The Changing Role of Dividends:
A Firm-Level Study From the Nineteenth to the Twenty-First Century

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Abstract

We study the changing role of dividends by examining the financial history of one of North America's oldest banks (and Canada's first bank), Bank of Montreal. We investigate how the Bank's dividend policy has changed over the Bank's history by focusing on the relationships between dividends, prices and earnings. In the early part of the sample we find that annual dividend and earnings changes are highly variable with dividend changes following changes in earnings, and a larger portion of investors' returns coming from dividends. In more recent periods an apparent change in dividend policy has lead to more stable and gradual increases in dividends with more of the returns coming from capital gains. In the early period, the Bank was focused more on its dividend payout ratio, but more recently has focused on dividend growth. We find evidence that information regarding future earnings is transmitted by dividends, as well as evidence of relationships between prices and future dividends. Our results suggest a distinctive change in the role for dividends over the past century.

JEL Codes: G21, G35

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Abstract

We study the changing role of dividends by examining the financial history of one of North America's oldest banks (and Canada's first bank), Bank of Montreal. We investigate how the Bank's dividend policy has changed over the Bank's history by focusing on the relationships between dividends, prices and earnings. In the early part of the sample we find that annual dividend and earnings changes are highly variable with dividend changes following changes in earnings, and a larger portion of investors' returns coming from dividends. In more recent periods an apparent change in dividend policy has lead to more stable and gradual increases in dividends with more of the returns coming from capital gains. In the early period, the Bank was focused more on its dividend payout ratio, but more recently has focused on dividend growth. We find evidence that information regarding future earnings is transmitted by dividends, as well as evidence of relationships between prices and future dividends. Our results suggest a distinctive change in the role for dividends over the past century.

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Introduction

> *"The Bank of Montreal has the double distinction of being the greatest single banking institution upon the continent of America and the first to transact banking business in Canada." Hopkins (1910)*

Dividends have been an important topic in financial economic research for at least the half century since Lintner's (1956) seminal study on dividend distributions. Despite the attention paid to this topic, "the dividend controversy" (why firms pay dividends) continues to make Brealey and Meyers (2003) top-ten list of unsolved problems in finance. In this paper we perform an in-depth longitudinal study of Canada's oldest financial institution, Bank of Montreal, to investigate how its dividend policy has evolved since its founding in 1817. We focus on Bank of Montreal because it has paid a regular dividend over almost the entire period. By examining one firm that has paid dividends consistently for 175 years (every year since 1829), we hope to shed some light on how firms' dividend payout policies have evolved over time and how the policies depend on different factors. A broad literature has developed examining the current dividend payment behavior of firms, but few studies have considered how dividend payments have changed over time and the impact this has had on investors. Taking an historical perspective, we show how dividend policy appears to depend on dividend changes, earnings changes, and prices, and how these relationships have changed over time.

Our paper makes three contributions to our understanding of dividend policy over the past century. First, we provide a detailed description of the evolution of Bank of Montreal's dividend policy relative to both its earnings and price over an extremely long period – the longest firm-specific dividend-related examination of any North American study of which we are aware. Second, we examine Bank of Montreal's payout policy and discuss how the qualitative features of dividend payments have evolved over time. Third, we formally examine the relationship between changes in prices, dividend payments, earnings and different measures of firm value over time. We start by using the well-known Lintner (1956) model to provide a foundation for our empirical study as well as other models which allow us to address recent theoretical developments in the study of dividend policy.

This study complements much of the existing literature in financial economics that focuses on cross-section analysis over short time periods or time series investigations of market indices over longer periods. We

recognize that there is an issue with respect to the generalizability of our single firm results, but we feel that this concern is outweighed by being able to study a firm that has been a leading corporation, has remained in the same industry and has consistently paid a cash dividend over such a long period.

For Bank of Montreal, we find that the annual dividend and earnings changes over the sample period are highly variable in the early period but more stable in the subsequent period with the dividend payout ratio actually decreasing since World War II. A large portion of the total return received by investors over the past century has come in the form of dividends, but proportionately more so in the earlier part of the sample. The changes in dividend payments and earnings move together in the early period, but the degree of comovement decreases in the latter period. Carefully examining the dividend changes, we see that many of the bank's dividend increases were through the use of special dividends. Special dividends allow the firm to maintain a target payout ratio but not commit to doing so with a regular dividend when it was unclear if the increased earnings were sustainable. These special dividend payments ceased in the early 1970s for Bank of Montreal (this is consistent with the findings in the U.S.).

To more formally investigate how managers set dividend policy, we use the model proposed by Lintner (1956) and several extensions of this model based on alternative hypotheses proposed to explain current dividend policies. Our results are consistent with the conjecture that firms historically focused on a specific dividend payout ratio but firms have recently become more concerned about maintaining a specific level of dividends or growth rate for dividends. Focusing on different aspects of the information content of dividends hypothesis, we find evidence that information regarding future earnings is transmitted by dividends, as well as evidence of a relationship between prices and future dividends. Over our sample period we find that these relationships are significantly stronger in the period before World War II than after. Since World War II dividend payments have consistently increased and thus have been less sensitive to changes in earnings. Nevertheless we find evidence of a continued relationship between dividends and the price of equity. In fact changes in price appear to anticipate changes in dividends better since World War II.

The paper is organized as follows. Section 2 provides a review of the dividend-related literature relevant for our study and provides a brief historical perspective of Bank of Montreal. Section 3 presents our models and

describes our hypotheses. Our data are described in section 4. Results are presented in section 5. Finally, conclusions are presented in section 6.

2. Background

The question of why firms pay dividends has intrigued academics for quite some time. One of the first detailed investigations of this question is Lintner (1956). His seminal work provides a survey of firms' dividend payout policies at the time. Specifically, Lintner interviewed managers from 28 companies and found that managers target a long-term payout ratio when determining their dividend policy. Subsequent theoretical contributions by Modigliani and Miller (1958 and 1959) and Miller and Modigliani (1961) argue that, under perfect capital market conditions, firm value is largely driven by operating decisions and not by the firm's payout decisions. Consequently a firm's dividend policy should not influence its value. Early empirical studies, however, find relationships between the dividend payout ratio and the market value of firms (for an early survey see Friend and Puckett (1964)). These results have continued to the present (for a more recent survey see Allen and Michaely (2002)).

In an attempt to reconcile these findings and improve our understanding of the factors influencing the dividend payment decision, researchers have relaxed some of the restrictions in models such as those by Modigliani and Miller. For example, Miller (1977) and others argue that taxes and other market frictions (e.g., agency conflicts, as in Jensen and Meckling (1976)) can impact dividend policies. The most widely accepted theories for why managers pay dividends, even in the face of dividend and capital gain taxation differences, are related to signaling. It is suggested that dividend increases (decreases) are viewed as positive (negative) signals for the firm's future outlook and future cash flows (e.g., Bhattacharya (1979), John and Williams (1985) and Miller and Rock (1985)). Although some empirical tests of these theories such as Benartzi, Michaely and Thaler (1997) do not find a significant change in earnings after dividend increases, Grullon, Michaely and Swaminathan (2002) find evidence consistent with changes in dividends signaling a decrease in the firm's systematic risk. Although it is well-known that stock prices react when firms unexpectedly announce changes in dividends (e.g., Aharony and Swary (1980), Asquith and Mullins (1983), Michaely, Thaler and Womack (1995)

among others), the evidence generally does not support the idea that unexpected changes in dividends provide information about future earnings. Despite the intuitive appeal of these arguments, both the survey of existing empirical evidence by Allen and Michaely (2002) and the updated Linter-type survey of Brav et al. (2003) reject this traditional notion of dividends signaling earnings.

The study by Brav, Graham, Harvey and Michaely (2003) is an interesting addition to the dividend literature because they update Lintner's original survey to investigate how managers' views have changed over the past half century. This is important because they consider some of the new techniques managers have available to distribute firm profits to shareholders (e.g., share repurchases). Brav et al. find that managers have moved from focusing on the long-term payout ratio toward maintaining a consistent level of dividends for smaller firms and maintaining a consistent growth rate of dividends for more mature companies. It has been suggested that this is because firms are willing and able to pay different dividends at various stages of their life cycle. We would expect a young firm to reinvest its earnings rather than paying dividends and more mature firms to distribute part of their profits as dividends. Consistent with this hypothesis, evidence from the 1980s and 1990s finds that firms were paying fewer dividends than they had previously (e.g., Fama and French (2001)). Although Fama and French suggest that this is because dividend payments by all firms, including larger, older and more profitable firms, are decreasing at this time, DeAngelo, DeAngelo and Skinner (2004) find that it is the increased presence of small firms which pay little or no dividends driving their results – the large dividend paying firms continue to pay large dividends. Providing a slightly different perspective on the apparent changes in dividend behavior of firms over the past few decades, studies such as Baker and Wurgler (2004a and 2004b) suggest that firms' dividend policies change as investors' view of returns coming from dividends relative to capital gains change. They propose that over the 1980s and 1990s there was an increasing preference for capital gains, thus we see lower dividend payments in this period.

We focus on the Bank of Montreal because it has consistently paid a dividend since its founding in 1817 and thus we can see how its dividend payout policies have changed over this period. Bank of Montreal has played a key role in Canadian banking and the Canadian economy since its founding. It is the oldest bank in Canada and it was considered one of the major corporations in North America through the early part of our

sample. It was even referred to as "The greatest bank in [North] America." Its dividend history goes back to its first year—the first year went so well that halfway through it the bank decided to pay a dividend. The only time the bank missed paying a dividend was following the financial collapse in England in 1825 – the Bank of Montreal had to skip its dividend payments in 1827 and 1828. In the early years, the size of dividend changes closely followed earnings fluctuations which are evidenced through the documentation from the annual meetings where information on earnings was explicitly used to determine the level of dividend to pay (Bank of Montreal Resolution Books 1817-1893). The bank grew as Canada expanded and at the beginning of the twentieth century, the bank had gained a preeminent position:

> "It may be interesting to note that the largest total dividend paid in Canada by one concern is by the Bank of Montreal. … which, by the way, after the Bank of England is the second largest banking institution in the world." *The Globe* (January 2, 1901)

Despite its ups and downs, the bank was able to maintain its dividend.

Consequently Bank of Montreal is an ideal candidate for studying how managers' views on dividends have changed over time. It has consistently paid dividends, it has remained in the same industry over the entire period, and it has been a key corporation in the Canadian economy, so one might expect that Bank of Montreal would adopt dividend policies which respond to investors' preferences over time.

3. Empirical Models and Hypotheses

To investigate several of the hypotheses proposed in the literature that we discussed earlier, we use a variety of models. Because the study of Brav et al. (2003) suggests that dividend behavior has changed since the original work of Lintner (1956), our analysis is designed to investigate several of the different dividend distribution policies hypothesized in the literature to be followed by managers. The first model we consider is from Lintner (1956) who was one of the first to suggest that current dividends depend on future as well as current and past earnings. Subsequent models in the literature build on this model and the observation that managers are reluctant to increase dividends unless they believe dividends can be sustained at the new level. Many empirical papers investigate the notion that managers use dividends to signal the future earnings prospects of their firms (i.e., the information content of dividends hypothesis). Since earnings are known to have been

more variable before World War II, it is important to study both this period as well as the more recent period to understand possible sources for the rejection of this hypothesis in these studies, most of which focus on very recent data (e.g., the past twenty years).

Our formal models start with our tests of the information content of dividends hypothesis using the Lintner (1956) model. The Lintner model has been widely used in the empirical literature to explain the proposed relationship between dividend changes and earnings (e.g., Lintner (1956), Fama and Babiak (1968), and Watts (1973)). The Lintner model is based on the idea that the firm's desired dividend in period t, D_t^*, is equal to the target payout ratio, k, times the earnings for this period, E_t; that is, $D_t^* = kE_t$. In addition, the model assumes that this period's dividends, D_t, do not fully adjust to this desired level immediately. This leads to the original Lintner model:

$$D_t - D_{t-1} = a + ckE_t - cD_{t-1} + e_t \qquad (1)$$

where D_t is the dividend per share in year t, E_t is the earnings per share in that year, and D_{t-1} is the dividend per share in the previous year. According to Lintner, a firm adjusts its dividend based on a target payout rate, k, and an adjustment factor, c. Firms decide on a long-run payout ratio, then as earnings increase over time, dividend payments should likewise increase. If firms are making their dividend decisions conservatively, there is only a partial adjustment to dividends as earnings increase. To empirically estimate this process, we use the following model[1]:

$$(D_t - D_{t-1}) = a_0 + a_1E_t + a_2D_{t-1} + u_t \qquad (1')$$

The estimated coefficients can be used to estimate the payout ratios and the speed of adjustment of dividends to changes in earnings. If firms make dividend decisions conservatively so there is only a partial adjustment of dividends to changes in earnings, we will see this in our estimated coefficient, a_2, which represents the "speed of adjustment." This coefficient will be larger (i.e., more negative) if the changes in current earnings are more

[1] Fama and Babiak (1968) and many subsequent papers have estimated similar models, but they have excluded the intercept term. Because the standard Lintner model includes an intercept term, we include it. The main argument provided for excluding the intercept is that it improves the fit of the model under certain circumstances. Although we estimate the model both including and suppressing the intercept, the results are relatively unaffected by the choice so we only present the results using the standard Lintner model with the intercept.

sustainable (i.e., better reflect managers' estimates of their firms' long-run sustainable earnings) and thus are more rapidly incorporated into dividends. Further we can "back-out" the implied payout ratio using $-a_1/a_2$ (see Fama and Babiak (1968)).

Recognizing that this process would result in dividends being much smoother than the underlying earnings, we follow Watts (1973) by investigating the value of information contained in changes in dividends:

$$E_t - E_{t-1} = \beta_0 + \beta_1 D_{t-1} + \beta_2 D_{t-2} + \varepsilon_t \qquad (2)$$

This model allows us to determine the value of changes in dividends for predicting sustainable changes in earnings.

Unexpected changes in dividends may also contain valuable information on future earnings, so we use the residuals from the estimation of equation (1'), u_t, to investigate whether *dividend* surprises help predict future *earnings* changes:

$$E_t - E_{t-1} = \beta_0 + \beta_1 (D_{t-1} - D_{t-2}) + \beta_2 \hat{u}_{t-1} + \beta_3 \hat{u}_{t-2} + \varepsilon_t \qquad (2')$$

Since u_t is the unexpected change in dividends for year t given earnings in year t, this model helps us test whether u_t contains information that helps predict subsequent changes in earnings. Managers may be willing to unexpectedly increase dividends if they believe future earnings will be stronger than current earnings and sustainable.

We also investigate whether dividend surprises help to predict future changes in dividends by utilizing the following equation:

$$D_t - D_{t-1} = \beta_0 + \beta_1 \hat{u}_{t-1} + \beta_2 \hat{u}_{t-2} + \varepsilon_t \qquad (2'')$$

All else equal we might anticipate unexpected changes in dividends to provide significant information about both changes in long-run sustainable earnings and future changes in dividends. In models (2') and (2'') we include two lags of the fitted residuals, since it may be that dividends provide information about aggregate earnings or dividends more than one period ahead.

Building on the work of Brav et al. (2003), we investigate whether it appears that managers are more concerned about a constant growth in dividends since the end of World War II and thus subsequent to the

seminal work of Lintner (1956). Consequently we consider a model focusing on the impact of past changes in dividends on current dividend growth (or current changes in the dividend value), thus we are investigating whether dividend policy focuses on maintaining a consistent growth rate:

$$D_t - D_{t-1} = \beta_0 + \beta_1(D_{t-1} - D_{t-2}) + \beta_2(D_{t-2} - D_{t-3}) + \varepsilon_t \qquad (2''')$$

Considering recent accounting-related scandals and the changes in the definition of earnings and accounting rules over our sample period, we also consider a model which is less dependent on reported earnings. The specification we consider is in the spirit of the models presented in Marsh and Merton (1987). It uses lagged stock returns to proxy for changes in investors' expectations of firms' permanent earnings. This model assumes that markets are efficient and price changes will reflect how investors interpret the future prospects of the firm and thus how dividends should change in recognition of the expected changes in future earnings:

$$D_t - D_{t-1} = \alpha_0 + \alpha_1(P_{t-1} - P_{t-2}) + \alpha_2(P_{t-2} - P_{t-3}) + \varepsilon_t \qquad (3)$$

This model uses the adjusted share price, P_t. All else equal we might expect increases in the price of equity for a firm to indicate an increase in investors' beliefs regarding the outlook for the firm and thus an increase in the expectation that dividends will be larger in the future. We also extend this model to more explicitly investigate whether or not the changes in prices provide information on the expected changes in earnings. This is based on the belief that prices should signal changes in the firm's ability to pay dividends and thus its future earnings. As a result we also consider the following model:

$$E_t - E_{t-1} = \alpha_0 + \alpha_1(P_{t-1} - P_{t-2}) + \alpha_2(P_{t-2} - P_{t-3}) + \varepsilon_t \qquad (3')$$

The final test we perform is based on the work of researchers such as Baker and Wurgler (2004a and 2004b). This model is designed to investigate if changes in the way investors value capital gains versus dividends influences the dividend payment behavior of firms. For example, in periods during which investors are valuing Bank of Montreal using a lower market-to-book ratio (i.e., the firm is being valued more as a value stock) are dividends valued differently and thus does the bank follow a different dividend payout policy from times when the ratio is higher (i.e., the firm is being valued more as a growth stock). We accomplish this by considering the following model:

$$D_t - D_{t-1} = \beta_0 + \beta_1(V_{t-1} - V_{t-2}) + \beta_2(V_{t-2} - V_{t-3}) + \varepsilon_t \quad (4)$$

where V_t is the market-to-book ratio and changes in this value are used to proxy for changes in how investors are valuing dividend paying firms.

4. Data

For Bank of Montreal we collected data on the stock price, dividends, earnings and other accounting related information from the Financial Post Investor Suite's Historical Corporate Reports, and its predecessor, the hard-copy Financial Post Cards. For our price series, due to data availability in the early part of our sample, we take an average of the annual high and low prices (since this is how prices were reported in our data sources). Even though dividend, earnings and other accounting based data are available from the Financial Post sources, where possible we rely on the actual annual reports which we have available (with a few gaps) from 1904. These data were supplemented by sources such as the report produced for the bank's centenary (Bank of Montreal (1917)) and copies of the *Globe* and *Montreal Gazette* newspapers extending back to the early to mid-1800s.

While the notion of a payout ratio is conceptually straightforward, measuring the portion of earnings paid out as dividends in practice is not quite so simple. Dividends, as a cash item, are easy to measure and are reported consistently throughout our sample; however, the notion of earnings has changed considerably over the past century. For example, prior to 1916, Bank of Montreal, like other firms, did not pay any taxes. During and shortly after World War I, a "War Tax" was imposed based on bank note circulation. In 1923, a corporate federal income tax (to the "Dominion Government") was imposed. In 1934, provincial taxes were also imposed. We have defined earnings on an after-tax basis over our sample. Another issue worth noting relates to depreciation. Bank of Montreal's 1913 annual report contains the first mention of depreciation, initially referred to as "provisions for bank premises." It appears that depreciation, in the early years, was very much a discretionary accounting item. We also define earnings after any information provided related to depreciation. Beginning in 1973, Bank of Montreal first started explicitly reporting an appropriation for loan losses, in

accordance with changes in regulations. We estimate earnings after such appropriations.[2] In terms of stock prices, and per share dividends, we have adjusted the data for a 10-for-1 split in 1944, a 5-for-1 split in 1967, and 2-for-1 splits in 1993 and 2001.

5. Results

5.1 Preliminary Analysis

We begin our analysis with Table 1 which contains the complete annual dividend history for Bank of Montreal from its founding in 1817 to 2003.[3] The series has two different fiscal year-ends (April 30 prior to 1904 and October 31 after that date) and presents total dividends both unadjusted and adjusted for stock splits. The bank consistently paid dividends to its shareholders and, in fact, it only had two years during which it did not pay dividends – 1827 and 1828. This suggests that, as discussed in Lintner (1956) and Brav et al. (2003), managers are very hesitant to decrease regular dividend payments. The increased variability in dividend payments before World War II that has been documented in other studies is clearly evident in our data as well. In the period between 1817 and 1944 there were many dividend changes (both up and down) generally precipitated by changes in economic conditions and thus bank profits. Since World War II the only dividend decline was in 1952, but that was because the special dividend was not paid – there was no change in the regular dividend.

Table 1 also allows us to observe the frequent use of "special" dividends by the bank until 1971 (DeAngelo, DeAngelo and Skinner (2000) provide evidence that special dividends appear to have virtually ceased in the U.S. in the early 1970s). The advantage of special dividends is that they do not entail future

[2] There were two outlier years related to earnings. In 1987, Bank of Montreal reported net earnings of $550 million before "special provisions for losses on transborder claims" of $765 million so we use the "before special provisions earnings" (in every other year in our sample the bank reported profits rather than losses). In 1989, we use "net income before country risk provision" of $441 million; increased loan loss provisions in that year reduced the earnings after tax to $51 million.

[3] Although focusing on a single firm such as the Bank of Montreal allows us to ensure we have all of the important financial data over as long a period as possible, it comes at a potential cost – our conclusions may be firm specific and subject to a possible survivorship bias. To address these issues, we compare the dividend behavior of the Bank of Montreal to that of all other Canadian banks for which data are available from 1902 to 1955. We were able to obtain information on 23 of the 37 banks (data on some of the smaller banks were not available). Based on t-tests, we are unable to reject the null hypothesis of no difference between the dividend policies of these banks.

obligations so they can be used in cases where a firm's ability to make future payments is unclear. For Bank of Montreal the special dividend was typically paid as a December "bonus." It is interesting to note that special dividends were paid as early as 1832. The function of special dividends is clear in many periods such as the 1870s. During this time, there was significant uncertainty in Canada due to events in the U.S. and England in the late 1860s and early 1870s. As a result the bank was uncertain about its ability to continue to increase its dividend. Special dividends allowed the bank to share some of its profits with its shareholders but not commit to continuing payments at this level. In fact, in 1875 when the regular dividend was changed, only part of the special dividend was turned into a regular dividend. It appears that special dividends were frequently used as a precursor to an increase in the regular dividend, especially in the period following World War II.

Figure 1 presents the level of dividends per share and earnings per share (both adjusted for splits) over the period from 1867 to 2003. The series move closely together with earnings appearing to be more volatile and leading dividends. These series demonstrate a very clear break in the pattern of earnings and dividends per share following the end of World War II. Before World War II changes in dividends were more common and in both directions whereas after World War II dividend policy appeared to become increasingly smooth and conservative – evidenced by the gradual widening of the gap between dividends and earnings per share. This change suggests that considering individual firms for as long a period as possible before World War II may provide added insight into the fundamental information content of dividends.

To more formally characterize our data series, we present summary statistics and tests in Table 2. Each row presents the means and standard deviations for changes in dividends, changes in earnings, dividend payouts, dividend yields, capital gains, total returns, price-earnings ratios and book-to-market ratios, respectively. The columns present the values over different sub-periods. To see how these values change over time we consider the period from 1885-2003 (based on the limits to availability of data on share prices). We next consider each of the three sub-periods: 1885-1913, 1914-1945 and 1946-2003. The final portion of the table presents p-values for tests of equality of the values across adjacent sub-periods (e.g., the values in 1885-1913 being equal to those in the sub-period from 1914-1945).

Examining the mean annual changes in dividends over our sample periods we find that the annual growth rate has been about 2.55% since 1818 and about 2.76% since 1885. We find that there is only a small growth in dividends over period one (1885-1913); there is actually a negative growth in period two (1914-1945) but there is a much higher growth in dividends in period three (1946-2003). The differences between periods one and two are marginally significant (at a 10% level) but very significant between periods two and three. The volatility of dividends is not significantly different across sub-periods though it does appear to increase slightly over time.

Figure 2a presents the annual changes in dividends over our sample. The dividends demonstrate large variability from the beginning of the sample until 1890 (around the beginning of our first sub-period). From 1890 until the end of World War II, the dividends only rarely change with most of the changes being concentrated in the period around the Great Depression and World War II. In the final sub-period the changes are small but frequent – virtually all being gradual increases in the dividends rather than the much larger changes in both directions present in the first sub-period. Table 2 quantifies this and shows that earnings generally grew at a slightly faster rate than dividends and we find a much higher standard deviation for earnings than dividends. Coupled with the lower changes in dividends than in earnings, these findings suggest a reluctance of managers to change dividends in response to changes in earnings; in other words, a stickiness in dividend policy. Comparing Figures 2a and 2b (which both have the same scale) we see this clearly: the changes in the dividends are much smaller but coincide with changes in earnings before 1900; post-World War II the changes in dividends are smaller and more frequent but no longer appear to follow the changes in earnings.

Table 2 shows the dividend payout ratios are high in both periods one and two but significantly lower in period three. Figure 3 more clearly illustrates the significant drop in the Bank's dividend payout ratios in the early 1970s. Until 1974 (inclusive), the payout ratio appears to oscillate around the 80% range, but in the post-1974 period, the average payout appears to oscillate around the 40% range. A t-test rejects the null hypothesis of the equivalence of the means between these two samples (the p-value is less than 0.001). The relationships between dividend payouts and other factors are considered more formally in our analysis below.

Table 2 also provides information from an investor's perspective. The dividend yields for Bank of Montreal are relatively stable over the entire period. Overall, over half of Bank of Montreal's total return is attributable to the dividend yield. Capital gains are lower over the first two periods because Bank of Montreal share price shows little change in the 1914-1945 period, all of the return to shareholders comes in the form of dividends. As such, the stock performed much like a bond over the period. In the more recent 1946-2003 period, capital gains dominate the total returns (63%). These results suggest that, more recently, either investors value capital gains more than dividends or Bank of Montreal is more actively pursuing growth strategies and is therefore re-investing more funds as opposed to paying them out to shareholders in the form of dividends. These results suggest that there are definite trends in the dividend payout policies over time.

The increasing importance of capital gains since World War II can be seen in Figure 4. Here we see that the observed stock price is stable until about 1945 after which it increases at a faster rate than the level of dividends.

5.2 Regression Analysis

To more formally study how the nature of Bank of Montreal's dividend payments has changed over time, we estimate the models discussed in section three. These models allow us to test several hypotheses regarding how and why firms pay dividends. By estimating these models over our entire period as well as different sub-periods, we can see how these behaviors may have changed over time. The first tests are based on the Lintner model in equation (1'). The results are presented in Table 3. For the overall sample period, 1871 to 2003, we find that the estimated coefficients have the predicted signs (a_1 and a_2 are significantly positive and negative, respectively) and the adjusted R-squared of 69% indicates this model performs well at explaining the variability of dividend changes. This model suggests that changes in dividends gradually adjust to changes in earnings. Over the full period, we calculate the implied (target) payout ratio and find that it is 0.510. This is lower than the actual payout of 0.736. To better understand this relationship between dividends and earnings we study the estimated coefficients over our sub-periods. In period one we find a reasonable fit for the model – the estimated coefficients have the required signs, and the implied payout is very similar to the actual payout ratio

(0.852 versus 0.874). For period two, the implied payout ratio is close to one, but the adjusted R-square value is much lower than in the other sub-periods. Given the sustained level of dividends for Bank of Montreal during the Great Depression despite the changes in earnings, this result is not surprising. Finally in period three we find a decrease in both the implied and actual payouts with the implied being lower than the actual payout ratio. This difference between the implied and actual payout ratios in the final sub-period is consistent with a change in dividend payout policy after World War II to one that is no longer as sensitive to changes in earnings.

Examining the estimated values for a_1, these results suggest that there is a decreasing "speed of adjustment" over time, especially in period three. The changes in dividend payouts by firms "in response" to changes in earnings is much lower in the later sub-periods than it was in the earlier sub-periods. This is consistent with the findings that dividends and dividend growth rates have become more stable since World War II and with the anecdotal evidence from the early years of Bank of Montreal which describe how sensitive its dividend policy was to changes in earnings.

Because it is possible that *unexpected* changes in dividends convey the most important information to the market, we follow Watts (1973) by estimating equation (2') to investigate whether dividend surprises help predict future earnings changes. The results in Table 4 provide mixed support for dividend shocks being informative about future earnings changes. As expected the coefficient on the lagged dividend changes (β_1) is positive and statistically significant. The estimated coefficients on the dividend shocks (β_2 and β_3) demonstrate little predictive ability for the dividend shocks from the previous period (β_2) but weakly significant evidence from the period prior to that (β_3). For our sub-periods we only find evidence of predictive ability for dividend shocks (the β_2 and β_3 coefficients) in period two and this evidence is relatively weak. Unexpected dividend changes provide only limited information about future earnings in the overall period and even less in the sub-periods. Consequently the only relationship uncovered is between earnings and lagged dividends. Examining the estimated coefficient for the intercept, β_0, we find that it is not significant in the overall period and the first sub-period but it is negative in the second and positive in the third sub-period. These results illustrate the volatility of earnings in the first sub-period, the difficult times in the second sub-period and the consistent

growth since the end of World War II. The estimated coefficient for the impact of lagged dividends on earnings, β_1, is greater than zero and suggests that changes in dividends provide useful information about future, sustainable changes in earnings.

In Table 5 we investigate how unexpected changes in dividends influence current dividends, based on model 2''. Although we do not find any significant relationships in the overall period, we do find significant results in sub-period one. In the pre-World War I period, we find that an unexpected change in dividends last period leads to a reversal in the current dividend. This is consistent with the large volatility in dividends and the strong relationship between changes in dividends and changes in earnings at this time. It also demonstrates that this connection between dividends and earnings has been weakening over time. The increasing significance of the intercept, β_0, suggests that there has been a change toward dividend policies which persistently increase dividends over our sample.

To more formally investigate our hypothesis that managers have adopted the strategy of maintaining a consistent dividend growth rate since World War II, we estimate model 2'''. The results from this estimation are presented in Table 6. The estimated value of β_0 is positive (although not significant) so we see a steady increase in dividends over the entire period. The estimated coefficients on β_1 and β_2 are significantly positive suggesting a persistence in the growth rate over time. Because the estimated coefficients are increasing in magnitude and significance over sub-periods, these results suggest an increasing persistence in the growth rate of dividends over time. The results are mainly because of a steady increase in the level and persistence of the growth rate of dividends since World War II. Although generally not statistically significant, the estimated coefficients on the persistence of dividend growth on the current dividend growth rate (β_1 and β_2)are increasing over sub-periods – going from the first sub-period (before World War I), to the final sub-period (post World War II). These results confirm our belief that firms have become increasingly focused on a consistent growth rate in dividends since World War II.

Since it is possible that reported earnings do not accurately capture the true level of the underlying earnings or the income generating ability of the firm's assets, we estimate a model similar to that of Marsh and

Merton (1987). This model, in equation (3), uses lagged stock returns to proxy for investors' expectations of the firms' permanent earnings, thus as the firm's stock price increases, we would expect this to indicate improving conditions for the firm and thus an increasing ability to pay dividends as well. The results from the estimation of this model are presented in Table 7. Over the entire period and all the sub-periods except the first sub-period, our results provide some support for this model. The results of this regression display more sub-period variation than the Lintner model estimates and suggest significant changes in the relationship between dividend policy and prices over time. Specifically the results suggest a stronger connection between dividend changes and prices later in the sample. This could be related to the Bank's equity behaving like a bond early in the sample and capital gains becoming more important later in the sample. The Durbin-Watson values being below two provide evidence that there is a positive serial correlation in the errors and thus that the dividend policy is sticky, especially in the final sub-period.

We extend model 3 to consider the ability of changes in prices to provide information on the changes in earnings (model 3'). The results presented in Table 8 demonstrate some interesting relationships between prices and changes in earnings. To understand the results in this table, we consider the results across different sub-periods. In the first sub-period we find no significant relationships between prices and earnings. This is not surprising as equity was viewed as being more bond-like with less of a focus on capital gains in the period before World War II (e.g., Arnott and Bernstein (2002)). There is, however, a weakly positive relationship between prices and earnings with changes in prices preceding changes in earnings. The estimated intercept is not statistically significant in either case. It is, however, interesting to note that this relationship has changed using the data from the most recent period. Since the end of World War II increases in recent prices appear to have an inverse relationship to earnings changes. There are several possible explanations for this result, but the fact that this finding is concentrated in the period after 1980 suggests that part of this relationship is due to the increased interest in capital gains and de-linking of dividends and earnings over this period. In fact, excluding the period from 1980 onward, the results are statistically insignificant suggesting that there is little relationship between earnings and prices over this period. The previous results suggest that prices and dividends are linked

in this period, so this is consistent with our finding little relationship between dividends and earnings over this period.

The final analysis we conduct is designed to investigate the hypothesis that changes in dividend policy may be related to changes in how investors value dividends. The results from the estimation of model (4) are presented in Table 9. Overall, the results show that the dividends increase following increases in the market-to-book ratio (the estimated coefficients on α_1 and α_2 are significantly positive). This suggests that the market recognizes the improving financial condition of the firm by increasing the share price and thus the market-to-book ratio in advance of the firm performing well and thus being able to increase its dividend. Consequently, we do not find that Bank of Montreal relies solely on an increasing share price (i.e., capital gains) to provide returns to its shareholders. Bank of Montreal appears to use the increasing growth prospects as an opportunity to increase dividends.

Across sub-periods, we see that the results differ between the first sub-period and the second and third sub-periods. In the first period, the estimated coefficient on β_2 is negative. This means that the market-to-book ratio decreases (increases) before dividends increase (decrease). This suggests that investors either receive their returns from an increasing share price (i.e., capital gains) or from dividends, but not from both as an increase (decrease) in the share price is followed by a decrease (increase) in the dividend payout. In the second and third periods, however, we see a role for both capital gains and dividends. The estimated coefficient β_2 is significantly positive and therefore we see that dividends increase following increases in the share price and thus in the market-to-book ratio. Despite the persistent growth in dividends following World War II (the intercept is very statistically significant), we still find a positive relationship between changes in how the firm is valued and dividends thus the growth rate in dividends continues to reflect the growth prospects implied by the increasing market-to-book ratio as well as a constant growth rate. As a consequence, our proxy for how investors value capital gains does not support the hypothesis that management focuses on either capital gains or dividends for companies such as Bank of Montreal. This is consistent with DeAngelo, DeAngelo and Skinner (2004) who find that the large dividend paying stocks continue to do so during the 1980s and 1990s.

5 Conclusions

The results from our analysis indicate that annual dividend and earnings changes move together and they are more variable in the early periods and more stable in the subsequent periods with the dividend payout ratio decreasing since World War II. A large portion of the total return is in the form of dividends but proportionately more so in the earlier part of the sample. Our results show that the Bank of Montreal has become more concerned about maintaining a specific level of dividends rather than a specific dividend payout ratio, especially since the end of World War II. We find weak evidence that information regarding future earnings is transmitted by dividends, as well as evidence of a relationship between prices and future dividends. This finding is relatively stable over time, although we do find evidence that dividends pre-World War II conveyed more information.

From a firm's perspective, managers need to recognize the extent to which investors rely on dividends and expect to receive them in the future. While the last half-century has been a period of extensive stock price appreciation, a large portion of total returns, for Bank of Montreal has come from dividends. If we are about to enter (as many envision) a sustained and much lower capital gain period, similar to those both in the pre-World War I period and the "between World Wars" period, investors may reward firms that are able to deliver on the dividend front.

References

Aharony, Joseph and Itzhak Swary, 1980, "Quarterly Dividend And Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *Journal of Finance 35* (1), 1-12.

Allen, Franklin, and Roni Michaely, 2002, "Payout Policy" North-Holland Handbook of Economics edited by George Constantinides, Milton Harris, and Rene Stulz; North-Holland.

Asquith, Paul and David W. Mullins, Jr., 1983, "The Impact Of Initiating Dividend Payments On Shareholders' Wealth," *Journal of Business, 56* (1), 77-96.

Baker, Malcolm and Jeffrey Wurgler, 2004a, "A Catering Theory of Dividends," *Journal of Finance* 59, 271-288.

Baker, Malcolm and Jeffrey Wurgler, 2004b, "Appearing and Disappearing Dividends: The Link to Catering Incentives," *Journal of Financial Economics*, forthcoming.

Bank of Montreal, 1917, "The Centenary of the Bank of Montreal: 1817-1917", The Herald Press and Advertising Agency.

Benartzi, S., R. Michaely and R. Thaler, 1997, "Do changes in dividends signal the future or the past*?", Journal of Finance* 52, 1007-1034.

Bhattacharya, S., 1979, "Imperfect Information, dividend policy and the bird in the hand fallacy", *Bell Journal of Economics* 10, 259-270.

Brav, Alon John R. Graham, Campbell R. Harvey, and Roni Michaely, 2003, "Payout policy in the 21st century", Working Paper Duke University.

Brealey, Richard and Stuart Myers, 2003, Principles of Corporate Finance, McGraw-Hill Irwin.

DeAngelo, Harry, Linda DeAngelo, and Douglas Skinner, 2000, "Special dividends and the evolution of dividend signaling," *Journal of Financial Economics, 57*, 309 -354.

DeAngelo, H., L. DeAngelo and D. Skinner, 2004, "Are Dividends Disappearing? Dividend Concentration and the Consolidation of Earnings" *Journal of Financial Economics 72*, 425-456.

Fama, Eugene and Harvey Babiak, 1968, "Dividend Policy: An Empirical Analysis", *Journal of the American Statistical Association* 63, 1132-1161.

Fama, Eugene, and Kenneth French, 2001, "Disappearing dividends: Changing firm characteristics or lower propensity to pay?", *Journal of Financial Economics* 60, 3-43.

Friend, Irwin and Marshall Puckett, 1964, "Dividends and Stock Prices", *American Economic Review* 44, 656-682.

Grullon, G., R. Michaely and B. Swaminathan, 2002, "Are dividend changes a sign of firm maturity?", *Journal of Business* 75, 387-425.

Jensen, Michael C. and William H. Meckling, 1976, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, 3 (4), 305-360.

John, Kose and Joseph Williams, 1985, “Dividends, Dilution, and Taxes: A Signaling Equilibrium,” *Journal of Finance* 40 (4), 1053-1070.

Lintner, J., 1956, “Distribution of Incomes or corporations among dividends, retained earnings and taxes”, *American Economic Review* 46, 97-113.

Marsh; T and R. Merton, 1987, “Dividend Behavior for the Aggregate Stock Market”, *Journal of Business* 60, 1-40.

Michaely, Roni, Richard H. Thaler and Kent Womack, 1995, “Price Reactions to Dividend Initiations and Omissions: Overreaction or Drift?,” *Journal of Finance* 50, 573-608.

Miller, Merton, 1977, "Debt and Taxes", *Journal of Finance* 32, 261-275.

Miller, M. and F. Modigliani, 1961, “Dividend policy, growth and the valuation of shares”, *Journal of Business* 34, 411-433.

Miller, M. and K. Rock, 1985, “Dividend policy under asymmetric information”, *Journal of Finance* 40, 1031-1051.

Modigliani, Franco, and Merton Miller, 1958, “The cost of capital, corporate finance and the theory of investment”, *American Economic Review* 48, No. 3, 261 -297.

Modigliani, Franco, and Merton Miller, 1959, “The cost of capital, corporate finance and the theory of investment: a reply”, *American Economic Review* 49, 655-669.

Watts, Ross, 1973, “The Information Content of Dividends, *Journal of Business* 46, 191-211.

Table 1
Bank of Montreal Dividend History (initial dividend is based on $100 stock price)

Fisc. Year-end	Regular Div.	Special Div.	Total Div.	Adj. Div.	Fisc. Year-end	Regular Div.	Special Div.	Total Div.	Adj. Div.
1818	3.00		3.00	3.00	1942	7.50		7.50	7.50
1819	8.00		8.00	8.00	1943	6.00		6.00	6.00
1820	6.50		6.50	6.50	1944	6.00		6.00	6.00
1821-1825	6.00		6.00	6.00	1945	0.60*		0.60*	6.00
1826	3.00		3.00	3.00	1946	0.80	0.15	0.95	9.50
1827-1828	0.00		0.00	0.00	1947-1949	0.80	0.20	1.00	10.00
1829	2.50		2.50	2.50	1950	1.00		1.00	10.00
1830-1831	6.00		6.00	6.00	1951	1.00	0.20	1.20	12.00
1832	7.00	5.00	12.00	12.00	1952	1.00		1.00	10.00
1833-1835	8.00	6.00	14.00	14.00	1953-1954	1.20	0.20	1.40	14.00
1836	8.00	4.00	12.00	12.00	1955	1.25	0.20	1.45	14.50
1837	8.00	16.00	24.00	24.00	1956-1957	1.40	0.20	1.60	16.00
1838	6.00		6.00	6.00	1958	1.45	0.20	1.65	16.50
1839	7.00		7.00	7.00	1959	1.60	0.20	1.80	18.00
1840-1841	6.00		6.00	6.00	1960	1.65	0.25	1.90	19.00
1842-1843	7.00		7.00	7.00	1961	1.80	0.25	2.05	20.50
1844	6.00		6.00	6.00	1962	1.80	0.30	2.10	21.00
1845	7.00		7.00	7.00	1963	1.90	0.25	2.15	21.50
1846-1847	7.50		7.50	7.50	1964	2.10	0.10	2.20	22.00
1848	7.00		7.00	7.00	1965	2.13	0.15	2.28	22.75
1849-1851	6.00		6.00	6.00	1966	2.25	0.13	2.38	23.75
1852	6.50		6.50	6.50	1967	0.48*	0.04*	0.52*	26.00
1853-1854	7.00		7.00	7.00	1968	0.56	0.02	0.58	29.00
1855	7.50		7.50	7.50	1969	0.67	0.03	0.70	35.00
1856-1857	8.00		8.00	8.00	1970	0.72	0.03	0.75	37.50
1858	7.00		7.00	7.00	1971	0.75	0.02	0.77	38.50
1859-1866	8.00		8.00	8.00	1972	0.84		0.84	42.00
1867-1868	10.00		10.00	10.00	1973	0.90		0.90	45.00
1869	11.00		11.00	11.00	1974-1975	0.96		0.96	48.00
1870	12.00		12.00	12.00	1976	0.98		0.98	49.00
1971-1874	12.00	4.00	16.00	16.00	1977	1.02		1.02	50.75
1875-1876	14.00		14.00	14.00	1978	1.09		1.09	54.50
1877	13.00		13.00	13.00	1979	1.32		1.32	66.00
1878	12.00		12.00	12.00	1980	1.54		1.54	77.00
1879	10.00		10.00	10.00	1981	1.80		1.80	90.00
1880	9.00		9.00	9.00	1982-1986	1.96		1.96	98.00
1881	8.00	2.00	10.00	10.00	1987-1988	2.00		2.00	100.00
1882	9.00	1.00	10.00	10.00	1989-1992	2.12		2.12	106.00
1883-1884	10.00		10.00	10.00	1993	1.12*		1.12*	112.00
1885-1886	10.00	1.00	11.00	11.00	1994	1.20		1.20	120.00
1887	10.00	2.00	12.00	12.00	1995	1.32		1.32	132.00
1888-1911	10.00		10.00	10.00	1996	1.48		1.48	148.00
1912-1918	10.00	2.00	12.00	12.00	1997	1.64		1.64	164.00
1919	12.00		12.00	12.00	1998	1.76		1.76	176.00
1920-1930	12.00	2.00	14.00	14.00	1999	1.88		1.88	188.00
1931	12.00		12.00	12.00	2000	1.00*		1.00*	200.00
1932	11.00		11.00	11.00	2001	1.12		1.12	224.00
1933	8.50		8.50	8.50	2002	1.20		1.20	240.00
1934-1941	8.00		8.00	8.00	2003	1.34		1.34	268.00

* indicates year with stock splits: 1945: 10 for 1, 1967: 5 for 1, 1993: 2 for 1, and 2000: 2 for 1

Table 2
Summary Statistics

Means (and standard deviations below) for annual dividends, earnings, returns, and valuation measures. Annual dividend, earning, and price changes are based on logarithmic changes. Mean differences are t-tests; standard deviation differences are F-tests. Period one is 1885-1913, period two is 1914-1945, and period three is 1946-2003.

	Overall	Subperiods			Tests (p-values)	
	1885-2003	1885-1913	1914-1945	1946-2003	1 vs 2	2 vs 3
change in dividends	2.76%	0.63%	-2.17%	6.55%	0.0923	0.0000
	8.54%	*5.41%*	*7.28%*	*8.79%*	0.1168	0.2557
change in earnings	3.46%	0.43%	-1.58%	7.76%	0.5181	0.0004
	14.76%	*14.90%*	*7.62%*	*16.52%*	0.0004	0.0000
dividend payout	73.65%	87.40%	90.84%	57.29%	0.2521	0.0000
	22.39%	*13.71%*	*8.54%*	*19.27%*	0.0114	0.0000
dividend yield	4.59%	4.34%	4.83%	4.59%	0.0141	0.3665
	1.18%	*0.46%*	*0.95%*	*1.49%*	0.0002	0.0086
capital gain	3.22%	0.64%	-0.65%	6.60%	0.5227	0.0081
	12.16%	*3.85%*	*10.52%*	*14.60%*	0.0000	0.0508
total return	7.78%	4.93%	4.16%	11.15%	0.6979	0.0089
	11.85%	*3.86%*	*10.33%*	*14.16%*	0.0000	0.0594
price/earnings ratio	17.09	20.21	19.54	14.18	0.4423	0.0000
	6.22	*2.89*	*3.86*	*7.14*	0.1271	0.0004
market-to-book ratio	1.32	1.44	1.07	1.40	0.0000	0.0000
	0.32	*0.14*	*0.26*	*0.35*	0.0021	0.0698

Table 3
Bank of Montreal Lintner Model Regressions

The regression is from equation (1'): $D_t - D_{t-1} = a_0 + a_1E_t + a_2D_{t-1} + u_t$ where D_t is the dividend at time t and E_t is the earnings at time t. Regression coefficients (and t-statistics in parentheses) are presented. The implied payout ratio is estimated as $-a_1/a_2$. "Adj R^2" is the adjusted R-square; DW is the Durbin Watson statistic.

Period	a_0	a_1	a_2	Adj R^2	DW	implied payout	actual payout
1871-2003	0.905	0.073	-0.143	0.693	1.885	0.510	0.736
	(2.41)	(7.81)	(-4.93)				
1871-1913	0.049	0.236	-0.277	0.508	2.101	0.852	0.874
	(0.08)	(6.53)	(-4.81)				
1914-1945	-0.352	0266	-0.274	0.244	1.733	0.971	0.908
	(-0.75)	(3.45)	(-2.96)				
1946-2003	1.836	0.076	-0157	0.628	1.932	0.484	0.573
	(1.90)	(5.23)	(-3.42)				

Table 4
Bank of Montreal Regressions Testing the Impact of Dividend Changes on Future Earnings Changes

The regression is from equation (2'): $E_t - E_{t-1} = \beta_0 + \beta_1(D_{t-1} - D_{t-2}) + \beta_2\hat{u}_{t-1} + \beta_3\hat{u}_{t-2} + \varepsilon_t$ where D_t is the dividend at time t and E_t is the earnings at time t. $\hat{u}_{t-1}$ and $\hat{u}_{t-2}$ are from regression equation (13') Regression coefficients (and t-statistics in parentheses) are presented. "Adj R^2" is the adjusted R-square; DW is the Durbin Watson statistic.

Period	β_0	β_1	β_2	β_3	Adj R^2	DW
1871-2003	1.878	1.930	0.651	1.605	0.153	2.555
	(0.78)	(4.37)	(0.80)	(1.95)		
1871-1913	0.014	1.205	0.860	0.362	0.109	2.467
	(0.04)	(2.71)	(1.43)	(0.74)		
1914-1945	-0.274	0.336	0.331	0.285	0.222	1.068
	(-2.09)	(2.08)	(1.71)	(1.48)		
1946-2003	5.418	1.735	0.882	1.851	0.083	2.531
	(0.79)	(2.14)	(0.65)	(1.35)		

Table 5

Bank of Montreal Regressions Testing the Impact of Unexpected Dividend Changes on Future Dividend Changes

The regression is from equation (2''): $D_t - D_{t-1} = \beta_0 + \beta_1 \hat{u}_{t-1} + \beta_2 \hat{u}_{t-2} + \varepsilon_t$ where D_t is the dividend at time t and $\hat{u}_t$ is the unexpected change in dividends obtained from equation 1 at time t. Regression coefficients (and t-statistics in parentheses) are presented. "Adj R^2" is the adjusted R-square; DW is the Durbin Watson statistic.

Period	β_0	β_1	β_2	Adj R^2	DW
1871-2003	1.98	-0.02	0.03	0.00	0.65
	(4.28)	(-0.13)	(0.18)		
1871-1913	-0.04	-0.61	-0.22	0.32	1.04
	(-0.34)	(-3.21)	(-1.05)		
1914-1945	-0.20	-0.05	0.09	0.00	1.46
	(-1.40)	(-0.23)	(0.39)		
1946-2003	4.17	-0.07	0.01	0.00	0.74
	(4.74)	(-0.30)	(0.05)		

Table 6

Bank of Montreal Regressions Testing the Impact of Dividend Changes on Future Dividend Changes

The regression is from equation (2'''): $D_t - D_{t-1} = \beta_0 + \beta_1(D_{t-1} - D_{t-2}) + \beta_2(D_{t-2} - D_{t-3}) + \varepsilon_t$ where D_t is the dividend at time t. Regression coefficients (and t-statistics in parentheses) are presented. "Adj R^2" is the adjusted R-square; DW is the Durbin Watson statistic.

Period	β_0	β_1	β_2	Adj R^2	DW
1871-2003	0.46	0.46	0.33	0.47	1.91
	(1.47)	(5.03)	(3.05)		
1871-1913	0.02	0.13	0.20	0.01	2.00
	(0.13)	(0.84)	(1.21)		
1914-1945	-0.13	0.16	0.22	0.05	1.90
	(-1.01)	(0.89)	(1.42)		
1946-2003	1.40	0.44	0.28	0.36	
	(1.72)	(3.03)	(1.63)		

Table 7

Bank of Montreal Regressions Testing the Impact of Price Changes on Future Dividend Changes

The regression is from equation (3): $D_t - D_{t-1} = \alpha_0 + \alpha_1(P_{t-1} - P_{t-2}) + \alpha_2(P_{t-2} - P_{t-3}) + \varepsilon_t$ where D_t is the dividend at time t and P_t is the stock price at time t. Regression coefficients (and t-statistics in parentheses) are presented. "Adj R^2" is the adjusted R-square; DW is the Durbin Watson statistic.

Period	α_0	α_1	α_2	Adj R^2	DW
1885-2003	1.346	0.009	0.003	0.363	1.117
	(3.22)	(7.80)	(2.24)		
1885-1913	-0.001	-0.003	0.001	0.001	1.672
	(-0.00)	(-0.21)	(0.08)		
1914-1945	-0.150	-0.002	0.015	0.209	1.812
	(-1.29)	(-0.31)	(2.99)		
1946-2003	3.043	0.008	0.002	0.309	1.147
	(3.70)	(5.12)	(1.11)		

Table 8

Bank of Montreal Regressions Testing the Impact of Price Changes on Future Earnings Changes

The regression is from equation (3'): $E_t - E_{t-1} = \alpha_0 + \alpha_1(P_{t-1} - P_{t-2}) + \alpha_2(P_{t-2} - P_{t-3}) + \varepsilon_t$ where E_t is the earnings at time t and P_t is the stock price at time t. Regression coefficients (and t-statistics in parentheses) are presented. "Adj R^2" is the adjusted R-square; DW is the Durbin Watson statistic.

Period	α_0	α_1	α_2	Adj R^2	DW
1885-2003	3.22	-0.02	0.06	0.40	2.53
	(1.66)	(-3.50)	(8.62)		
1885-1913	0.05	0.05	-0.03	0.09	2.54
	(0.15)	(1.22)	(-0.87)		
1914-1945	-0.12	0.02	0.00	0.21	1.65
	(-0.73)	(2.57)	(-0.19)		
1946-2003	6.99	-0.02	0.06	0.40	2.60
	(1.74)	(-2.66)	(5.84)		

Table 9

Bank of Montreal Regressions Testing the Impact of Valuation Changes on Future Dividend Changes

The regression is from equation (4): $D_t - D_{t-1} = \beta_0 + \beta_1(V_{t-1} - V_{t-2}) + \beta_2(V_{t-2} - V_{t-3}) + \varepsilon_t$ where D_t is the dividend at time t and V_t represents the market-to-book ratio for the Bank of Montreal at time t. Regression coefficients (and t-statistics in parentheses) are presented. "Adj R^2" is the adjusted R-square; DW is the Durbin Watson statistic.

Period	β_0	β_1	β_2	Adj R^2	DW
1885-2003	0.030	0.1344	0.208	0.083	1.696
	(3.57)	(2.03)	(3.13)		
1885-1913	-0.0005	0.144	-0.434	0.071	1.637
	(-0.04)	(0.60)	(-1.76)		
1914-1945	-0.015	0.033	0.283	0.244	1.831
	(-1.42)	(0.41)	(3.42)		
1946-2003	0.067	0.124	0.156	0.03	1.55
	(5.04)	(1.37)	(1.72)		

Figure 1 Bank of Montreal Dividends/share and Earnings/share, 1867-2003

Graph of the annual dividend, and earnings per share for the Bank of Montreal over the period from 1867-2003. All values are corrected for stock-splits over the period

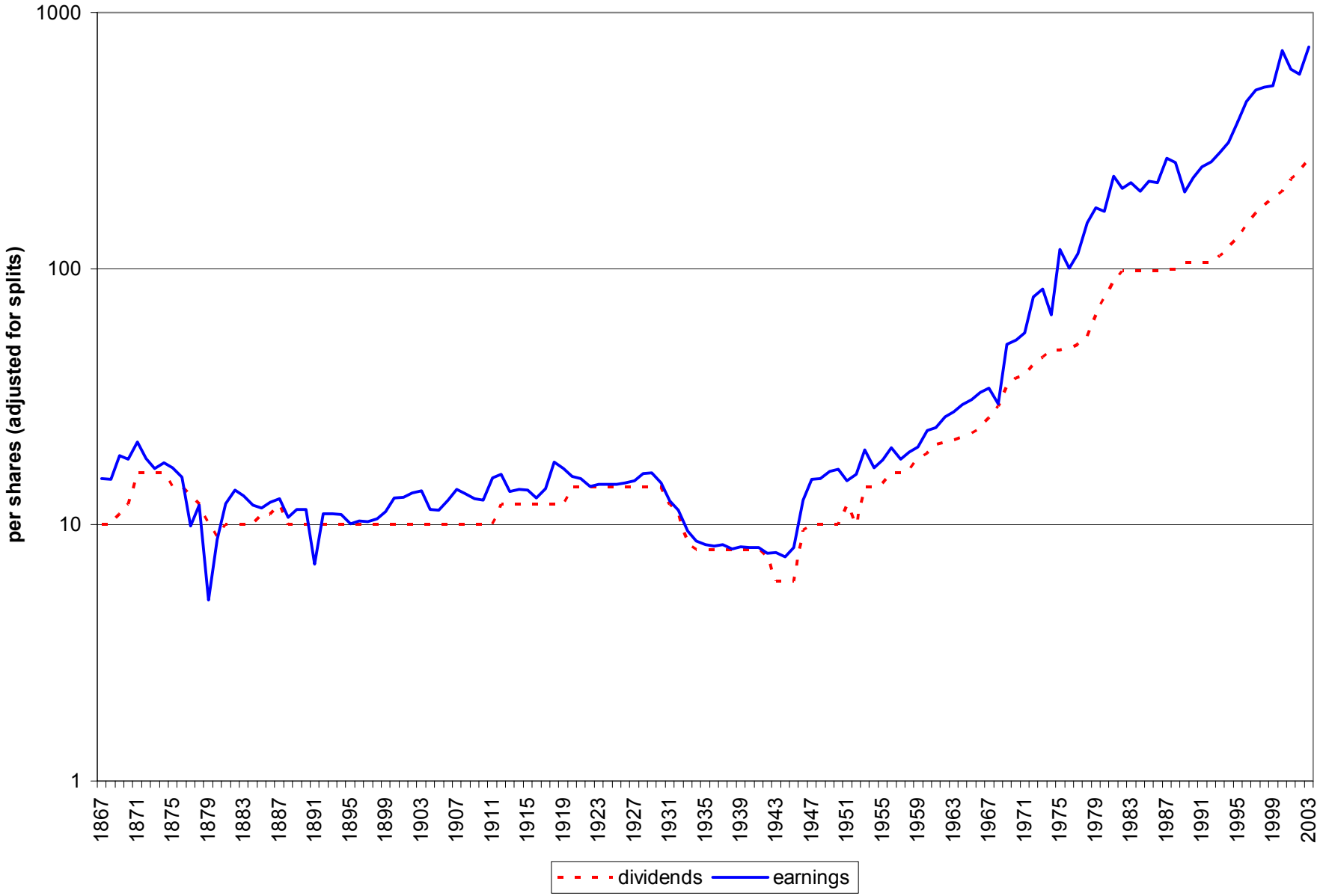

Figure 2a
Bank of Montreal Dividend Changes 1818-2003

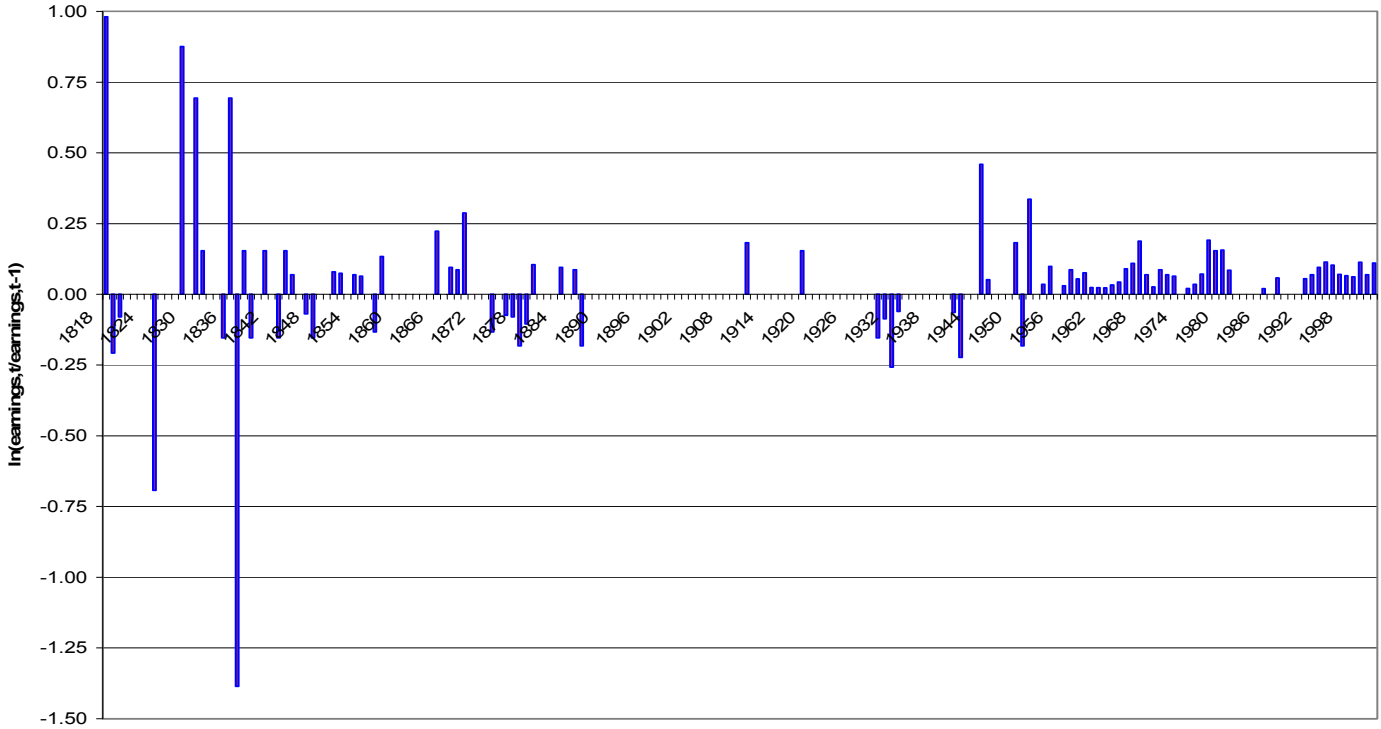

Figure 2b
Bank of Montreal Earnings Change 1818-2003

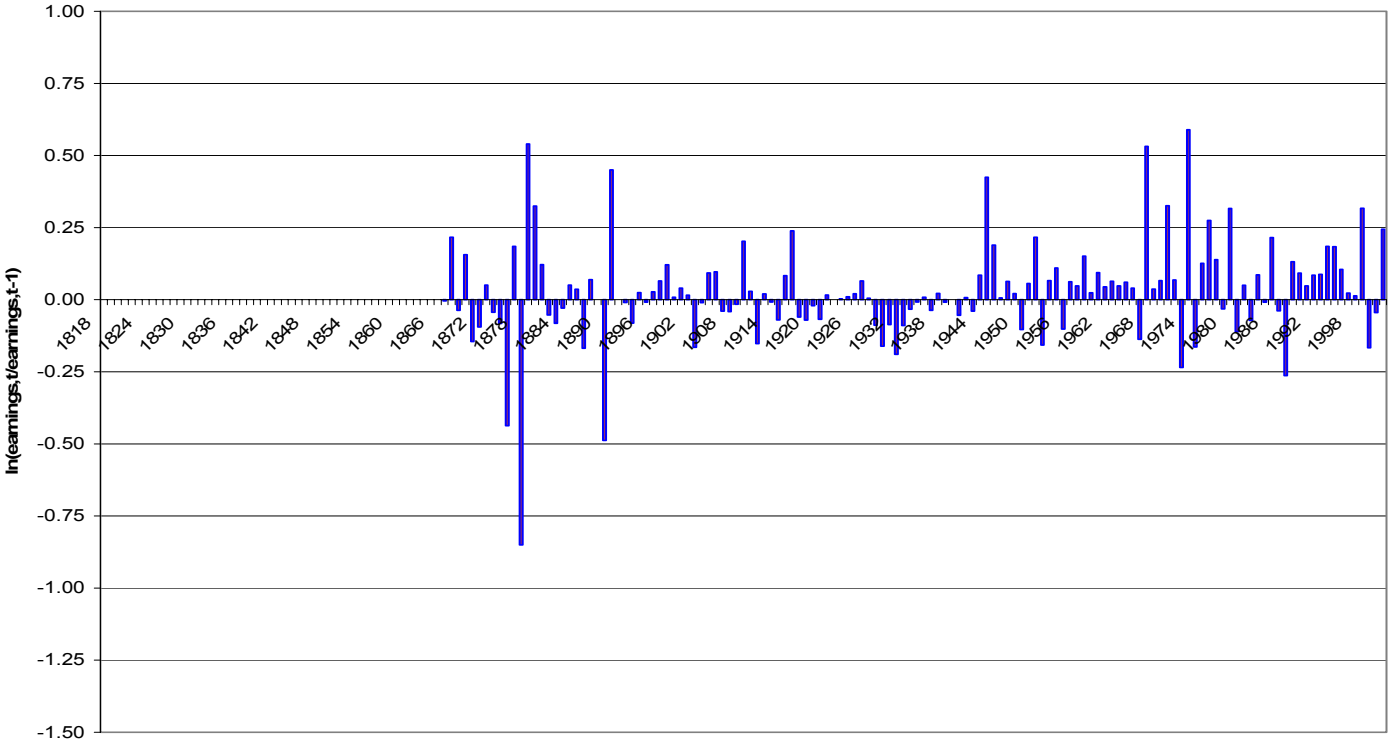

Figure 3
Bank of Montreal Payout Ratio, 1867-2003

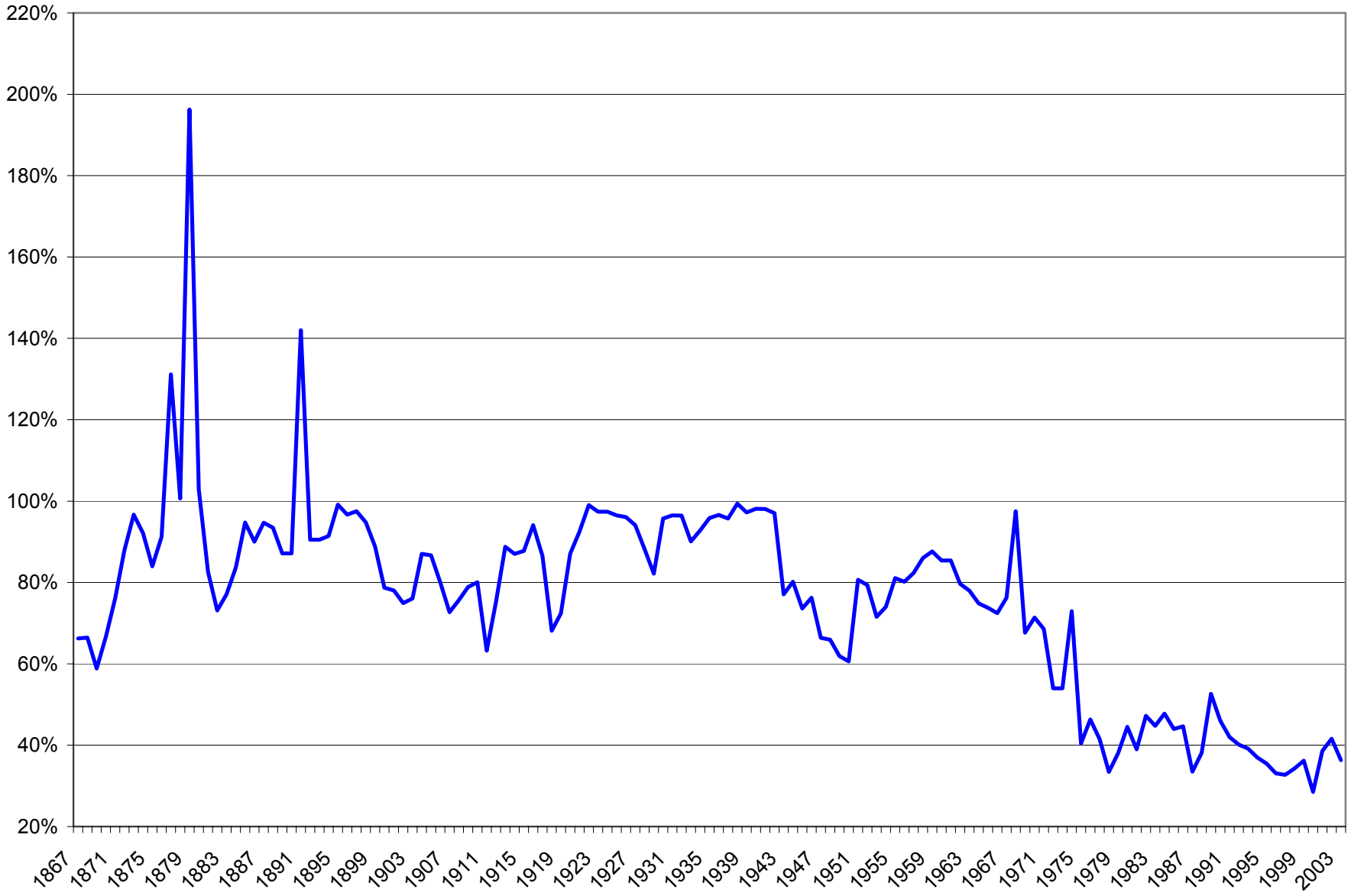

Figure 4
Bank of Montreal Prices and Dividends, 1818-2003