APPENDIX D

DISCOUNTED CASH FLOW ESTIMATES

The DCF Model

The standard alternative to risk premium models is the discounted cash flow model. This model infers the required rate of return by replicating the actions of an investor in valuing the firm's securities. To do this we need to define the costs and benefits attached to an investment. The cost is simply the price of the security (P_0, price at time zero) and the benefits the stream of cash inflows expected at time t in the future (C_t). However, since the investor can always invest in alternative investments, future expected cash flows are not of equal value. As a result future cash flows are "discounted," or reduced in value, to reflect this "opportunity cost." This is the basic idea behind using the discounted cash flow model,

$$P_0 = \sum_{t=1}^{\infty} \frac{C_t}{(1+K)^t}$$

where K is the discount rate or investor's required rate of return.

Once we estimate the stream of future cash inflows, we can equate them to the current price and solve for the investor's required rate of return. For example, this is the standard way of valuing bonds. At the end of every business day investment banks simply take the coupon payments on a bond and its terminal value, and use the last trading value for the bond to solve the above equation for the bond's "yield to maturity." This yield to maturity is published in the newspaper as an objective measure of the investors' required rate of return for a default free security. I already use this DCF estimate as part of my risk premium estimates. However, we can take this a stage further and estimate the DCF required return on equity directly using this same procedure.

The expected equity cash flows are the future expected dividends. Unlike the stream of cash flows on a bond the dividends are not contractual and are more difficult to forecast, particularly

for individual stocks. Consequently, the DCF model is only used for low risk dividend paying stocks or the market as a whole, where the expected dividends can be assumed to grow at some long run average growth rate *g*. In this case, each dividend is expected to grow at the rate *g*, so we can substitute $d_1 = d_0 * (1+g)$ into the valuation equation. Taking this process to infinity and using the value of a geometric series, we can solve to get:

$$P_0 = \frac{d_1}{K - g}$$

This says the stock price is equal to the expected dividend per share, divided by the investor's required rate of return, minus the dividend growth expectation, *g*. The advantage of this formulation of the problem is that we can easily rearrange the equation to obtain,

$$K = \frac{d_1}{P_0} + g$$

This states that the investor's required rate of return can be estimated as the expected dividend yield plus the expected growth rate in dividends. This is the direct analogy with the yield to maturity on a bond. This formulation of the model is often called the Gordon (or dividend discount) model after my late colleague Professor Myron Gordon of the University of Toronto.

Further, it is straightforward to show that increased dividends primarily come from increased future earnings, which are generated by the firm retaining some of its current earnings for re-investment. If we set *X* as the earnings per share and denote *b* as the fraction of earnings retained within the firm, then *(1-b)X* is the dividend and *bX,* the retained earnings.[1] Provided the assumptions of the DCF model hold, it is straightforward to show that dividends and earnings will then grow at a long run growth rate estimated as the product of the firm's retention rate *(b)* and its return on common equity *(r)*, which is referred to as its *sustainable growth rate*.[2] Note

[1] This assumes that the only change in shareholder's equity comes from retentions, that is, everything flows through the income statement.

2 This is consistent with industry practise and the Financial Post's definition in Schedule 3.

that while *K* is the return that investor's require, *r* is the actual return on equity (*ROE*) the firm is expected to earn.[3] These are different concepts.

An example may help to make these assumptions clear. Suppose, as in Schedule 1, the firm's book value per share is $20 and its return on equity expected to be 12%. In this case, its earnings per share are expected to be $2.40 and with a 50% dividend payout rate, its dividends per share and retained earnings are both expected to be $1.20. Moreover, since $1.20 has been retained and reinvested within the firm, next period's book value per share increases to $21.20. As a result, the firm is expected to earn $2.544 in the following year, i.e., 14.4 cents more. This additional 14.4 cents comes from earning the 12% return on equity on the $1.20 of retained earnings. The increase in earnings per share, dividend per share and retained earnings is 6% each year and is calculated directly as the product of the firm's return on equity of 12% and its retention rate of 50%. Moreover, the value of the firm's common stock can be calculated from equation (1), which also increases at this 6% rate, since only the dividend per share is expected to change.

The importance of Schedule 1 is in showing some of the implications of the dividend growth model. First, note that if the investor's fair rate of return is 10%, the stock price in Schedule 1 is $30, determined as the expected dividend of $1.20 divided by the discount rate minus the growth rate (or 0.04). This price exceeds the book value of $20 by 50%. This is because the firm's return on equity (*r*) is 12% and the investor's required or fair rate of return (*K*) is only 10%. This is the reason why economists look at market-to-book ratios to infer the investor's opportunity cost. If market-to-book ratios exceed one for a regulated company, most economists immediately assume that the firm's return on equity exceeds the return required by stock holders, implying that the regulator should lower the firm's allowed rate of return. In our example the *ROE* exceeds the required rate of return by 2% which results in a market to book ratio of 150%.

Second, it is the return on equity that drives the growth in both dividends per share and earnings

[3] There is an additional term if the firm repeatedly sells shares at a premium to its book value, but this term is small and usually dwarfed by estimation problems.

per share, provided that the dividend payout is constant. If the dividend payout is gradually increased over time, then it is possible to *manufacture* a faster growth rate in dividends than earnings per share, from the same underlying level of profitability.

For example, in Schedule 2 the same data is used as in Schedule 1 except that the dividend payout starts at 50% and then increases by 2% per year. By the end of year 5 earnings per share have only risen to $2.99 instead of the $3.03 in Schedule 1, because less money has been reinvested within the firm. As a result, there is less capital to generate earnings. Thus the earnings in Schedule 2 only grow at a 5.6% compound growth rate, down from the 6% of Schedule 1. Conversely, since more of the earnings are being paid out as dividends, dividends per share are up to $1.73 instead of $1.52. This is a 9.6% compound growth rate, rather than the 6% in Schedule 1.

In the short-run, Schedule 2 demonstrates that the growth in dividends per share can be artificially manipulated by increasing the dividend payout. This is not sustainable in the long run, since the dividend payout cannot be increased indefinitely. Moreover, the manipulation can be detected by performing the basic 'diagnostic' check of tracking the behaviour of the firm's dividend payout over time, and the firm's return on equity. However, if the analyst is not aware of the change in the dividend payout, estimating the fair rate of return by adding this manipulated dividend growth rate to the expected dividend yield will overstate the investor's required rate of return. It is important in this case to base the estimate of the investor's required rate of return on a long run sustainable growth rate, estimated from the underlying growth in earnings and dividends and the two components of growth.

The third implication of Schedule 1 is that the DCF estimate using the historic growth rate is appropriate only when the assumptions of the model hold. This means that non-dividend paying firms, firms with highly fluctuating earnings and dividends, and firms with non-constant expected growth cannot be valued accurately using the formula. Usually these assumptions hold for regulated utilities since the allowed rate of return applies to the book value of equity both old as well as on new investments. In this case, the DCF estimate is particularly appropriate for use

in determining the fair rate of return for a regulated utility. However, for non-regulated firms and utility holding companies (UHCs), these assumptions are frequently violated. As a result, estimating the investor's required rate of return by using the formula $K=d_1/P_0 + g$, is tenuous and subject to significant measurement error.

Circularity

When we apply the DCF model to estimate a fair return we estimate the dividend yield and future growth rate. In the example in Schedule 1 the dividend is forecast to be $1.20 which with a $30 stock price means a 4% dividend yield. When this is added to the sustainable growth rate of 6% we get back the investor's fair rate of return of 10.0%. However, it is sometimes alledged that this DCF estimate is circular, since the ROE used to forecast the future growth rate of 12% differs from the investor's required return estimated at 10%. The allegation is that if a regulatory body were to accept the 10% estimate and reduce the allowed ROE then future growth will drop and with it the stock price. As a result, there is an inconsistency between the forecast ROE and the DCF fair return estimate.

However, this inconsistency or circularity is *false,* as there will always be a difference between the forecast ROE and the investor's required return whenever the market to book ratio differs materially from 1.0.[4] However, this does not affect the estimate produced by the DCF model. Suppose for example the ROE was decreased to 10% in the example after the fair return is correctly estimated at 10% using the DCF model, what happens? In this case the forecast earnings per share drop to $2 from $2.40 and with the same 50% payout the dividend is cut to $1.0 and the forecast growth rate drops to 5% (50% retention times the 10% ROE). However, using the same DCF equation the market price will fall back to its book value of $20.

$$P_0 = \frac{\$1}{0.10 - 0.05} = \$20$$

[4] We see this every day in the bond market where a bond selling above (below) par has a stated coupon interest rate higher (lower) than the current market interest rate.

At the new price the dividend yield increases to 5% ($1/$20), so that with the new lower forecast growth rate of 5%, we again estimate the investor's fair return at 10%.

Investors will be far from happy that the allowed ROE has been cut from 12% to 10%, but that does not invalidate the use of the DCF model to estimate their fair, or required, rate of return of 10%. Similarly, if the regulator for some reason increases the allowed ROE to 14% then the dividend would increase to $1.40 and the forecast growth to 7%. In this case, the stock price would increase to $46.67 and the dividend yield drops to 3.0%, so again the dividend yield plus growth correctly estimates the investor's fair rate of return of 10.0%.

The fact is that the DCF model simply reverse engineers the forecast cash flows to extract the investor's fair rate of return; it says nothing about whether or not the investor would be happy if the firm earned that rate of return on its book value. Further proponents of this circularity argument often apply the DCF model based on analyst growth estimates, yet these same analysts have to get their forecast growth rates from somewhere and invariably they are based on future profitability, that is, forecast ROEs. Moreover, even if they are not explicitly based on a forecast ROE, one is always implicit in any growth forecast. For example, if an analyst's growth forecast of 7% is used in a DCF model, then with a 50% dividend payout this means by definition the analyst is forecasting an ROE of 14%. It is impossible to ignore the result that any forecast growth rate carries with it a forecast ROE, which will almost certainly deviate from the investor's required rate of return.

DCF Estimates for the "Market" as a whole

In terms of DCF estimates we can go from the broad to the specific. By broad, I mean the market as a whole, since by holding a diversified portfolio an investor reduces the possibility of gains from one firm being the result of losses by another. In Schedule 4 is a graph of the dividend yield on the TSX Composite (Cansim V122628) along with the yield to maturity on the long Canada (LTC) bond (Cansim V122501). Currently the TSX dividend yield is about 2.83%, while the LTC yield is 2.17%. This is a very unusual situation, which has prevailed since the end of 2011.

It is unusual since equities are a claim on real resources and should grow in line with the growth rate in profits and GDP. In contrast, the yield on the long Canada bond is fixed and is all the investor can earn when the bond is held to maturity. As a result, we would expect the TSX dividend yield to be below that on the long Canada bond.

In Schedule 5 is a graph of the after tax profits and dividends earned and paid in Canada by Canadian corporations. The data is from the GDP accounts and goes back to 1956 and in both cases is scaled by dividing by GDP. The after tax profits are those reported for tax purposes and do not reflect the accounting "games" that are often used to inflate accounting or GAAP profits to "please" investors. For example, non-cash items like capital gains are removed and inventories are adjusted to remove inflationary gains. As is to be expected, aggregate dividends (right side axis) are more stable than aggregate after tax profits. After-tax profits plummeted, for example, during the recessions in 1981, the early 1990s, marginally in the early 2000s and during the recent financial crisis. Overall, average (median) dividends have been 3.2% (2.7%) of GDP and average (median) after tax corporate profits 6.6%, (6.7%) but much more variable. Until recently after tax profits have been above these long run averages and reached over 10.0% in 2008 before the financial crisis as high resource prices benefitted Corporate Canada.

Dividends are more stable than earnings as firms do not like to cut their dividends. This is important since some utility analysts "key" dividend growth forecasts off earnings forecasts. This is suspect since the greater variability in earnings means that their average growth rate always exceeds that of dividends in the same way that the arithmetic return always exceeds that of the geometric (compound) growth rate.[5] However, with this caveat, it is hard not to conclude that in the long-run dividends and after tax profits grow at about the same rate as the overall economy, but are much more variable. The average real Canadian growth rate since 1961 has been 3.17%, similar to that for 2017 when it was 3.0%, while the Bank of Canada's operating band for inflation centres on 2.0%.[6] This implies a long-run growth rate in dividends and

[5] The standard deviation of after tax profits as a % of GDP has been about twice that of dividends.

[6] Schedule 6 has the Canadian CPI inflation rate back to 1914 and shows how successful the Bank of

earnings of about 5.2% (1.02*1.0317). This is probably a low estimate for two reasons. First, the GDP accounts have become less reliable as the economy has shifted to a knowledge-based economy, since it has become more difficult to estimate the value of productivity changes. This has recently been reflected in changes to partly include R&D expenditures as an investment, rather than an expense. Second, the arithmetic vs compound growth rate problem also affects the GDP accounts, which are less variable than similar accounts for companies. However, with this caveat the DCF estimate for the Canadian market as a whole is 8.21% (1.0283*1.052-1).

An alternative estimate of future growth for the market as a whole is to use the "*br*" or sustainable growth rate. In Schedule 7 is the aggregate dividend payout from the GDP accounts. We can see very clearly the jump in the payout during the severe recessions in the early 1980s and 1990s, when Corporate Canada had serious profitability problems. The median dividend payout is 42%. This is more reliable than the average, which is biased due to very low earnings in some recessionary years. In Schedule 8 is the return on equity (ROE) earned by Corporate Canada as reported by Statistics Canada. Again, we can see the business cycle as very low profitability in the mid 1990's and again in 2003 and 2009 which makes the median more useful. Combining the median retention rate (1-dividend payout) and median ROE gives a sustainable growth rate of 5.77% and DCF equity cost of 8.76%.

These two DCF equity cost estimates of 8.21% and 8.76% would seem to be reasonable estimates assuming that the economy is neither in recession or booming. Otherwise, there might be short run growth built into the dividend yield. In Schedule 9 is the Statistics Canada capacity utilisation showing that the economy is running very close to full capacity. The median capacity utilisation levels since 1987 have been 83.4 & 81.6% for non-farm and manufacturing respectively. In 2018Q3, we were slightly below these levels at 82.6% and 78.8% respectively, where both have been weak in 2018 reflecting continued weak commodity prices. However, the service sector has remained strong as is confirmed by the latest unemployment rate of 5.6% with the series graphed in Schedule 10. The unemployment rate to some extent contradicts the

---

Canada's policy has been.

capacity data, but is confirmed by the Bank of Canada's business outlook survey in Schedule 11, where there are clear indications of optimism on behalf of senior Canadian executives.

In Schedule 12 is a graph of the dividend yield on the S&P500 index and in Schedule 13 a graph of the dividend payout rate on the S&P500 firms. The average dividend payout since 1956 is 48.4% while the median payout is 43.2% meaning that typically 56.8% of the earnings for S&P500 firms are reinvested to generate future growth in earnings. However, note from the graph that the S&P500 firms suffered significant problems in 2007-2009 during the financial crisis, which was not as evident in the Canadian data. In contrast, there is no evidence of the serious problems suffered by Corporate Canada in the recessions in the early 1980s and 1990s.

In Schedule 14 is the S&P ROE data for the S&P500 firms since 1977, where the average ROE was 13.35% and the median ROE 13.77%.7 These are higher than the average Canadian ROE since the data is for the largest firms in the US economy and includes a large proportion of foreign earnings, whereas that for Canada is for all firms. Over this same period the average and median retention rates were 51.6% and 56.8%. If I pair the median payout and ROE the "*br*" growth rate is 7.83% and if I pair the averages the growth rate is 6.88% reflecting both the higher average payout and lower average ROE. Combining these with the current dividend yield on the S&P500 index of 2.14% gives a fair return on the S&P500 of 9.17-9.89%. Note the higher sustainable growth rate for the S&P500 is offset by its lower US dividend yield. As a result, the estimate for the S&P500 is only about 1.00% higher than for the overall Canadian market.

Using the DCF model to estimate the market's required return on equity (equity cost) would indicate a value of 8.21-8.76% for Canada and about 1.0% higher for the US. These numbers look more accurate than they really are, since the US value for instance has increased significantly for the last month of 2018. However, a value of 9.0% in a range of 8.5% to 9.50% would seem reasonable. More importantly, this range of estimates for the market as a whole provides a ceiling for the required return for utility investors, since utilities are unambiguously

7 The earnings of the SP500 firms include significant foreign earnings and they are much more profitable than average US centric firms.

lower risk than the market as whole.

S&P US Utility DCF cost estimates

As well as the data for the S&P500 as a whole, Standard and Poors also publishes data on the utilities that meet the requirements to be included in the S&P500 index. In Schedule 15 is the summary data for the electric utilities in the S&P500 index. Note that the S&P data includes the firms that at the time were classified into industry sub groups, where the data for each year reflects the S&P value weighted average of the firms for that year.

The schedules provide the basic data needed for a DCF analysis. The data includes dividends, earnings, book value per share, average market values and the return on equity. From this data, it is possible to calculate several pieces of useful information. First, is the average payout, which is in the fourth column followed by the retention ratio. Utilities as low risk and low growth investments have relatively high payouts. For the electric utilities the average and median payouts are both 74%. This is corroborated by the very high average (median) dividend yield of 4.47% (4.40%). The very high dividend payout means that the growth potential for these utilities is low, which reduces the error in using the DCF model. It also means that utilities are quintessentially dividend or income stocks. The average 2017 dividend yield for the electric utilities was 3.57% or almost twice that for the S&P500 index in 2017.

To estimate the future growth rate I can assume that each year the utility is expected to earn its current *ROE,* so that its earnings will grow by the retention rate times this *ROE*. For example, in 1993 the retention rate was 10.57% and the ROE 11.25% for the electric utilities implying future earnings growth of 1.19%, which is the *g (b*ROE)* in the next column. For 1993 the dividend yield for the S&P Electric utilities was 5.73% (column 8), so that the DCF equity cost estimate was 6.99%, which is in column 10. In 1993 the average long term (ten year) US Treasury yield was 5.80% implying that the electric utility risk premium was only 1.18%. Column 11 gives the market to book ratio for these utilities, which in 1993 was 1.59, implying correctly that the ROE of these utilities of 11.25% exceeded their equity cost.

The above calculation is a *mechanical* exercise and includes estimation error in both the earned ROE, which affects both the forecast ROE and the retention rate. To reduce individual estimation errors the exercise is repeated for each year from 1993 until 2017. This gives the average and median electric utility risk premium of 3.36% and 3.49%. However, the *br* growth rate is sensitive to the actual earnings, which affect the retention rate and may not capture the full amount of growth expectations. To check for this the last two columns estimate the utility risk premium with two alternative growth expectations. URP2 assumes that the expected ROE is the median ROE for the whole period 1993-2017, which avoids the problem of fluctuating earned returns. URP3 also assumes that the retention rate is the constant median retention rate for the whole period. This avoids the problem of declining retention rates as earnings are squeezed and the dividend maintained. The average and median URP2 is 3.18% and 3.74% and for URP3 the values are 3.20% and 2.94%.

As a final check, I looked at the growth rate in the dividend per share for the electric utilities relative to the growth rate in US GDP.[8] Over the period from January 1993 to 2017 the average (median) nominal US GDP growth rate was 4.46% (4.50%), whereas the average (median) dividend per share growth rate of the S&P500 Electrics was 1.91% (2.23%). These electric utility growth rates are 43%-50% of the growth rate in US GDP, which is what you would expect for mature utilities.[9] A naïve forecast would be that these utilities have dividend growth rates of no more than 50% of US GDP. Mr Trogonoski (page 30) provides consensus estimates for the US GDP growth rate of 4.35%, based on the historic performance by US electric utilities since 1993 I would expect their dividend growth rates to be about 2.18%.

In Schedule 12 is a graph of the ten-year US Treasury yield against the dividend yield of the S&P500 electrics. The correlation is over 0.50 and dividend yields have clearly dropped with the drop in US interest rates indicating that these companies are defensive interest rate sensitive

[8] The dramatic reduction in the number of gas companies makes their use problematic and even for the electrics where the number of firms is not constant there are problems.

[9] In 1993 the average DPS was $7.11 whereas in 2017 it was $10.57 for a *compound* growth rate of 1.66% well below the real growth rate in the US economy let alone the nominal growth rate.

investments. However, since the financial crisis it is also clear that US Treasuries have structurally lower yields than on these electric companies. This is consistent with the intent of the Federal Reserve's bond buying program to lower treasury yields. Most recently, dividend yields have been 153% of the value of US treasury yields. Overall with current US Treasury Yields of 2.83% this means an electric utility dividend yield of 4.33% combining this with the long run growth estimate of 2.18% implies a DCF electric utility cost of 6.6% and adding 0.50% for flotation costs a fair ROE of 7.10%.

From the data in Schedule 15, I derive two conclusions:

- Risk premiums of the order of 3.00-3.70% for a typical US electric utility over ten year US government bond yields are normal, since they reflect the experience of the last 25 years.
- The most recent 2017 data reflect a risk premium of 3.60-4.18% over the currently lower US Treasury yields indicating higher current risk premiums.

Both these conclusions are broadly consistent with the Canadian experience.

Individual company estimates

The DCF estimates for the market as a whole and the S&P utility indexes are more reliable than for individual companies due to the significant measurement error attached to forecasting future growth rates. For example, the forecast growth rate for the economy is more accurate since the growth rate in profits for the market as a whole is constrained by the growth rate in the economy. However, the growth rates are mechanically estimated and do not reflect market estimates. Consequently, some use analyst forecast of earnings growth as a proxy for the sustainable growth rates in the former estimates. However, in my judgment these are no more reliable as can be illustrated by looking at the sample of US electric utilities I analysed in Appendix C plus others that have recently been used by company witnesses.

Schedule 17 has data I extracted on January 15, 2019. The data consists of the analyst forecast five year growth rate and the past 5 year growth from Yahoo Finance, which sources their data from S&P's capital IQ data service. If the 5 year forecast growth rate is combined with the

current dividend yield, it provides the equity cost based on 5 year analyst growth expectations (K(Est g)). This estimate ranges from 1.05% for OGE since it has negative future 5 year growth to 12.43% for Evergy since it has 9.2% forecast growth. Overall the average (median) value across all 11 companies is 8.25% (8.90%) and may appear to be reasonable. However, there are several problems.

First, these UHCs are clearly lower risk than the overall market and an estimate of 8.25% is very similar to that of the market as a whole. This is confirmed by their average (median) beta of 0.19 (0.22) confirming the discussion in Appendix C that UHC stock prices are currently being driven by interest rate risk, rather than market risk. Second, the average (median) five-year growth forecast is 4.48% (4.41%) earnings growth. However, the past average (median) 5 year growth rate was only 3.98% (3.64%), that is, these analysts are forecasting an increase in earnings growth. What this indicates is the "optimism bias" amongst security analysts. This bias is simply a cognitive bias and not a fraudulent or intentional bias, that is, analysts tend to be optimistic about the companies they follow. This optimism is compounded by the relatively small number of analysts, where there is sometimes only one or two analysts providing revenue forecasts.

It also has to be emphasised that the DCF model assumes growth *forever* at this constant forecast growth rate. The average forecast growth rate of 4.48% might seem reasonable but the Mr. Trogonoski (page 30 of his report) estimates US growth at just 4.35%. It is inconceivable that low risk US utilities can consistently grow faster than the US economy that supports them ***forever***. Moreover, as indicated above this has not been the pattern in the past, where they have attained only 50% of GDP growth.

At Schedule 18 is a reprint of a Globe and Mail article reporting on an update of a study by the consulting firm, McKinsey. They report that analysts start out optimistic when making their five year forecast, but gradually as they get more information (generally from the company) they hone in on the correct number and this number is invariable lower. In Schedule 19 is an extract

from the Royal Bank of Canada's Investment Strategy Playbook (February 2016) reporting the same phenomena.

This optimism bias has been in the academic literature for some time. Easton and Sommers[10] for example, have documented the optimism bias at 2.84% where they also state (page 986)

> Our estimate of the implied expected rate of return on the market from the value-weighted regression, after removing the effect of bias in analysts' forecasts, is 9.67% with an implied equity risk premium of 4.43%. Of course, this estimate of the equity risk premium is more reasonable than that obtained when all observations have equal weight.[8]

These estimates are in line with my own estimate of the expected return on the US market even though their estimates were based on data several years ago. More importantly there is no reason to believe that analyst optimism has suddenly disappeared. In fact, this optimism bias persists in current studies to the extent that authors refer to it as "well documented"[11] that is, researchers are so used to the optimism bias that they automatically take it into account. The Financial Times also noted that analyst optimism exists in Europe, where they quote Goldman Sachs that "going back 25 years analysts have been too optimistic about earnings growth in 20 years out of the 25 and by 8 percentage points on average over the whole period."[12] A Google search on analyst optimism produced 5,510,000 hits up from just 645,000 three years ago!

Mark Grinblatt of UCLA recently looked at the optimism bias and a summary of his research on May 30, 2018[13] reported that

> "When analysts were either most biased or most optimistic, it was by a lot: Among the 20 percent of companies about which analysts most optimistically forecasted earnings

[10] "Effect of analyst's optimism on estimates of the expected rate of return implied by earnings forecasts, Journal of Accounting Research, 45-5, December 2007.

[11] See Huang and Tan, for example, "Analyst target price optimism around the world," November 2013.

[12] Sarah Gordon, "European corporates thwart analyst's optimism," Financial Times, April 27, 2014.

[13] https://www.anderson.ucla.edu/faculty-and-research/anderson-review/analyst-bias

— those analysts' estimates were on the high side by about 50 percent. By contrast, among the 20 percent of companies about which analysts were least optimistically biased, earnings forecasts overshot actual results by less than 1.0 percent."

Of importance is that even amongst the least biased they are still biased, even though by less than 1.0%.

Recent research[14] has indicated that after the global settlement precipitated changes in the regulation of analysts to make them independent of investment banking, the star analysts left. This is consistent with the research of Espahbad et al[15] that there was a short run improvement in the forecast accuracy of analysts after the regulations were introduced, but that over the longer period forecast accuracy has actually declined. I therefore place little reliance on analyst growth estimates since they are inaccurate and known to be biased.

A standard way of alleviating the effects of analyst growth optimism is to use the sustainable growth rate, which indicates that growth in earnings and dividends generally comes from reinvesting earnings at a positive rate of return. From the data on the US electric utilities in Schedule 17 their retention rate of earnings averages just 21%. This is biased low by one firm actually paying more in dividends than is being earned. For this reason, the median value of 38% is more reasonable meaning that 62% of earnings are paid out as dividends similar to the earlier data from S&P's Analyst Handbook. As we would expect, these mature utilities reinvest less of their earnings than do typical companies so we would expect them to grow at less than the average earnings growth rate. With the recent average ROE for each utility the sustainable growth rate averages just 2.82% and the median slightly higher at 3.44%. These growth rates are more consistent with a US economy growing at 4.35% and the historic record of their growing at less than this rate, the mature nature of their operations and adjusting the analyst growth rates downwards to reflect persistent optimism.

14 Guan, Li, Lu and Wong, "Regulations and brain drain: Evidence from Wall Street Star Analysts' career Choices", Management Science (forthcoming)

15 Espahbad, Espahbad and Espahbad, "Did analyst forecast accuracy and dispersion improve after 2002

The DCF estimates using sustainable growth rates produce an average (median) equity cost of 6.41% (6.50%) consistent with their average (median) market to book (MB) ratio of 1.78 (1.84), and investors being happy with the average (median) earned ROE of 8.91% (9.181%). Notably the difference between these estimates and those obtained by using analyst forecasts is similar to the optimism bias of bias as reported by Easton and Summers. Further, we can always back out from analyst growth forecasts an implicit rate of return. For example, with an average growth forecast of 4.48% for these electric utilities and a retention rate of 38%, the implied rate of return on investment is ROE = .0499/.32 or 11.79%[16] which exceeds their current median ROE of 9.18% by a significant margin.

Earnings versus dividends

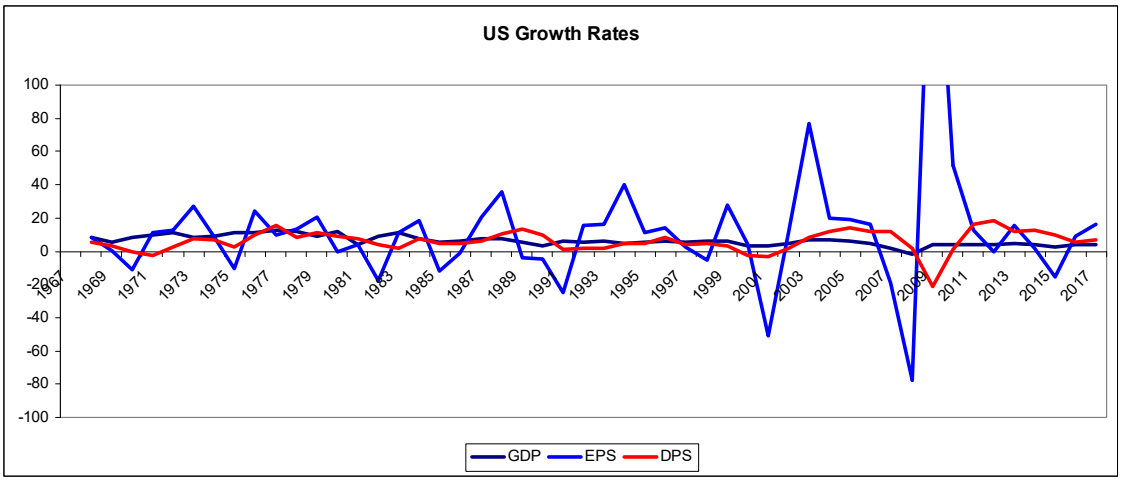
A final problem with the use of analyst forecasts is that they are based on earnings, not dividends, whereas the DCF model values dividends not earnings! As Schedule 5 showed earnings are more volatile than dividends even after we aggregate over all firms. What this means is that the short term growth forecast for earnings is on average higher than for dividends, even if their long run, or compound, growth rates are unbiased and exactly the same. This is due to the common practise of smoothing dividend payments, or put another way, firms only increase their dividend after their fundamental earnings have increased and not as a result of temporary factors.

To illustrate the problem in using earnings I used the S&P Analyst Handbook for the S&P500 index. This index comprises the majority of the value of US companies and is representative of Corporate USA. It includes EPS and DPS data from which I calculated annual growth rates. I did the same for the nominal GDP series available in the Federal Reserve Bank of St Louis Economic data bank (FRED, GDPA). The following is a graph of the EPS and DPS growth rates starting in 1969.

---

following the increase in regulation, Financial Analyst Journal, (Sept/Oct 2015)

[16] This just reverses g = b*ROE.



The earnings series is clearly more volatile even for this index of 500 companies that diversifies away the unique results of any individual company. We can see for example, the dramatic effect of the financial crisis when 2008 aggregate EPS dropped from $66.17 to $14.88 for a growth rate of -77.5%. The EPS of the S&P500 then recovered to $50.87 with a 242.5% increase, but the average of these two growth rates of 83% still left earnings below their 2007 level. In contrast, DPS slightly increased in 2008 by 1.83% before dropping in 2009 by 21.06% as firms reacted to the lower earnings with a lag.

Over the entire period from 1967, the following is the data on average growth rates:

	GDP	EPS	DPS
Average	6.48%	11.94%	6.00%
Median	5.99%	10.99%	5.86%
Volatility	3.01%	40.56%	6.36%
Compound	6.44%	6.24%	5.80%
OLS	6.13%	6.11%	5.68%

US GDP grew at 6.48% (5.99%) using the simple average (median) of the annual growth rates whereas earnings per share "grew" at almost twice that rate at 11.94% (10.99%). In comparison, annual dividends per share grew at 6.00% (5.86%) only slightly less than GDP.

How can earnings grow so much faster than either GDP or dividends? The answer is that they can't, as it is a statistical oddity similar to the difference between arithmetic (simple average) and compound growth rates. If a stock drops 50% and then increases by 100% then it is back to where it started and the compound growth rate is zero even though the arithmetic growth rate or simple average of -50% and+100% is +25%. The greater the volatility the bigger the difference between the arithmetic and compound growth rate The volatility of US GDP growth is only 3.01% versus twice that for dividends and 13 times that for earnings! The result is that the compound growth rate of US GDP was 6.44% over this 50 year period only slightly less than the simple arithmetic growth rate. In contrast, dividends per share grew at 5.80% or 0.20% below the arithmetic growth rate but earnings grew at a compound growth rate of 6.24%, essentially the same as GDP, but fully 5.70% or barely half the arithmetic growth rate.[17]

Finally, the best estimate of the growth rate is that obtained by using ordinary least squares (OLS) since this statistical procedure minimises the variability around the estimated annual growth rate. For GDP it lowers the growth estimate to 6.13%, which is almost the same as the earnings growth estimate of 6.11%. For dividends, it lowers the growth rate to 5.68% or basically 0.50% below the GDP and earnings growth rate. This might reflect the cumulative impact of share buybacks, but the problem is that the impact of these buybacks should show up in a greater earnings per share growth rate and it does not.

What this means is that analyst growth expectations are biased inputs into the constant growth model, even if the analysts themselves are neither fraudulent nor suffering from the optimism bias. This is because the limited growth forecasts that are available are all short term and at most for five years. Long term, the best estimate for earnings growth for the overall stock market is the growth rate in GDP, since both EPS and DPS growth have tracked GDP growth over the last 50 years.

17 Note for earnings to grow faster than GDP it means that profits increase as a share of GDP, which is unlikely in the long run.

Here it is appropriate to note that Mr. Trogonoski's estimates of the "forward" market risk premium on page 36 have no validity whatsoever. These estimates are derived by subtracting the projected risk free rate from the overall market return estimated using the constant growth model for each company in the TSX composite and S&P500 indexes. However, as explained earlier the constant growth model can not be used for most companies since the growth rate is assumed to go on in perpetuity. In JPT-5 he estimates the average perpetual growth rate for the Canadian companies at 11.21% and in JPT -6 at 11.45% for the US companies. It is absolutely impossible for earnings or dividends to grow at over 11.0% when he is forecasting Canadian GDP to grow at 3.73% and US GDP to grow at 4.35%. It would mean that each year ***forever*** earnings and dividends would increase as a share of GDP and eventually become GDP with no room for any form of salary income whatsoever.

The AUC noted this inconsistency when it stated (AUC 22570-D01, August 2, 2018, page 93) in reaction to identical evidence from another Concentric witness (Mr. Coyne)

> *445. The Commission finds that both Mr. Coyne's and Mr. Hevert's estimates of the expected Canadian and U.S. market returns using the DCF model, which range from 12.65 to 14.84 per cent, are too high. These results are driven by unreasonable growth rate estimates. The Commission observes that the basis of Mr. Coyne's estimate of the Canadian market return relied on a sample with approximately 14 per cent of the companies having growth rates that exceeded 20 per cent. Turning to Mr. Hevert's estimate of the Canadian market return, approximately 16.5 per cent of the companies in his sample had growth rates that exceeded 20 per cent. Considering that the single-stage DCF model assumes a growth rate into perpetuity, the Commission finds the resulting estimate unrealistic, and affords Mr. Hevert's and Mr. Coyne's equity market DCF estimates no weight. In addition, the Commission notes that the expected market return rates used by Mr. Coyne and Mr. Hevert use analyst estimates of growth rates that far exceed GDP growth. Accordingly, the Commission finds that the expected market return rates put forward by Mr. Coyne and Mr. Hevert are too high. No meaningful evidence was provided that would enable the Commission to quantify the extent of the over-estimation in order to develop a more reasonable estimate.*

I did not provide evidence in the AUC hearings, but if I had, I would have pointed out the prior statistical evidence that over the last fifty years earnings and dividends in the US have grown at the same rate as GDP. This is consistent with the macro data that earnings and dividends have

been a relatively constant share of GDP. If instead of the "unrealistic" growth estimates used by Mr. Trogonoski we substitute his GDP growth estimates, then for Canada the overall market return in JMT-5 becomes a forecast dividend yield of 3.33% +3.73% or 7.06%. This is then consistent with the views of market professionals. Subtracting the forecast long Canada rate of 3.08% gives a market risk premium of basically 4.0%. I would regard this as too low since subtracting a forecast LTC yield from a current or spot DCF estimate is inconsistent. At the time of his evidence LTC yields were about 2.45% so a more reasonable estimate of the market risk premium would be 4.61%. However, I would note that once I adjust for the "unrealistic" nature of Mr. Trogonski's growth estimates this procedure is the same as that which I use for my overall market return estimates. Subtracting the LTC yield to convert this market return estimate into a risk premium estimate then adds little.

I would also note that these comments obviously apply to the US electric utilities as well. I collected dividend per share data for the following US electric utilities Duke, Allette, Eversource, Great Plains, OGE, PNW, Westar and Southern since 1961 as well as for US nominal GDP. I then calculated the simple average of the annual growth rates (Arithmetic), the compound growth rate, the OLS estimate of the annual growth rate and the annual volatility. The results are below.

Electrics DPS Growth rates

	Arithmetic	Compound	OLS	Volatility
Duke	4.2%	1.4%	0.5%	30.4%
Allette	3.0%	0.5%	0.4%	24.7%
Ever	5.8%	0.8%	-1.6%	45.1%
Great Plains	-0.2%	-1.3%	-1.3%	12.8%
OGE	1.1%	0.1%	0.3%	12.1%
PNW	8.0%	2.4%	1.3%	46.0%
WR	1.2%	0.1%	-0.2%	12.8%
SO	1.3%	0.8%	0.6%	9.0%
"Industry"	0.9%	0.6%	0.3%	7.1%
GDP	6.6%	6.5%	6.8%	

Over this 56 year period US GDP grew at about 6.6%, whereas the average of these US utilities (industry) had dividend per share growth of 0.3%-0.6% with the arithmetic average skewed by Eversource which cut its dividend to zero in 1998 and PNW which did not pay a dividend between 1990-1992, making growth rates difficult to estimate. I place no reliance on this data since these firms have changed dramatically over time, but it confirms the data in S&P's Analyst Handbook that electric utilities grow at a much slower growth rate than corporate US as a whole. Consequently, analyst forecast earnings growth rates are doubly biased: first since they are optimistic and second since they are based on earnings and not dividends.

Conclusion

From the forgoing DCF estimates I draw the following conclusions:

- The overall equity market return in Canada is in a range 8.21%-8.76% and that in the US slightly higher;

- The US S&P electric utility risk premium has been 3.0-3.70% over ten year US government bond yields, but has recently been slightly higher due to very low bond yields;

- The individual DCF estimates for US electric utilities based on analyst growth forecasts would put their equity cost at just under 9%. However, these forecasts are biased high and inaccurate estimates of their underlying DPS growth rates. Removing this bias by using sustainable growth forecasts lowers this estimate to 6.5%.

- Earnings growth rate forecasts are optimistic (biased) estimates of dividend growth rates, since earnings are much more volatile. Over long periods of time, the compound growth rate of earnings and dividends of S&P500 firms is approximately that of US GDP. However, simple average growth rates of earnings are almost twice as high as for dividends making them biased when used in the constant growth DCF model.

- Mr. Troganoski's "forward" DCF equity risk premium estimates are based on an "unrealistic" application of the constant growth DCF model (AUC's words). I would simply say they produce market risk premium estimates well out of the range used by market professionals in Canada.

Given the errors attached to any estimate, I judge the DCF equity market required return to be in a range 8.5-9.5% and the fair return to a US electric utility to be around 6.5%. These estimates

are very similar to my equity risk premium estimates and with a 0.50% flotation allowance produce a fair return estimate of 7.0%.

SCHEDULE 1

YEAR	BEGINNING BOOK VALUE PER SHARE	EARNINGS PER SHARE	DIVIDEND PER SHARE	RETENTIONS PER SHARE
1	20.00	2.40	1.20	1.20
2	21.20	2.54	1.27	1.27
3	22.47	2.70	1.35	1.35
4	23.80	2.86	1.43	1.43
5	25.24	3.03	1.52	1.52

ASSUMPTIONS: Return on Equity = 12%
Dividend Payout = 50%
Cost of Equity = 10%

SCHEDULE 2

YEAR	BEGINNING BOOK VALUE PER SHARE	EARNINGS PER SHARE	DIVIDENDS PER SHARE	RETENTIONS PER SHARE
1	20.00	2.40	1.20	1.20
2	21.20	2.54	1.32	1.22
3	22.40	2.69	1.45	1.24
4	23.70	2.83	1.59	1.25
5	24.90	2.99	1.73	1.26

ASSUMPTIONS:

	Return on Equity	=	12%
	Dividend Payout	=	50% + 2% p.a.
	Required Return	=	10%

Definition of the Sustainable Growth rate

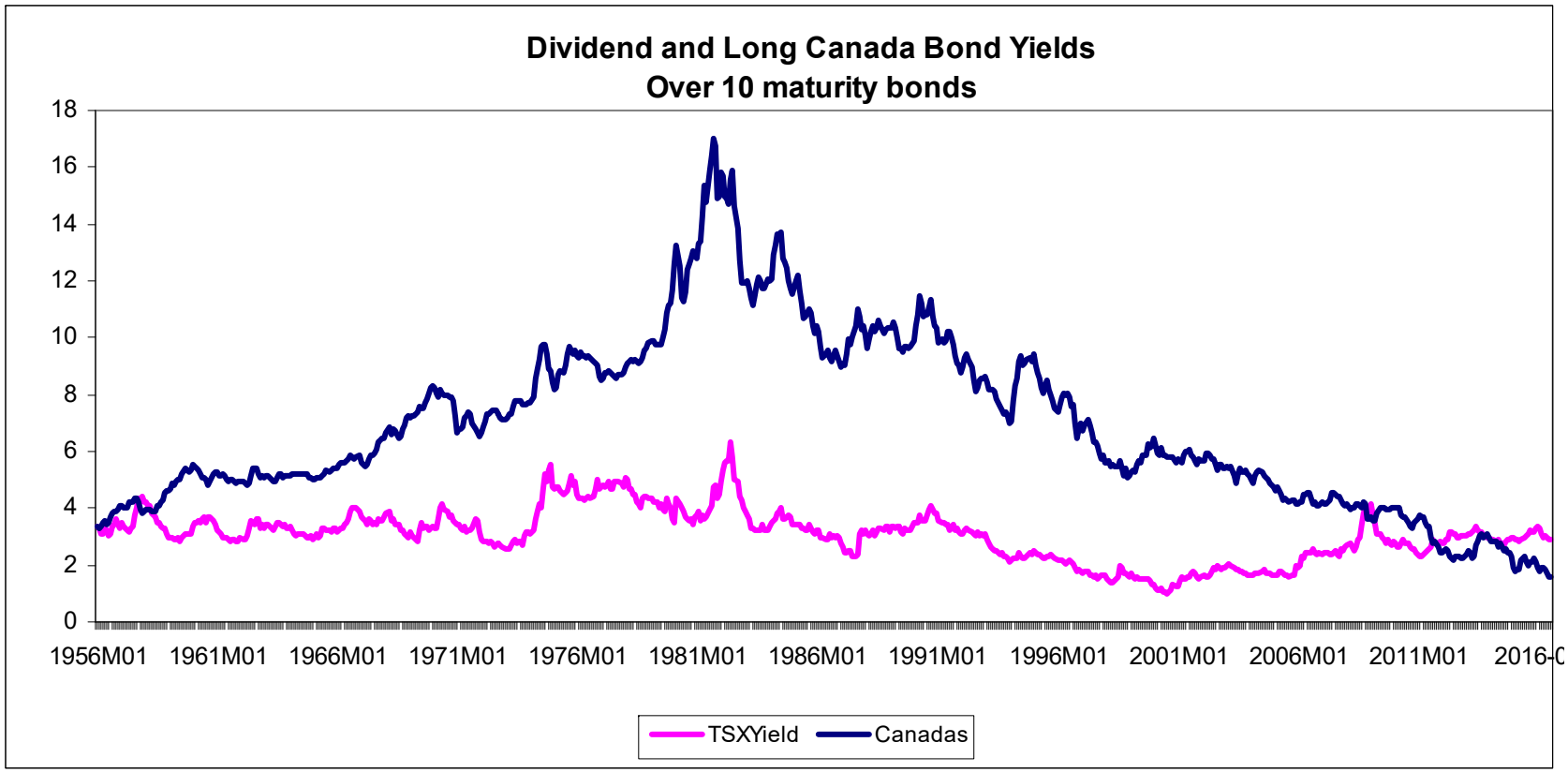
(from the Financial Post Corporate Analyzer data base)

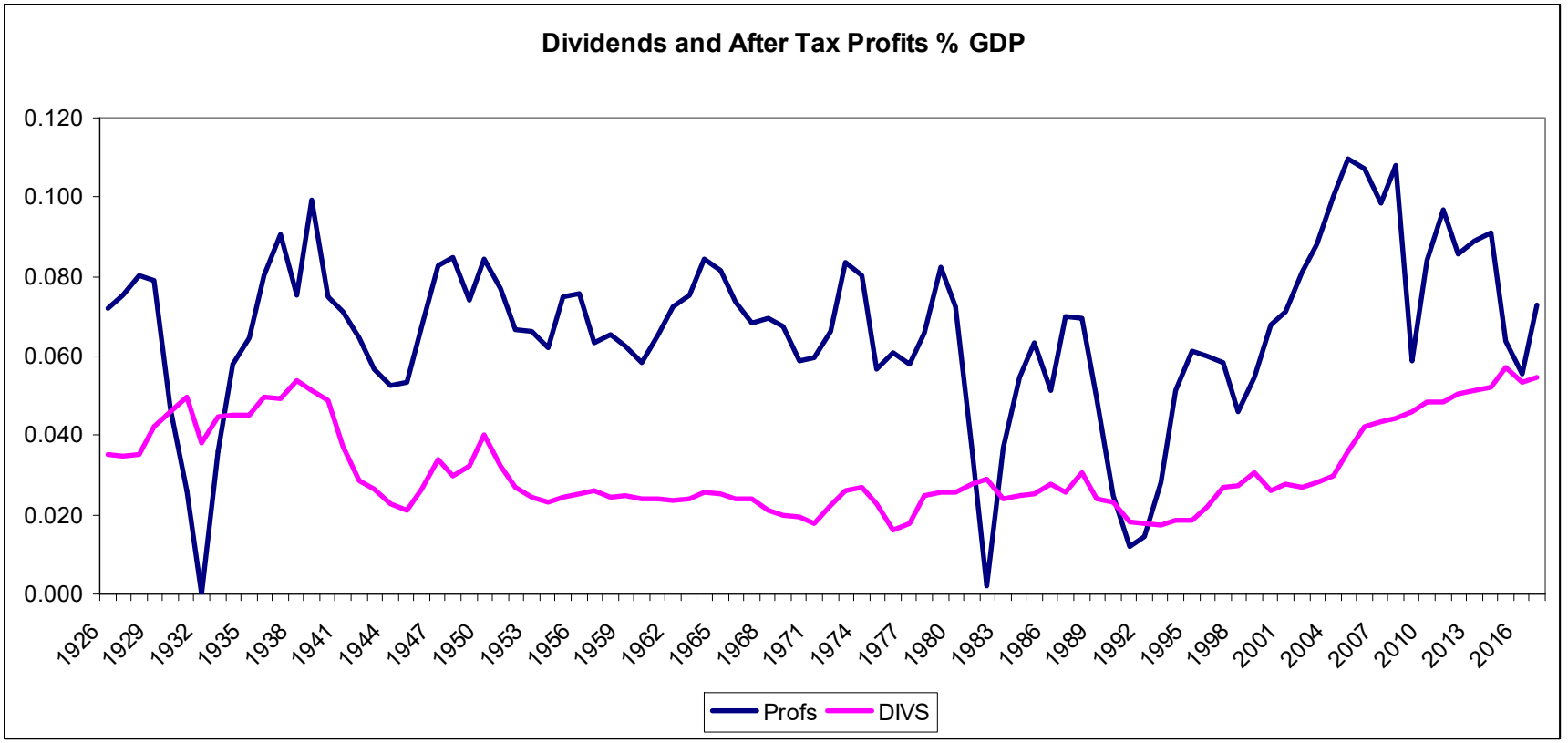
Sales (CY – 1)

X401 - Sustainable Growth (%) - This calculation is the rate at which company sales can increase without the company experiencing financial strain or requiring additional financing to fund continued growth. Many executives believe growth should be maximized. In reality, uncontrolled growth can result in financial strain or worse, bankruptcy, if not managed properly. Conversely, lack of growth can make a company vulnerable to a takeover. To determine the possible strategies the company may employ in managing their growth, see the Growth Rates Section which describes the ratio combination of Sales Growth and the Sustainable Growth rate.

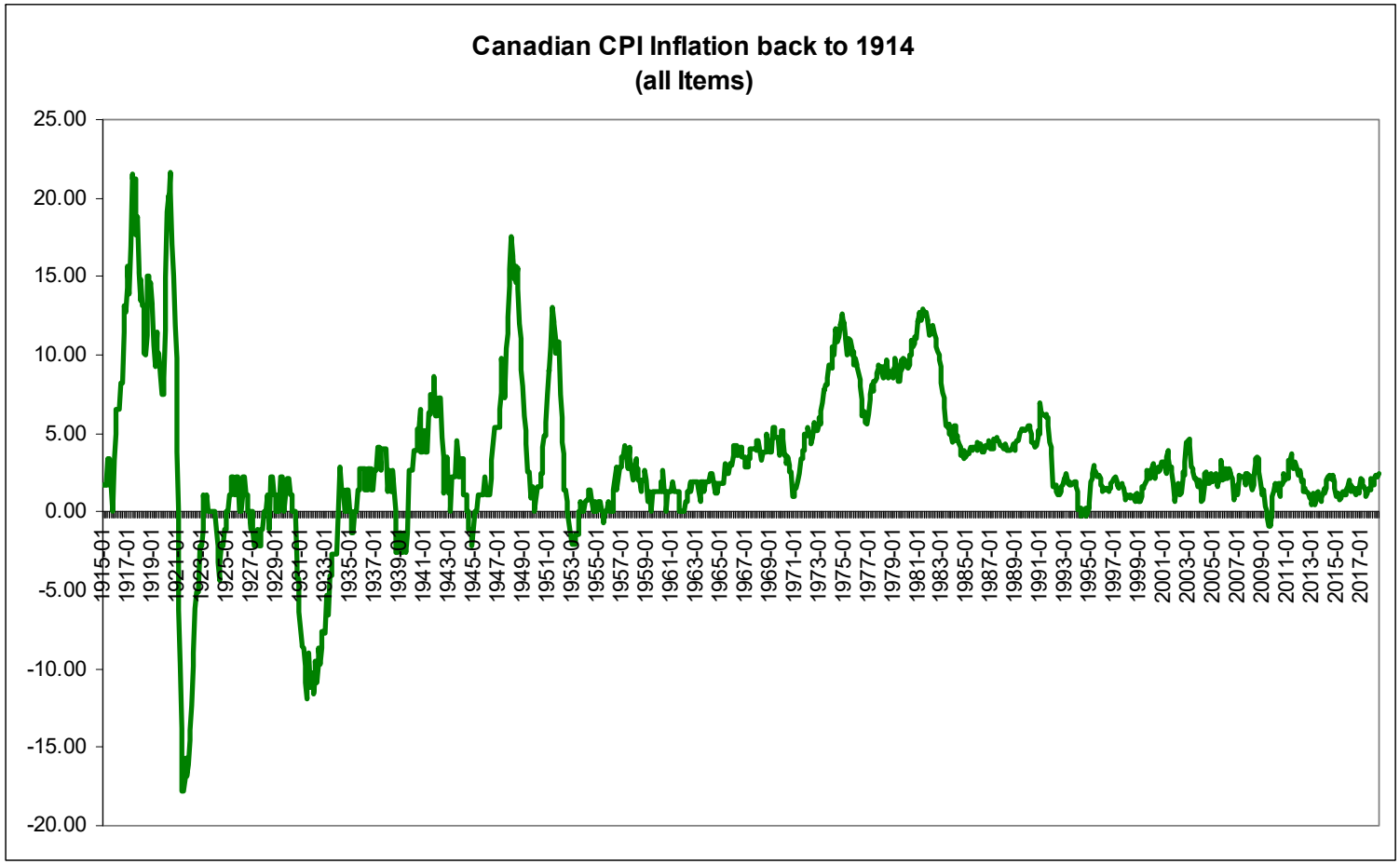
$$ROE \times \left(1 - \left(\frac{\text{Common Dividends}}{\text{Net Income before Discontinued Operations} - \text{Preferred Dividends}}\right)\right)$$

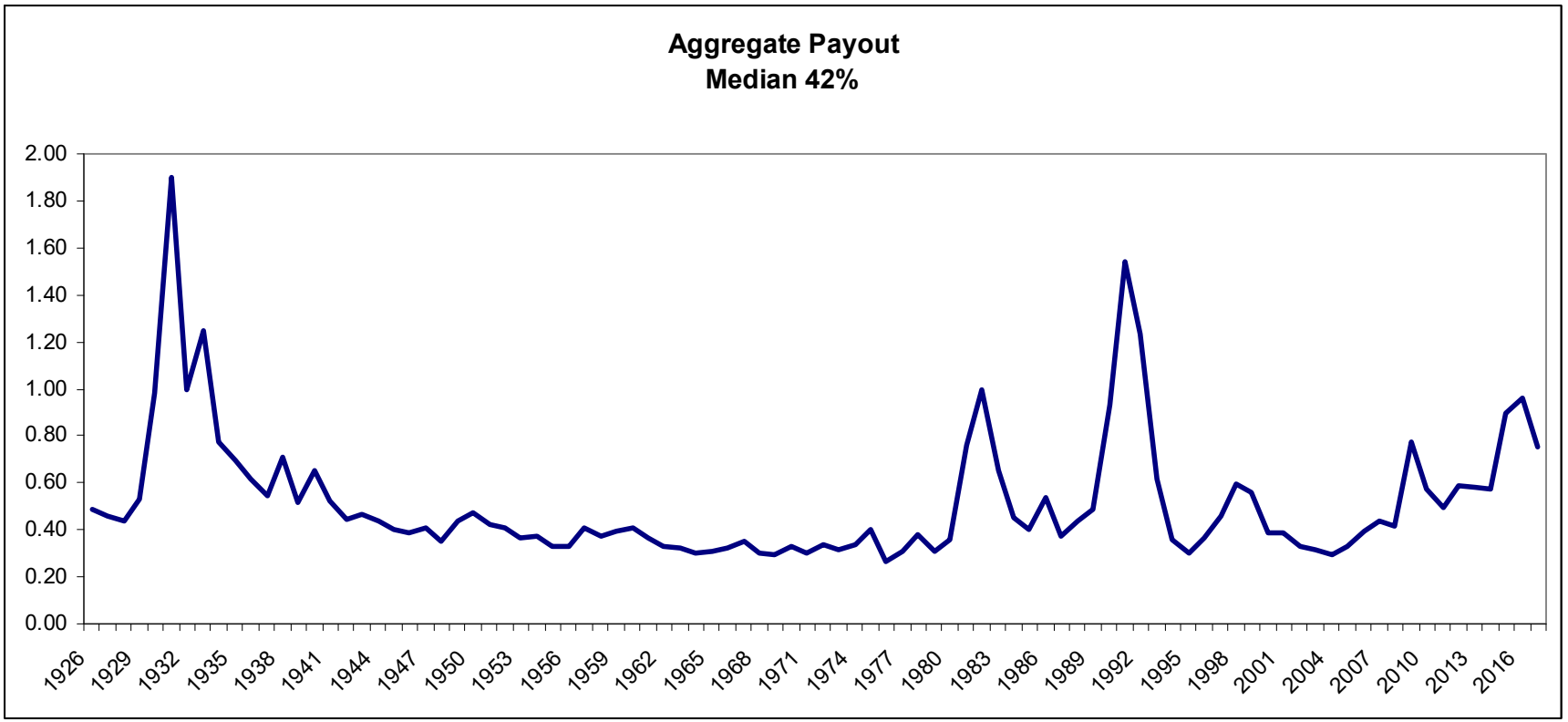
SCHEDULE 4


Dividend and Long Canada Bond Yields
Over 10 maturity bonds
18
16
14
12
10
8
6
4
2
0
1956M01
1961M01
1966M01
1971M01
1976M01
1981M01
1986M01
1991M01
1996M01
2001M01
2006M01
2011M01
TSXYield
Canadas

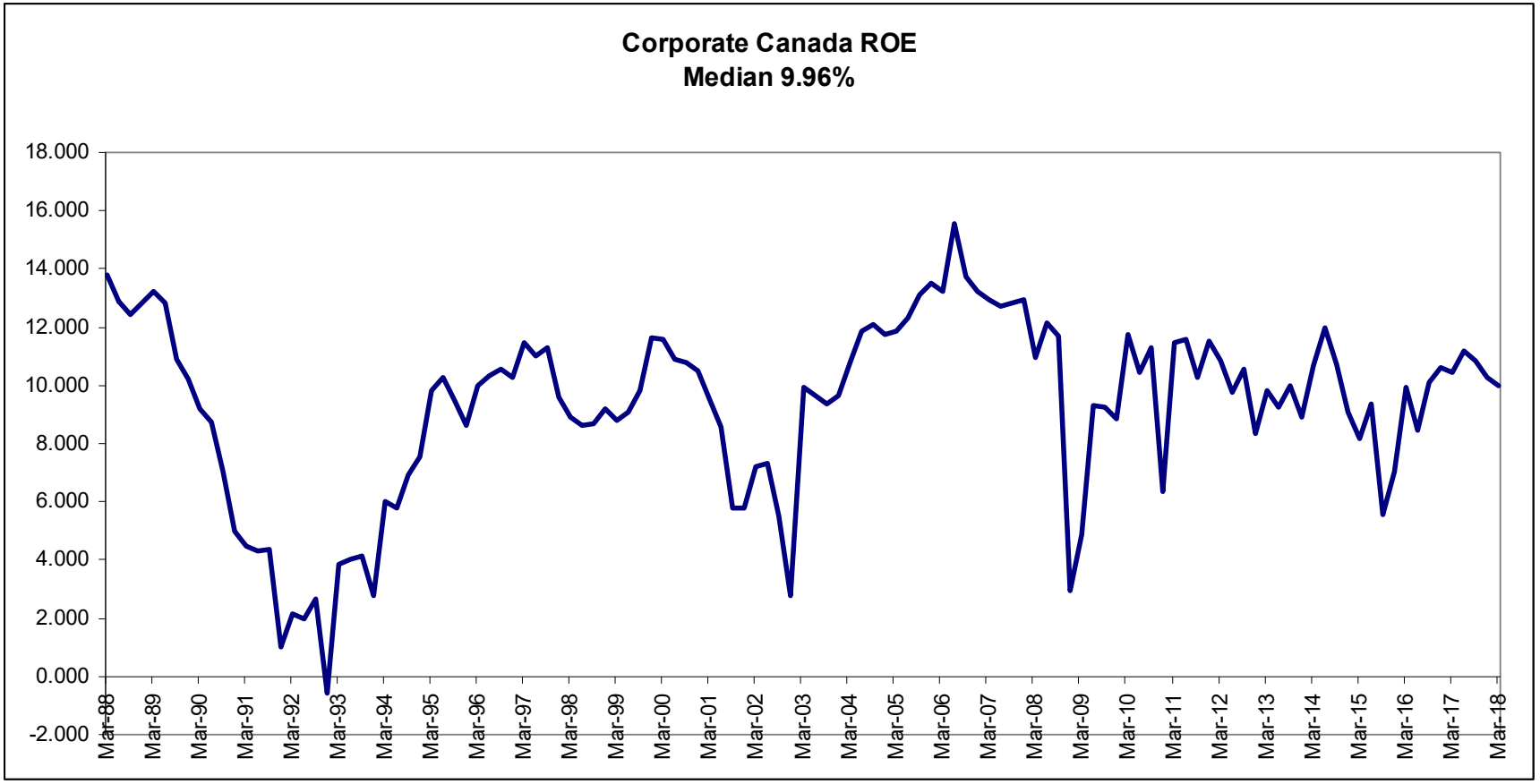


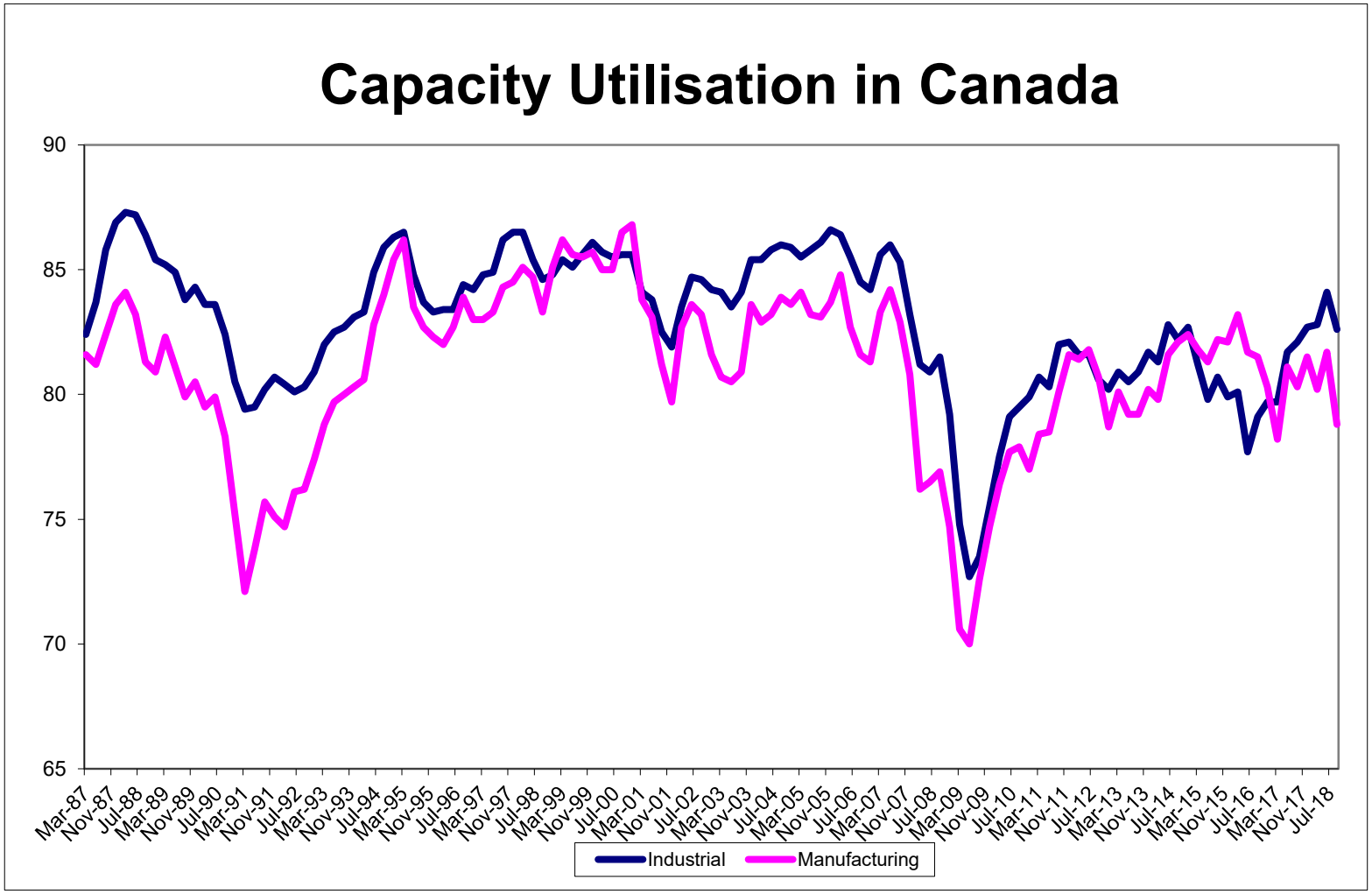
Note: Statistics Canada issued a new revision of the GDP accounts starting in June 2012 where there was a substantial revision to profits and dividends to reflect the importance of inter corporate dividend payments.


Canadian CPI Inflation back to 1914
(all Items)
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
1915-01
1917-01
1919-01
1921-01
1923-01
1925-01
1927-01
1929-01
1931-01
1933-01
1935-01
1937-01
1939-01
1941-01
1943-01
1945-01
1947-01
1949-01
1951-01
1953-01
1955-01
1957-01
1959-01
1961-01
1963-01
1965-01
1967-01
1969-01
1971-01
1973-01
1975-01
1977-01
1979-01
1981-01
1983-01
1985-01
1987-01
1989-01
1991-01
1993-01
1995-01
1997-01
1999-01
2001-01
2003-01
2005-01
2007-01
2009-01
2011-01
2013-01
2015-01
2017-01

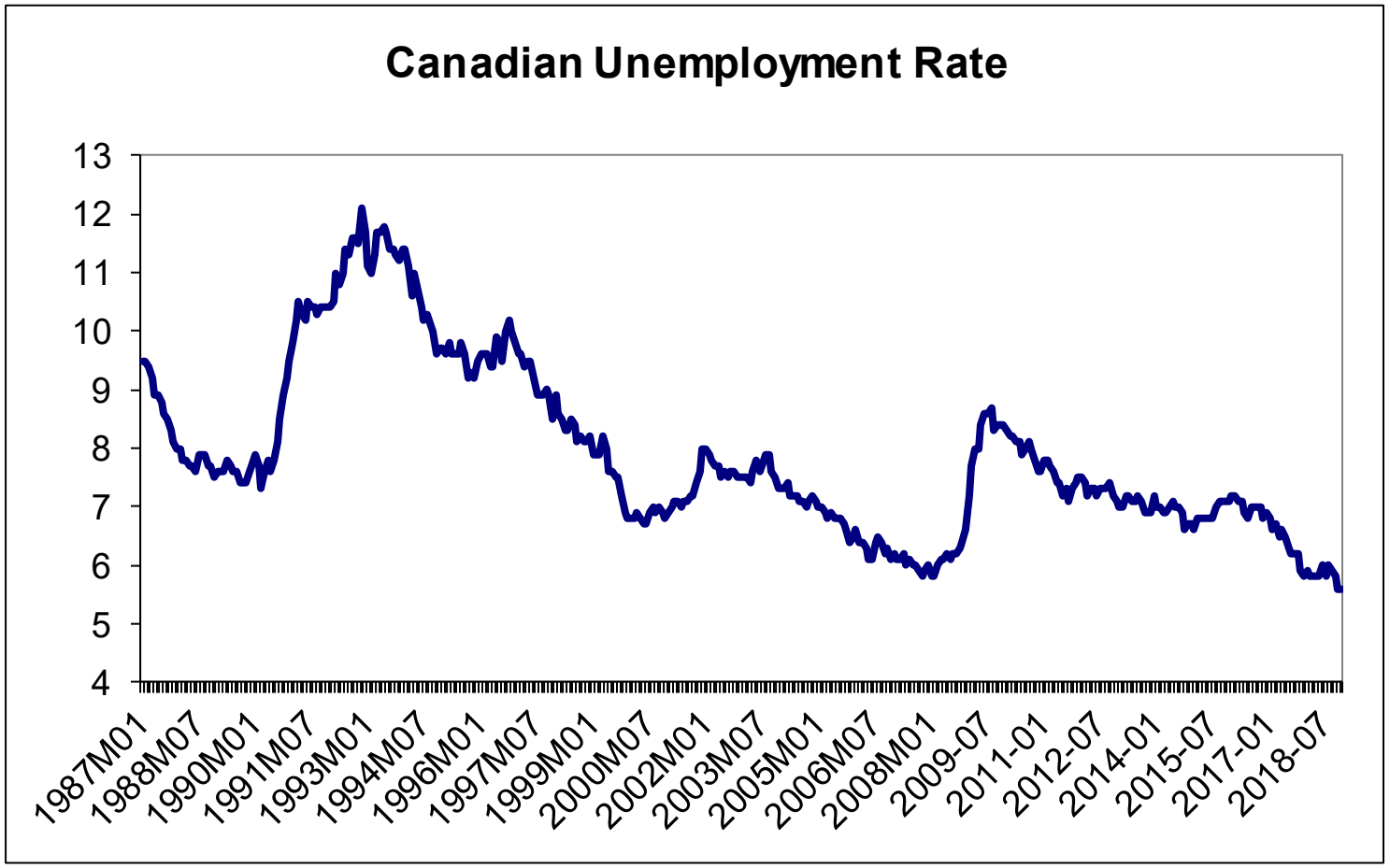

Aggregate Payout
Median 42%
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1926
1929
1932
1935
1938
1941
1944
1947
1950
1953
1956
1959
1962
1965
1968
1971
1974
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
2007
2010
2013
2016

SCHEDULE 8


Corporate Canada ROE
Median 9.96%
18.000
16.000
14.000
12.000
10.000
8.000
6.000
4.000
2.000
0.000
-2.000
Mar-88
Mar-89
Mar-90
Mar-91
Mar-92
Mar-93
Mar-94
Mar-95
Mar-96
Mar-97
Mar-98
Mar-99
Mar-00
Mar-01
Mar-02
Mar-03
Mar-04
Mar-05
Mar-06
Mar-07
Mar-08
Mar-09
Mar-10
Mar-11
Mar-12
Mar-13
Mar-14
Mar-15
Mar-16
Mar-17
Mar-18


Capacity Utilisation in Canada
90
85
80
75
70
65
Mar-87
Nov-87
Jul-88
Mar-89
Nov-89
Jul-90
Mar-91
Nov-91
Jul-92
Mar-93
Nov-93
Jul-94
Mar-95
Nov-95
Jul-96
Mar-97
Nov-97
Jul-98
Mar-99
Nov-99
Jul-00
Mar-01
Nov-01
Jul-02
Mar-03
Nov-03
Jul-04
Mar-05
Nov-05
Jul-06
Mar-07
Nov-07
Jul-08
Mar-09
Nov-09
Jul-10
Mar-11
Nov-11
Jul-12
Mar-13
Nov-13
Jul-14
Mar-15
Nov-15
Jul-16
Mar-17
Nov-17
Jul-18
Industrial
Manufacturing

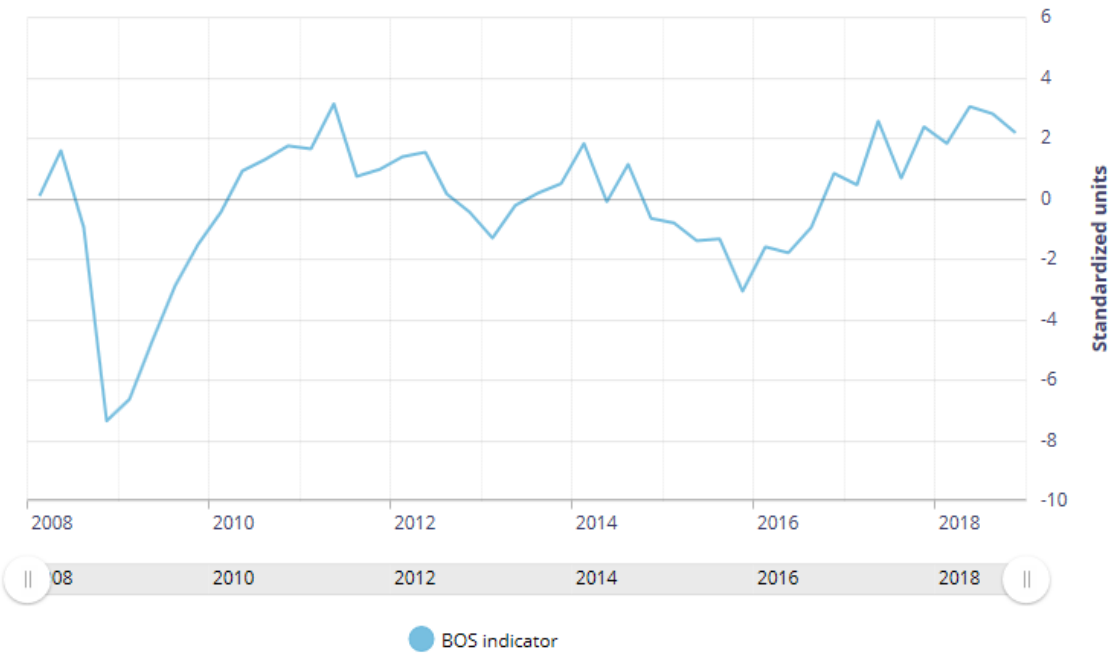
SCHEDULE 10


Canadian Unemployment Rate
13
12
11
10
9
8
7
6
5
4
1987M01
1988M07
1990M01
1991M07
1993M01
1994M07
1996M01
1997M07
1999M01
2000M07
2002M01
2003M07
2005M01
2006M07
2008M01
2009-07
2011-01
2012-07
2014-01
2015-07
2017-01
2018-07

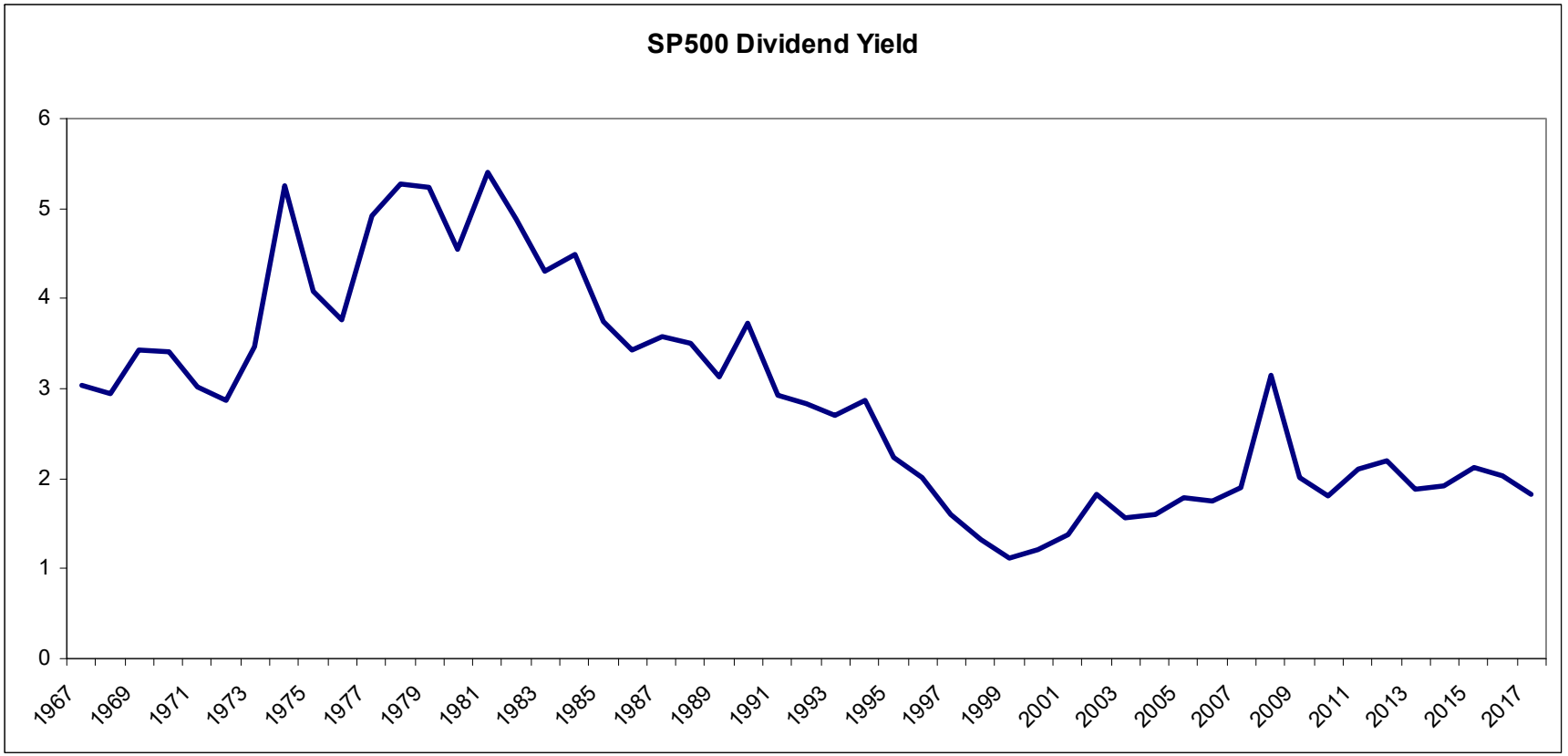
Business Outlook Survey indicator

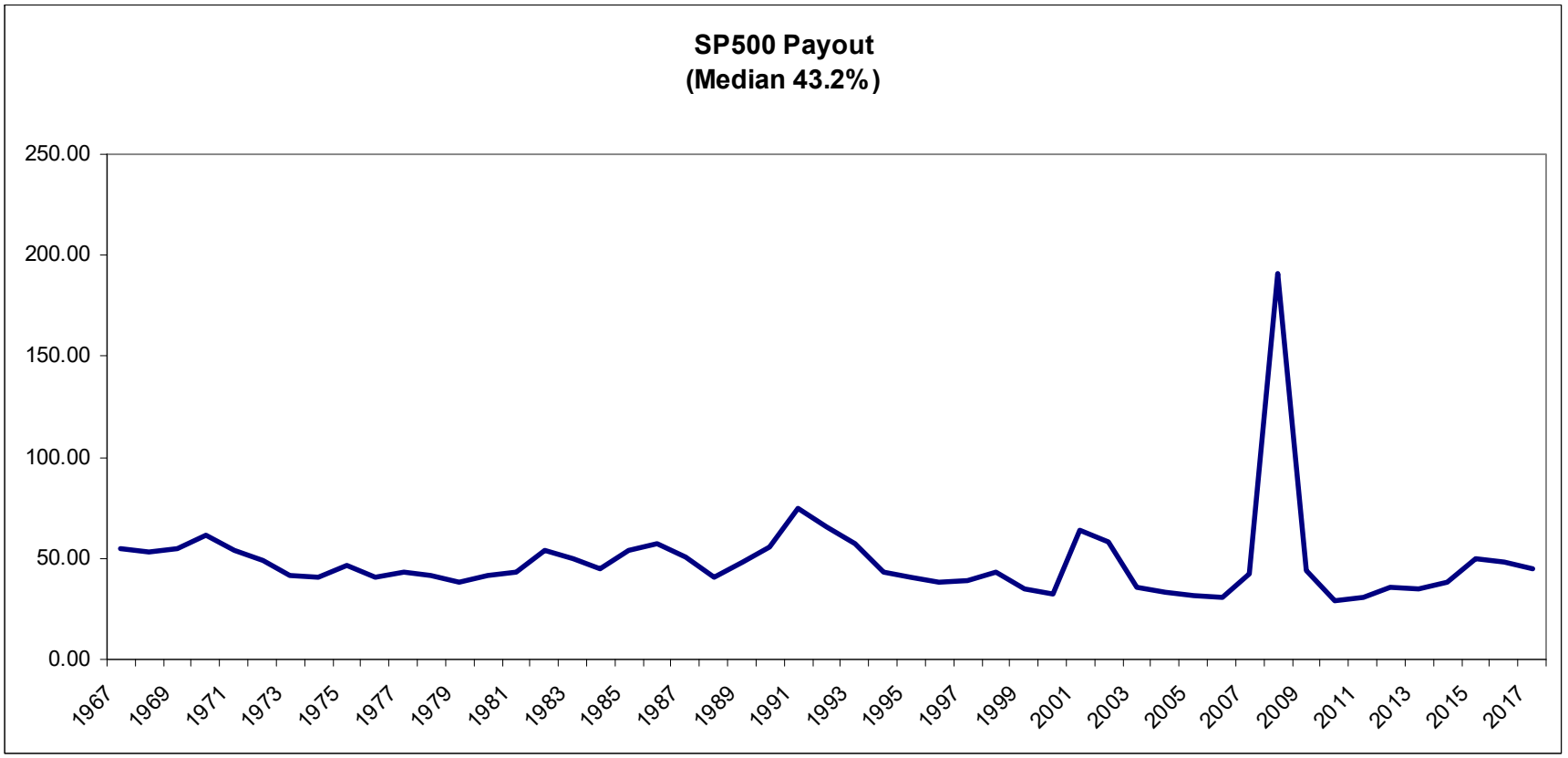
The Business Outlook Survey (BOS) indicator decreased slightly but remains elevated (**Chart 11**), as responses to almost all BOS survey questions are holding above their historical averages. This continues to signal that overall business sentiment is positive.

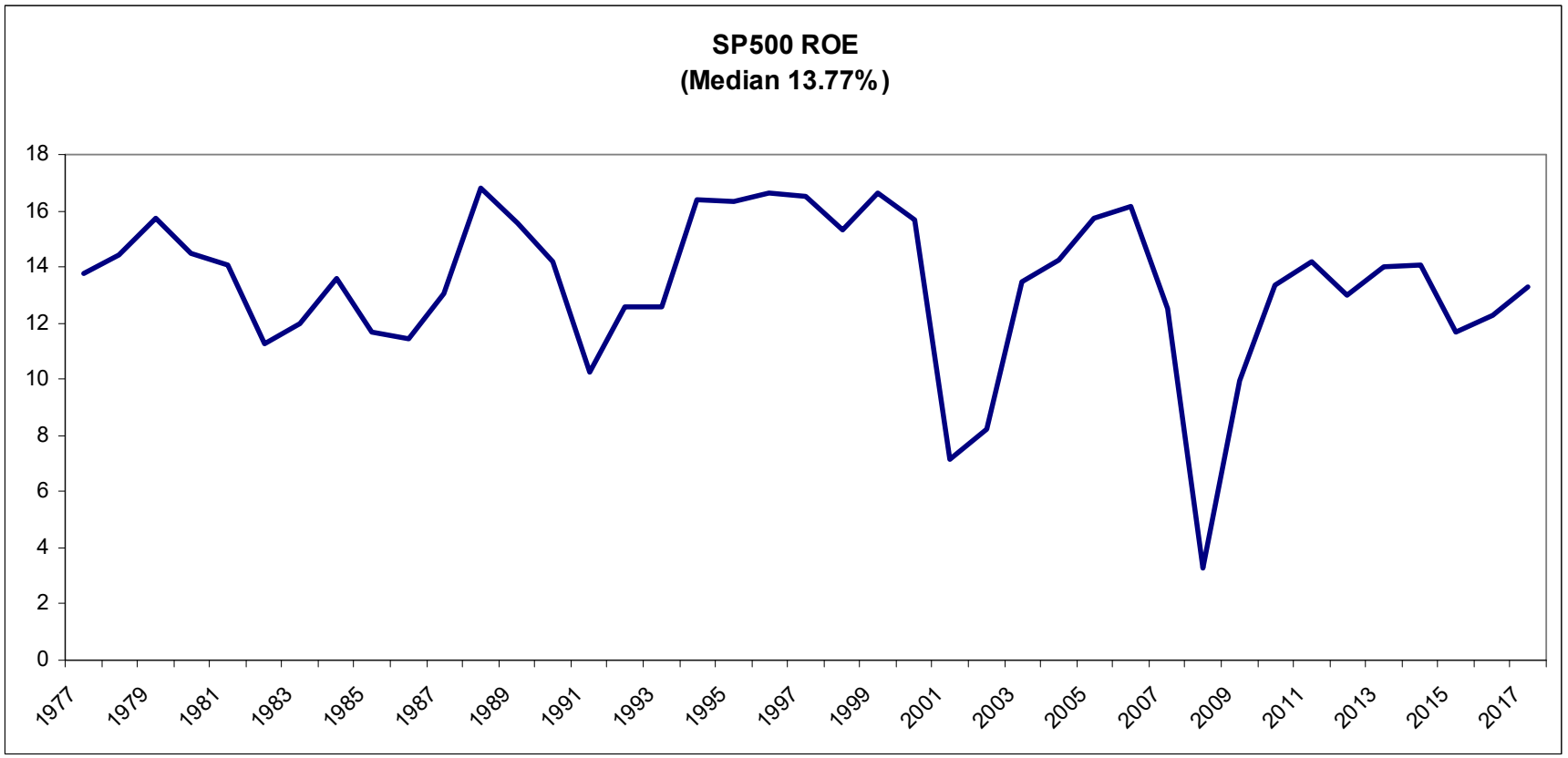
Chart 11: The BOS indicator decreased slightly but remains elevated



SCHEDULE 12


SP500 Dividend Yield
6
5
4
3
2
1
0
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017

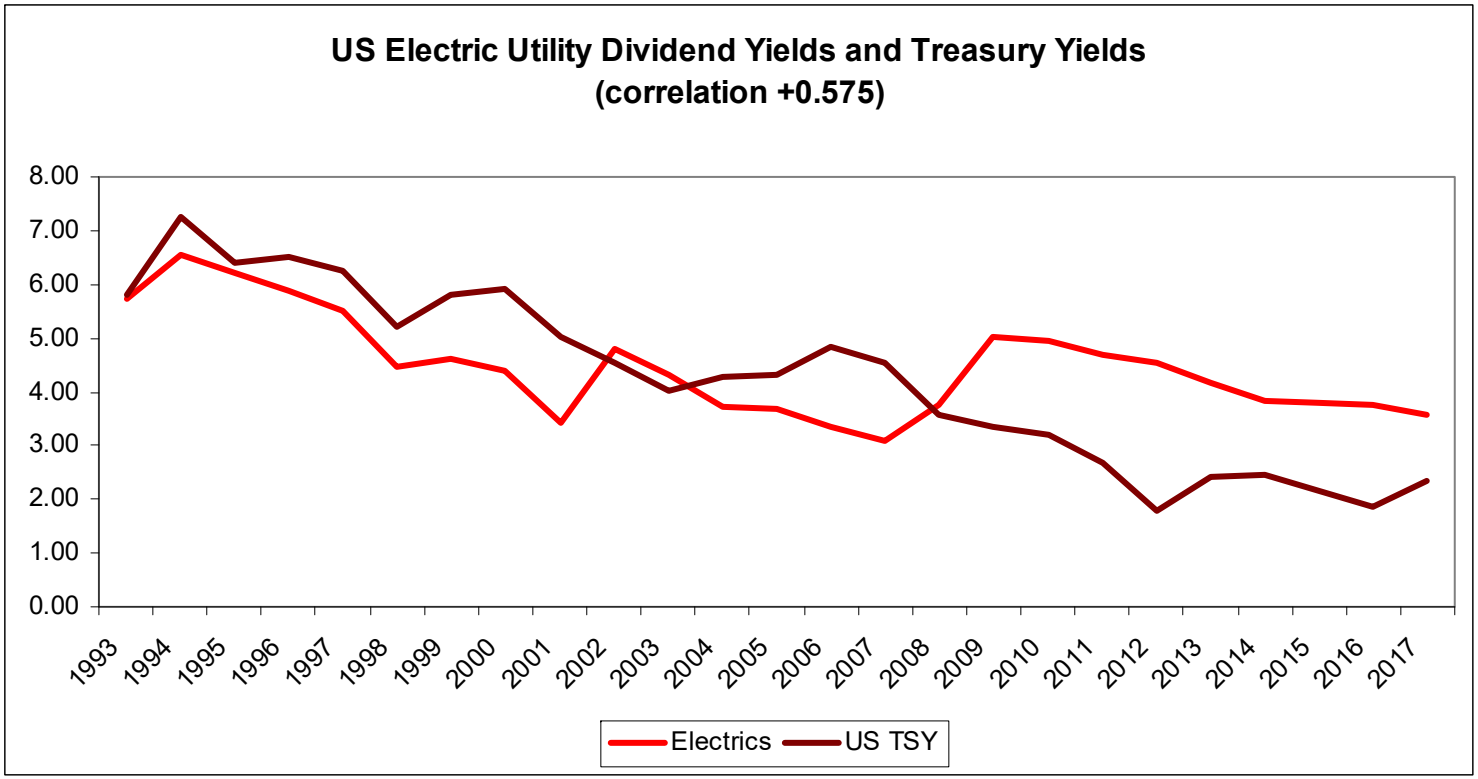

SP500 Payout
(Median 43.2%)
250.00
200.00
150.00
100.00
50.00
0.00
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017


SP500 ROE
(Median 13.77%)
18
16
14
12
10
8
6
4
2
0
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017

S&P Electric UHC Data

	EPS	DPS	PAYOUT	RETAIN	ROE	g (B*ROE)	YIELD	US TSY	K	MB	URP	URP2	URP3
1993	7.95	7.11	89.43	10.57	11.25	1.19	5.73	5.80	6.99	1.59	1.18	1.15	2.94
1994	8.45	7.05	83.43	16.57	11.71	1.94	6.55	7.25	8.62	1.37	1.37	1.24	2.35
1995	9.23	6.97	75.51	24.49	12.36	3.03	6.23	6.40	9.45	1.39	3.04	2.68	2.86
1996	9.07	6.96	76.74	23.26	11.64	2.71	5.86	6.52	8.73	1.43	2.21	2.04	2.37
1997	7.63	6.64	87.02	12.98	10.16	1.32	5.49	6.27	6.88	1.49	0.62	0.73	2.24
1998	8.52	6.5	76.20	23.80	11.05	2.63	4.45	5.20	7.19	1.82	2.00	1.98	2.23
1999	9.31	6.24	67.02	32.98	12.36	4.08	4.60	5.80	8.87	1.69	3.07	2.59	1.79
2000	6.06	6.36	104.95	-4.95	7.04	-0.35	4.40	5.90	4.04	1.80	-1.87	-2.07	1.48
2001	10.58	5.42	51.23	48.77	13.63	6.65	3.41	5.01	10.28	1.88	5.27	3.93	1.35
2002	7.31	5.93	81.12	18.88	10.18	1.92	4.82	4.53	6.83	1.63	2.30	2.46	3.28
2003	8.44	5.29	62.68	37.32	10.61	3.96	4.31	4.02	8.44	1.51	4.42	4.56	3.27
2004	11.12	5.77	51.89	48.11	12.37	5.95	3.74	4.28	9.91	1.68	5.63	4.93	2.42
2005	10.22	6.85	67.03	32.97	11.86	3.91	3.69	4.31	7.75	2.04	3.44	3.14	2.35
2006	12.35	6.99	56.60	43.40	12.68	5.50	3.37	4.82	9.06	2.13	4.24	3.46	1.50
2007	14.82	7.85	52.97	47.03	12.81	6.02	3.09	4.54	9.30	2.20	4.76	3.86	1.49
2008	15.27	8.57	56.12	43.88	12.83	5.63	3.75	3.57	9.59	1.92	6.03	5.18	3.15
2009	13.37	8.8	65.82	34.18	10.53	3.60	5.01	3.36	8.79	1.38	5.44	5.59	4.65
2010	14.56	9.06	62.23	37.77	10.96	4.14	4.96	3.19	9.30	1.38	6.12	6.12	4.76
2011	13.94	9.49	68.08	31.92	10.1	3.22	4.70	2.67	8.07	1.47	5.40	5.69	5.02
2012	12.46	9.78	78.49	21.51	8.38	1.80	4.53	1.80	6.41	1.45	4.62	5.20	5.72
2013	11.52	9.52	82.64	17.36	7.47	1.30	4.18	2.43	5.54	1.48	3.11	3.74	4.73
2014	12.67	9.43	74.43	25.57	8.04	2.06	3.82	2.46	5.95	1.57	3.49	4.27	4.32
2015	14.1	9.8	69.50	30.50	8.85	2.70	3.81	2.15	6.61	1.61	4.46	5.13	4.62
2016	7.56	10.32	136.51	-36.51	4.8	-1.75	3.77	1.87	1.95	1.74	0.08	-2.26	4.86
2017	14.29	10.57	73.97	26.03	8.8	2.29	3.57	2.34	5.94	1.82	3.60	4.18	4.18
average			**74.06**	**25.94**	**10.50**	**3.02**	**4.47**	**4.26**	**7.62**	**1.66**	**3.36**	**3.18**	**3.20**
Median			**73.97**	**26.03**	**10.96**	**2.71**	**4.40**	**4.31**	**8.07**	**1.61**	**3.49**	**3.74**	**2.94**

URP assumes actual br growth, URP2 assumes that the expected ROE is the median value and URP3 also assumes a median retention rate. Source data is Standard & Poors Analyst's Handbook 2018.


US Electric Utility Dividend Yields and Treasury Yields
(correlation +0.575)
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Electrics
US TSY

US Electrics

	5 year Growth Past	Future	# Analysts	Yield	K (Est g)	ROE	Retention	SUST G	K	MB	DPS	EPS	Beta
Duke Energy	0.51	4.41	7	4.3	***8.90***	6.84	0.12	0.85	***5.19***	1.41	3.6	4.11	0.07
Allete Inc.,	1.21	6	1	3.06	***9.24***	7.43	0.26	1.96	***5.08***	1.81	2.21	3	0.3
Eversource	5.86	5.83	6	3.03	***9.04***	9.21	0.39	3.61	***6.74***	1.84	1.99	3.27	0.26
OGE Energy	2.55	-2.25	2	3.38	***1.05***	17.41	0.60	10.46	***14.19***	1.98	1.33	3.33	0.5
Pinnacle West	6.98	4.11	4	3.37	***8.90***	9.77	0.38	3.73	***7.23***	1.76	2.78	4.5	0.11
Evergy	3.75	9.2	3	2.96	***12.43***	7.73	0.44	3.44	***6.50***	1.4	1.66	2.99	0.33
Alliant	5.59	6.9	2	3.2	***10.32***	11.41	0.41	4.69	***8.04***	2.17	1.32	2.24	0.22
American Electric	3.64	5.83	5	3.36	***9.39***	10.58	0.39	4.14	***7.64***	1.95	2.418	3.97	0.09
Edison International	0.56	3.75	5	4.16	***8.07***	2.97	-0.72	-2.13	***1.94***	1.48	2.42	1.41	-0.21
PNM	9.7	4.1	3	2.59	***6.80***	5.51	0.02	0.10	***2.69***	1.85	1.06	1.08	0.3
Southern	3.48	1.39	8	5.11	***6.57***	9.18	0.02	0.15	***5.27***	1.94	2.36	2.4	0.11
Average	3.98	4.48	4	3.50	***8.25***	8.91	0.21	2.82	***6.41***	1.78	2.10	2.94	0.19
Median	3.64	4.41	4	3.36	***8.90***	9.18	0.38	3.44	***6.50***	1.84	2.21	3.00	0.22

Wall St.'s woeful forecasting not getting better

David Parkinson The Globe and Mail

PublishedFriday, May. 21 2010, 6:00 PM EDT

http://www.theglobeandmail.com/globe-investor/investment-ideas/wall-sts-woeful-forecasting-not-getting-better/article4353202/

Nearly a decade ago - about the time the bursting tech bubble had raised serious questions about conflicts of interest in Wall Street equity research - consulting firm McKinsey & Co. did a study on the accuracy of analysts' company earnings forecasts. The results were discouraging: Analysts were routinely over-optimistic about earnings growth, too slow to revise forecasts when economic conditions changed, and prone to increasingly inaccurate forecasts when the economy slowed.

Since then, major scandals involving tainted research have come to light, Wall Street's biggest firms have paid $1.4-billion (U.S.) in penalties for those practices, and regulators have put rules in place aimed at creating equity research with more independence and distance from the investment-banking side of the business. Unfortunately, McKinsey reports, the changes have had little effect on the accuracy of analysts' projections.

Downturn reveals same old habits In an update of the 2001 study, McKinsey researchers found that from 2003 to 2006, analysts' earnings projections actually did look less unrealistically rosy. In each of those years, analysts, on average, actually underestimated S&P 500 annual earnings for significant portions of the year - and undershot through the entire year in 2005 and 2006.

But lest we think this was evidence of a new kind of thinking within Wall Street research departments, the Street's wide-eyed optimism came back with a vengeance starting in 2007.

Going back over the past 25 years, McKinsey found that, on average, analysts' earnings-growth forecasts "have been nearly 100-per-cent too high." Annual S&P 500 consensus growth forecasts have typically been in the 10- to 12-per-cent range, while actual earnings growth has averaged 6 per cent.

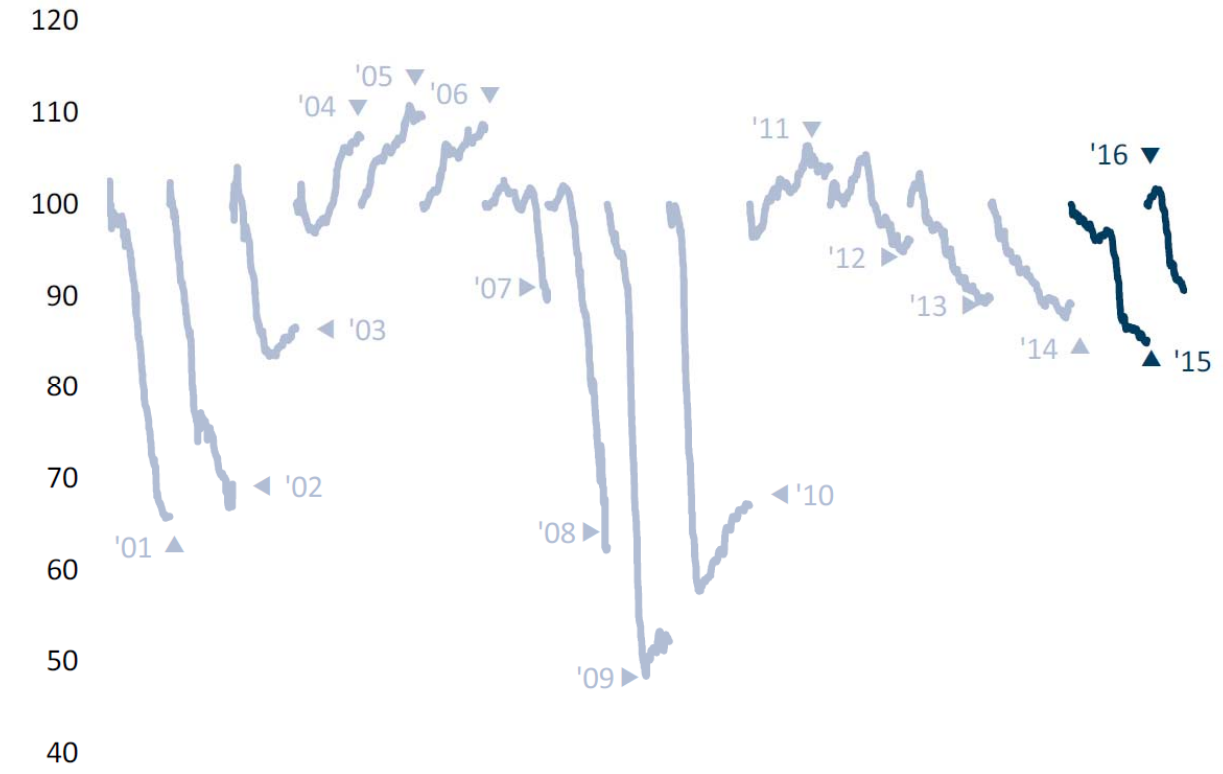
Broken-clock accuracy Looking at five-year rolling average growth estimates, there have only been two periods in the past 25 years when the earnings met or exceeded analysts' forecasts. Both were in recovery periods after the U.S. recessions of the early 1990s and the early 2000s.

"This pattern confirms our earlier findings that analysts typically lag behind events in revising their forecasts to reflect new economic conditions," McKinsey researchers wrote. "When economic growth accelerates, the size of the forecast error declines; when economic growth slows, it increases."

This pattern means that when the analysts are accurate with their forecasts, it's sort of the same way a broken clock is accurate - twice a day.

"As economic growth cycles up and down, the actual earnings S&P 500 companies report occasionally coincide with the analysts' forecasts."

Consensus Bottom-Up S&P 500 EPS Forecasts (Indexed to 100)



Note: Estimates are bottom-up and indexed to 100; shown from initial release through final/most recent results.
Source: S&P, Thomson Financial, Compustat, FactSet and RBC Capital Markets

Source: RBC Investment Strategy Playbook, February 2016