major issue is whether the proportion classified correctly by the validation test differs significantly from the 63 percent classified correctly in the original test. That is, is the difference in the two proportions classified correctly by the two tests due to bias, and if so, the objective is to determine if this bias is significant. The jackknife validation resulted in the correct classification of 61 percent of the firms. Since there are only two samples for analysis the binomial test is appropriate:

$$122 - 200 (.63) / [200 (.63) (.37)]^{1/2} = -.88 \text{ is less than } t_{05} 1.64. \quad (5)$$

Thus, the null hypothesis that there is no significant difference between the proportion of firms classified correctly in the original test and the proportion classified correctly in the validation test cannot be rejected. Therefore, it can be concluded that while there may be some bias in the original analysis, it is not significant. The procedure will classify new firms as well as it did the original sample.

In addition to the validation procedure, researchers usually address the question of the equality of matrices. One of the assumptions in using MDA is that the variance-covariance matrices of the two groups are equal. The SPSS program tests for equality of matrices by means of Box's M statistic. In this study Box's M transformed to the more familiar F statistic of 2.33 resulted in a zero level of significance. Thus, the null hypothesis that the two matrices are equal cannot be rejected, and the midpoint value between the two group means can be defined as the critical Z value.

## **SUMMARY AND CONCLUSIONS**

The purpose of this study was to analyze empirically observed financial measures of risk and return associated with those firms identified by *Value Line* as having the greatest price growth persistence ratings in their database, and to determine whether those firms have financial characteristics that are significantly different from firms in the same industries that were selected at random. The results of the statistical analysis indicated first, that there was a significant difference in the financial variables that measure value, between the two groups.

The fact that the discriminant function separated the two groups, and classified a significant proportion correctly on the basis of selected financial variables that measure risk, return, and value, as perceived by the market, is no surprise. The two groups were simply not homogeneous, regardless of the fact that they were from the same industries. One group had the highest rating for price growth persistence and the other was simply selected at random. That may suggest that investors at the margin were looking for certain risk-return characteristics associated with the SPGP companies. If this supposition is valid then it would certainly have been a surprise if the discriminant function had not been so efficient.

It follows that the group of firms identified as having the highest price growth persistence ratings has a unique financial profile. Table 2 summarizes the findings. According to Table 2, *Value Line's* rating for financial strength made the greatest contribution to the overall discriminating function. That was followed respectively by the measure of return to total capital, the price earnings growth (PEG) ratio, the measure of size, the measure of financial leverage, and finally the measure of operating leverage. The arithmetic signs of the adjusted coefficients in Table 2 are important. A positive sign indicates that the greater a firm's value for the variable, the more likely it will be in the SPGP group. Conversely, a negative sign for an adjusted coefficient signifies that the greater a firm's value for the variable, the more likely it will be classified in the FRC group. Thus, according to Table 2: the greater the firm's values for all variables in the model except the measures for both financial and operating leverage, the more likely the firm would have experienced a very high level of price growth persistence. Conversely, the greater the measures of

both types of leverage the less likely the firm would be classified in the group with strong price growth persistence.

Three of the abovementioned results may have been expected, and three simply had no apriori expectations. It was expected that financial strength, return to total capital, and the price earnings growth ratio would be characteristic of firms with strong price growth persistence. Due largely to the fact that there have thus far been no published empirical studies or evidence, the relationships between the size of the firm, financial leverage, operating leverage, and the group of firms with strong price growth persistence was simply not known. Consequently, there were no apriori expectations. Explanations of why the variables are associated with one group or the other are beyond the scope of this study. However, a few comments on the findings are in order.

The findings that a strong measure for financial strength, high returns to total capital, and high price earnings growth ratios are characteristics of companies with strong price growth persistence may have been expected simply because they are desirable characteristics that would contribute to price growth persistence, and provide an added sense of safety for potential shareholders. Return to total capital needs no explanation as to its desirability. Financial strength is a proprietary *Value Line* rating whose primary determinant is the strength of a company's balance sheet. Earnings and annual interest charges are also factors in this rating (Value Line Educational Series Program 20, 2006). It has been suggested that the PEG ratio is a better measure of a company's potential future value than the price earnings multiple. Moreover, many analysts have abandoned the P/E ratio, not because of

any perceived shortcomings, but simply because they desire more information about a stock's potential (Damodaran, 2002). The numerator in the PEG ratio would certainly reflect intrinsic value, and all other known variables in reasonably efficient markets. Consequently, the PEG ratio is said to reflect the market's perception of the future value of a company, and thus, it was also expected that high PEG ratios would be characteristic of firms with strong price growth persistence.

The findings that the higher the levels of both financial and operating leverage in a company, the less likely that company would experience price growth persistence was neither expected nor unexpected. It was simply not known. Arguments could be made either way. The higher the measures for leverage the higher will be the fixed costs and the higher will be both financial and operating risk, and the increased risk should make the stock less attractive. However, those fixed costs will result in the potential for higher returns. Moreover, according to financial signaling theory increased leverage is a positive sign. That is, if management has reason to believe that the prospects for a company are better than the stock price indicates, they will choose to issue debt because they feel that the stock is undervalued. Myers and Majluf (1984) suggested that financial managers will issue stock if they feel the stock is overvalued and debt if they feel the stock is undervalued. Van Horne (2001) writes that investors are not unmindful of this. Thus, debt issues are regarded as "good news," and stock issues are regarded as "bad news." Apriori information on whether the "good news" associated with a debt issue would offset the increased risk associated with increased leverage was simply not known and may be different for every firm and industry. There are no definitive

prior studies on this subject, and that clearly suggests that further studies are needed in this area.

The sample was validated in such a way as to conclude that the procedure will classify new firms as well as it did in the original analysis. Thus, it is suggested that the model may be used to predict firms that may become classified as having high levels of price growth persistence in the future.

This study has resulted in a contribution toward the construction of a theory that describes the financial characteristics of those firms that experienced the highest levels of price growth persistence in the *Value Line* database. In order to make a more complete contribution, further research is needed. The construction of a complete theory would be valuable to all investors, investment counselors, and academicians by providing greater information on the determinants of high levels of price growth persistence.

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