Corrected May 28, 2008
EB-2007-0905
Exhibit M
Tab 3

FAIR RETURN AND CAPITAL STRUCTURE FOR

ONTARIO POWER GENERATION

EVIDENCE of

Laurence D. Booth

BEFORE THE

Ontario Energy Board

April 2008

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Vulnerable Energy Consumers Coalition (VECC) and the Consumers Council of Canada (CCC) have asked me to provide an independent assessment of the appropriate ROE and capital structure for Ontario Power Generation Inc (OPG) and to assess its business risk. My overall assessment is:

- The Canadian economy is slowing and the US economy is probably in recession as it adjusts to the credit problems caused by the fall-out from the US sub-prime mortgage market. As a result there has been the normal cyclical "flight to quality" as investors shed risky securities to invest in the safe harbour of government bonds as markets weaken. Consequently, while long Canada bond yields have weakened, credit spreads for even high grade credits have widened significantly and inflation has moderated to marginally below the middle of the 1.0-3.0% operating range of the Bank of Canada.

- I continue to recommend that regulatory boards should adjust for changes in business risk wherever possible through the use of deferral accounts and common equity ratio adjustments, rather than through changes in the ROE. This allows the use of ROE adjustment formulas in a mechanical way to avoid ROE hearings. I therefore support the use of deferral accounts to moderate the business risk of OPG, so that it can be treated similar to any other utilities under the jurisdiction of the Ontario Energy Board (the Board).

- I would place the business risk of OPG as marginally higher than that of either of the two natural gas distribution companies, Union Gas Ltd and Enbridge Gas Distribution Inc (EGDI), or Hydro One Transmission or the electricity distribution companies, all of which are regulated by the Board. However, given the extensive regulatory protection afforded OPG and the fact that the regulated operations are base-load units I would judge a 40% common equity ratio to be sufficient to equalise OPG's risk with that of these other utilities.

- Although in an absolute sense, nuclear generation is inherently more risky than Hydro, I would use the same common equity ratio for both. The reasons for this are that the major risks are not borne by OPG, but by ratepayers through the extensive use of deferral accounts. Further it would be my expectation that should a significant risk materialise, the Province would intervene to allocate the costs either to ratepayers or taxpayers. In this respect it is important to "pierce the corporate veil" and recognise that OPG is still owned by the people of this province and it is ***they*** who will bear the risks attached to nuclear whether as taxpayers, shareholders or ratepayers. It is then ***double counting*** the risks of nuclear to charge ratepayers higher financial costs, through ROE and the common equity ratio, while also having them bear substantially all the risks.

- Risk also has to be assessed in a relative sense from the point of view of capital markets. This is the conventional way of assessing risk from the point of an investor holding a diversified portfolio. Here it is difficult to think of the technological and production risks of nuclear as being ***market risks*** associated with other investments held in a diversified portfolio. It would be my contention that the risks attached to nuclear are largely uncorrelated with the risks faced by an investor holding a diversified portfolio similar to other utilities.

- However, this risk assessment is based on existing assets with OPG's risk mitigated by deferral accounts; OPG is then making a fundamental mistake in using the same discount rate (hurdle rate) for evaluating ***new*** investments (L-3-1-2c) in all its generating assets. For new project appraisal OPG should be taking into account the total risks imposed on ratepayers, taxpayers and investors. It is disturbing that OPG has not analysed the social cost of capital (L-3-1-3h) or taken into account the total risks that new nuclear investments impose over and above the risks of hydro and peaking assets. In making the same mistakes as the old Ontario Hydro, rate payers are implicitly being asked to bear the same risks that lead to the $20 billion stranded nuclear debt charge. Such a practise is contrary to any and all financial principles that I am aware of.

- Using traditional risk premium tests I continue to judge utilities as having a relative risk rating of 45-55% of the overall market. Given that I make risk adjustments through the common equity ratio I would use a value of 0.50 for a representative or benchmark utility.

- I estimate the current market risk premium consistent with long Canada bond yields at the 4.5-4.75% level, to be 5.0%. Market risk premium studies support this 5.0% estimate, which is higher than realised market risk premiums for the fifty years. Including estimates from a multi-factor risk premium model gives an average fair return of approximately 7.25%, adding in a 50 basis point "cushion" gives a fair ROE of 7.75%.

- In my judgement current formula allowed ROEs are excessive across Canada and have failed to recognize that the use of an adjustment mechanism has ***lowered*** the investment risk attached to Canadian utilities and converted their equity into a form of floating rate preferred share, where observed yields are significantly lower than current allowed ROEs.

- It is the generosity of current allowed ROEs that has caused utility assets to be valued above their book values. The evidence from takeovers of Canadian utilities indicates that they are attractive investments since the takeovers are uniformly at significant premiums to book value. Once it is recognised that the takeover premium is a non-earning asset it, is obvious that investors are willing to "eat through" this non-earning asset simply to get the return from the book assets in the rate base. In turn this implies that these assets are being allowed a too-generous rate of return.

- Evidence from US natural gas utilities indicates that despite less regulatory protection, like Canadian utilities, the market also views them as very low risk.

- It is my judgement that OPG has sufficient financial flexibility to access capital markets on reasonable terms with a 7.75% ROE on a 40% common equity ratio.

1.0 INTRODUCTION

Q. PLEASE DESCRIBE YOUR NAME, QUALIFICATIONS AND EXPERIENCE.

A. Laurence Booth is a professor of finance and finance area co-ordinator in the Rotman School of Management at the University of Toronto, where he holds the CIT Chair in Structured Finance. A detailed resume is filed as Appendix A to this testimony. Further information and copies of working papers by Dr. Booth can be can be downloaded from his web site at the University of Toronto at http://www.rotman.utoronto.ca/~booth.

Dr. Booth has recently filed testimony before the Ontario Energy Board providing an expert opinion on the financial parameters of Union Gas Ltd, Enbridge Gas Distribution, and Hydro One Transmission. He has also appeared before most of the major utility regulatory boards in Canada including the National Energy Board and the CRTC.

Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY AND ITS ORGANISATION

A. The Consumers Council of Canada (CCC) and the Vulnerable Energy Consumers Coalition (VECC) have asked me to provide an independent assessment of the appropriate common equity ratio for Ontario Power Generation Inc (OPG), to assess its business risk, to make a recommendation on its fair ROE and recommend an appropriate adjustment mechanism to adjust this ROE in the future.

In doing this I first look at the current economic and capital market conditions since the fair ROE and capital structure stem from the ability of a utility to raise capital to finance operations and this varies with the economy and capital market conditions. I then discuss the regulatory compact and how this affects the risk borne by shareholders. Here I discuss the risk of OPG and how it is allocated to ratepayers and shareholders. I then discuss estimates of the fair ROE and an appropriate adjustment mechanism before concluding by considering the fairness of the overall recommendations and the (ir) relevance of certain issues in the capital market. A series of appendices contain much of the detailed analysis

However, before considering my testimony in detail I would like to emphasise that the issues before the Board all revolve around risk. The risk of a firm's operations can be allocated to various stakeholders in the firm, but whereas shareholders bear these risks in a competitive firm, it is invariably the *ratepayers* that bear these risks in regulated utilities. This is particularly true when the utility in question is a quasi crown corporation like OPG and ultimately owned by the people of the province of Ontario, who are also electricity users, tax payers and ratepayers. The fact that the ratepayers and the shareholders are largely the same is reinforced by the fact that it is the government of the province of Ontario that owns the shares in OPG and also acts on behalf of the ratepayers and taxpayers in setting energy policy. As a result the normal separation of owners and ratepayers does not obtain: they are largely the same entity. The memorandum of understanding (MOU) between the province and OPG recognises the importance of OPG to the province and the implicit fact that it is the Province of Ontario that ultimately bears the risk or at the very least determines how that risk is allocated.

In this regard OPG can not be "harmed" to the extent of requiring a "risk premium," if the owners voluntarily take measures that harm themselves as owners and yet help themselves as ratepayers. ***In this respect, and contrary to Ms. McShane's assertions (T1-S1-P11-13), it is incorrect to state that the stand alone principle means that we should ignore the actual owners of the utility***. The cost of capital is determined by investors who own the shares, not by others who have no interest in it.

Here two points are important:

1) First, the standalone principal simply asserts that there should not be any subsidies in the operation of the utility. This is important when services are provided to the utility by non-arms length firms within a holding company structure. Otherwise ratepayers could be charged more than the fair cost for services rendered to the utility. However, it does not mean that ratepayers should be charged a phantom "risk premium" as if the utility were owned by a third party.

2) Second, the cost of capital is the ***minimum*** rate of return required by investors in a firm. The fair return is then this minimum plus a financial flexibility allowance. The

cost of capital then ignores the return requirement of non-investors, since they have not invested in the firm and implicitly have a higher required rate of return: by definition if they had a lower rate of return they would have valued the asset more highly and invested in it! The fact that the province remains the sole owner and is unwilling to sell off the assets is a critical fact and indicates that these assets are more valuable to the province than to other investors. This fact can not be ignored.

2.0 FINANCIAL AND ECONOMIC OUTLOOK

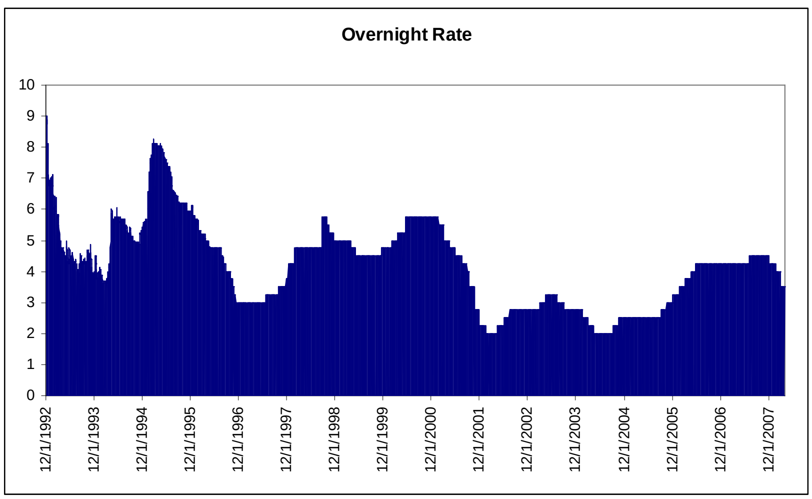
Q. WHAT ARE CAPITAL MARKET CONDITIONS AT PRESENT?

A. Basic macroeconomic data for the last twenty plus years is provided as background in Schedule 1. Economic conditions can sometimes change quite rapidly as the impact of hurricanes and oil price shocks are unpredictable. However, there is a rhythm to the economy, which reflects the momentum as shocks gradually work through the system; this is what is generally referred to as the business cycle. The basic economic variable here is the rate of economic growth. The trend line for economic growth is around 3.0%, while some believe that potential GDP can now grow slightly faster due to increases in total factor productivity, largely resulting from the application of information technology. So that periods with growth significantly below that level are periods of contraction or recession, whereas periods of growth significantly above that are expansionary periods.

Looking back over the last twenty years indicates that from 1989 until 1993 Canada was mired in a deep recession in response to a normal cyclical slowdown as well as restructuring that accompanied the passage of the Free Trade Agreement (FTA). We can also see the strong economy of the mid 1980s and again the mid to late 1990s, when real economic growth was over 4.0% as the output gap caused by the recession was soaked up. More recently, we can see the mild slowdown of the early 2000's as recession in the United States and the effects of the stock market crash in Canada weakened the economy. The recovery was then slowed in 2003 as Canada was hit by a "perfect storm" of a strengthening exchange rate, slowing growth in the United States, severe acute respiratory syndrome (SARS) and a single incident of BSE or mad cow disease. These effects were largely temporary as the Bank of Canada lowered interest rates in July 2003 and economic growth picked up to close to trend.

Most recently we have again had good economic growth as strong growth soaked up the remaining available labour and the unemployment rate dropped to 6.2% in 2007 and has recently been below the natural or non-accelerating inflation rate of unemployment (Nairu) of 6.0%. Consumer spending has been strong as low interest rates supported the purchase of consumer durables, as well as record residential housing sales as housing starts exceeded 200,000 for the sixth year in a row. Further Business investment has remained strong with inventory rebuilding and a planned increase of 6% in business investment forecast for 2008. This business investment has been propelled by an increase in oilsands investment, which has grown from $5.3 billion in 2003 to a projected $19.7 billion in 2008, eclipsing the 7% forecasted increase in manufacturing investment of $19.6 billion.

The dramatic improvement in Canada's terms of trade (export versus import prices) has supported the perception that Canada has again become a petro, or at least a raw materials, based economy. This allied to the continuing strength of the current account surplus running at 1.0% of GDP, lead to a strengthening Canadian dollar and incipient inflationary pressures. The result was that in September 2005 the Bank of Canada started increasing its overnight rate from 2.50% to reduce the stimulus that it was injecting into the financial system. As the following graph shows this tighter monetary policy continued throughout 2006 into the start of December 2007 when the target overnight rate was cut from 4.5% to 4.25%.



The reason for the change in monetary policy is the financial problems stemming from the sub-prime crisis in the United States and its spill-over effects into Canada. The crisis actually started in the US at the end of 2006 as US house prices peaked and started to fall, but it wasn't until July 2007 with the failure of two hedge funds managed by Bear Sterns that investors realised that it was spreading beyond the mortgage markets. The reason for this is that faced with declining house prices purchasers were increasingly drawn into mortgages by some or all of the following:

- Teaser low interest rates for short periods of time;
- No down payment;
- No verification of income

The fact that often the mortgage originator did not keep the mortgage, but sold it off to others, primarily hedge funds and asset backed commercial paper issuers, meant that the normal checks in the lending process broke down and the quality of these "sub-prime" mortgages was far worse than anticipated.

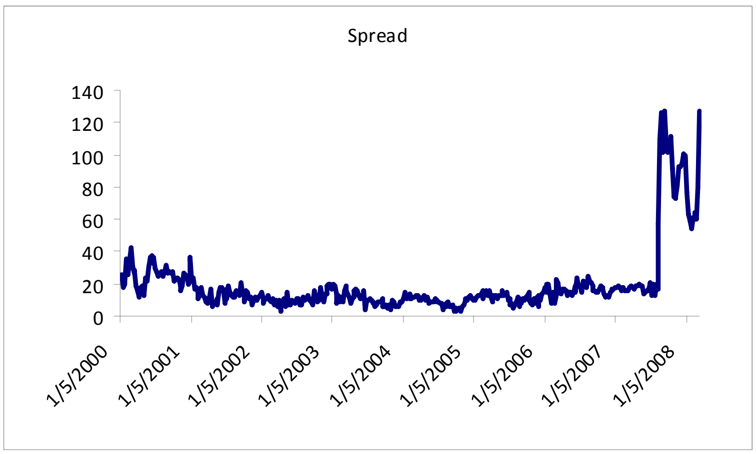
The crisis broke in August 2007 when funds that had issued commercial paper to invest in mortgage related assets could not roll over the commercial paper as investors bolted from anything associated with sub-prime US mortgage debt. In Canada this lead to the Montreal Accord as about $30 billion in asset backed commercial paper was essentially frozen and turned into long term notes. However, in the US the real damage became apparent as Citigroup and Merril Lynch wrote off tens of billions of losses and sought emergency equity infusions from offshore sovereign wealth funds, and the Fed had to put together a "rescue package" on March 16, 2008 to get JP Morgan to buy Bear Sterns for $2 a share, when Bear was selling for $155 the previous summer.[1]

The result in the US has been fear of any sort of credit risk and a rush to quality as lenders have belatedly increased credit standards. Further home owners are believed to be using credit cards and other forms of debt to stay in their houses and lenders are bracing for a rash of delinquencies on home equity loans and credit card loans as well as on mortgages. In response the Federal Reserve has dramatically cut interest rates, bailed out Bear Sterns and made repurchase

[1] Approximately $130 billion in sub prime mortgages have been written off so far and estimates of actual losses go as high as $250 billion, prompting some to believe that the crisis has far from passed.

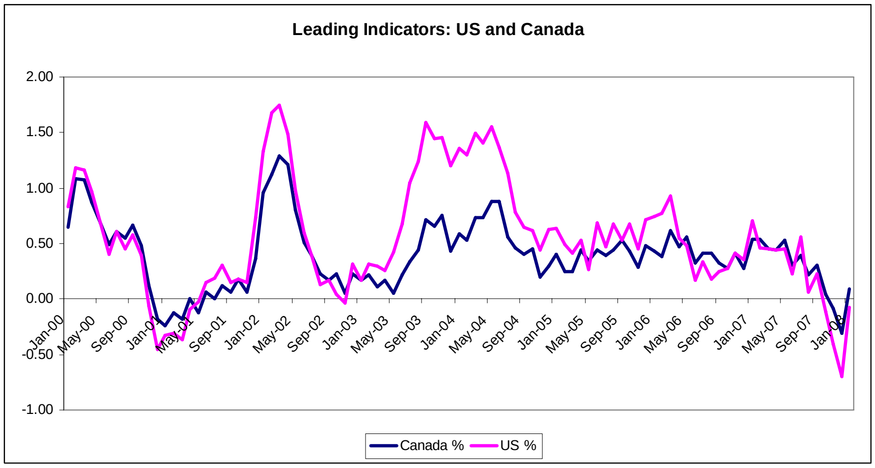
agreements more widely available in the financial system in an attempt to stop the credit crisis from tipping the US into a full blown recession.

These US problems have percolated into Canada directly through losses at CIBC and the National Bank on asset backed commercial paper and indirectly through heightened credit standards and the fear of a US recession. The following graph indicates the impact the credit squeeze has had on lenders. It graphs the spread between the 91 day Treasury bill yield and that on 90 day commercial paper.



Only the very safest of issuers can borrow on the basis of a promise to repay in 90 days, so normally the spreads over Government of Canada treasury bills is a tiny 0.1-0.2% on an annual basis. On August 15, 2007 this promptly jumped to 0.57% and then the next day to over 1.0% and has been at very high levels ever since.

Whether the US is in a recession at the moment will not be known for some time, but the leading indicators in both the US and Canada have both turned down and it will take some time for the monetary stimulus to work through the economy. As a result the current outlook is for sub-par economic growth, probably marginally below 2.0% through 2008 with a pickup back to trend for 2009 as more normal markets reassert themselves.



Q. WHAT IS YOUR OUTLOOK FOR INFLATION?

A. The Canadian economy has experienced low and stable inflation together with reasonably strong economic growth for the past several years. The graph in Schedule 2 shows the average CPI inflation rate since 1951. What is clear is the enormous run up in inflation from the early 1950's through to its peak in the early 1980s. Since then it dropped to plateau at the 4.0% level through the 1980s before the effects of the major slow down in the early 1990s caused it to drop to its cyclical low in 1994/5, where it almost touched price stability. Since that time changes in the consumer price index have remained close to the middle of the Governor of the Bank of Canada's 1-3% range.

Schedule 3 graphs the average annual inflation rate along with the average yield on long Canada bonds and Treasury Bills since 1961. The graph shows that prior to 1981, inflation was increasing steadily, until the Bank of Canada engineered a recession in 1982-3 to bring inflation under control. Similarly, in the late 1980's there was a gradual increase in inflation and wage settlements that peaked about 1991, as again, the Bank of Canada engineered a recession to bring down the rate of inflation. Although the absolute rate of inflation has been brought down considerably from these earlier periods, the same pattern of increasing inflation from 1994-2001 is evident as in the earlier periods of 1986-1990 and 1976-1982. In each case, interest rate increases slowed down the economy and with it the rate of inflation. We can also see the effects of the Bank of Canada's tightening during 2006 as the 91 day Treasury Bill yield increased so that by the end of the year it was almost at the same level as the long Canada bond yield, so that we had a flat yield curve indicating a slowing economy.

Schedule 5 shows that the long Canada real bond yielded 1.65% on March, 28, 2008, or 2.32% below the equivalent nominal bond yield of 3.97%. The real bond guarantees the investor protection from inflation, whereas the nominal bond has built into the yield compensation for both the expected rate of inflation and a real yield. As a result, the spread between the nominal and real rate, which is called the break-even inflation rate (BEIR) marginally overstates the market's inflationary expectations. Other measures of inflation come in slightly lower as the GDP deflator has been running at under 2.0% and the core rate of inflation even lower as Canada's terms of trade improve and retailers try to combat cross border shoppers by lowering prices. Currently the Consensus Economics forecast for 2008 is 1.8% rising to 1.9% for 2009 and given the success of the Bank of Canada in combating inflation it is difficult to believe that long run CPI inflation will be outside its 1-3% operating band.

The graph in Schedule 4 shows the aggregate net lending of governments in Canada, where a negative number indicates government borrowing or a fiscal deficit. What is clear from Schedule 4 is the dramatic improvement in the fiscal position of all layers of government since the early 1990s and their return to balanced budgets. This in turn has reduced the supply of government bonds and the need for the Bank of Canada to follow accommodative monetary policy, which in turn has supported the drop in inflation. In January 2008 the GST tax rate was cut to 5% which further reinforces the continuation of low inflation, while the recent Monetary Policy Update by the Bank of Canada (January 2008) indicates confidence that core inflation will remain at the 2.0% target inflation level through 2009.

Q. WHAT IS YOUR INTEREST RATE FORECAST?

A. Schedule 5 provides data on the full range of interest rates across the broad maturity spectrum as of March 28, 2008. What is evident is that interest rates for long maturity instruments are now much higher than they are at the short end of the maturity spectrum; this is referred to as a 'normal' or positively sloped yield curve. Schedule 3 charts the history of short and long term interest rates together with inflation since 1961. It is clear that short term Treasury bill yields have continued their long decline from their peaks in 1981 as inflation has receded. This long run decline has been punctuated by periods when Treasury bill yields have increased to support the dollar (1996) or fight a too vigorous economy (late 1980's, late 1990's and mid

2000's). In contrast, long-term rates have continued their gradual year over year decline without these peaks. This is because long-term bond investors look not just at the next 91 days, but far off into the future. As such, long-term bond yields reflect the *long*-term future of the Canadian economy, while T-Bill yields reflect *short*-term expectations.

Another way of looking at the impact of the Bank of Canada's monetary policy is to recognise that monetary policy works through both interest rates and the exchange rate: higher interest rates and a stronger dollar together slow down the economy by impacting interest sensitive and export industries. To examine both of these effects, the Bank of Canada created a "monetary conditions index" or MCI, which is reproduced in the graph in Schedule 6. Again, the dramatic changes since the early 1990's are evident, as the MCI increased dramatically. We can also see the long run monetary loosening ending around 1998 with the levelling off of the MCI as the Bank of Canada started to worry about a too strong economy. This policy stance was reversed by the end of 2001 as the stock market crashed, and the effects of 9/11 exposed the economy to another shock, with further loosening helped by a weak dollar. It has been the subsequent strength in the value of the Canadian dollar that has largely produced the upturn in the MCI

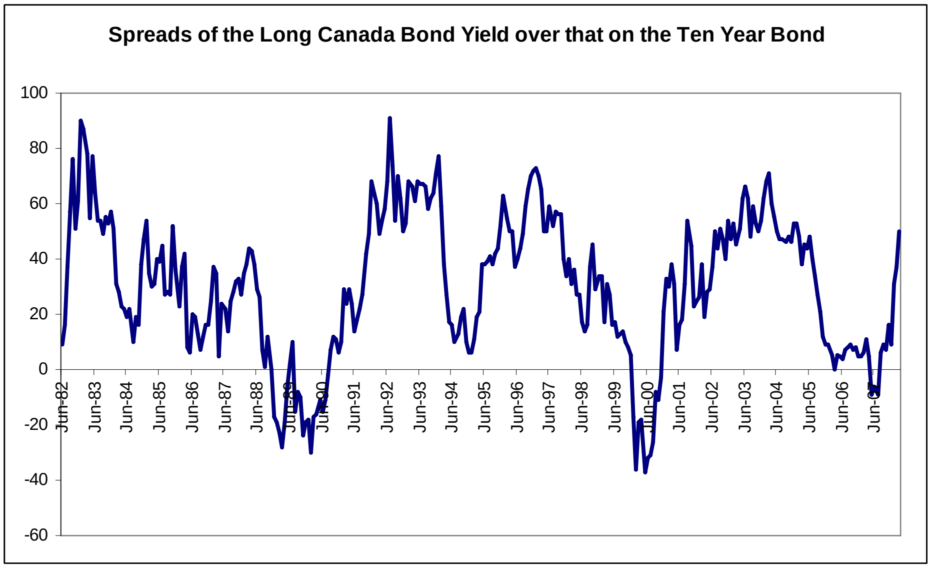
The Bank of Canada has recently downplayed the MCI, probably because the strength of the $ has not reflected internal monetary policy so much as external commodity prices. However, the current high value of the MCI still reflects the discipline imposed on Canadian exporters and retailers faced with cross border shoppers, both of which will keep inflation and interest rates low. However, what is clear is that the high Canadian dollar gives the Bank considerable room to lower interest rates to head off a slowdown as inflation is not a concern. This is why it has dropped its target overnight rate from 4.5% at the start of December 2007 to the current 3.5%. In doing so it has brought down the whole short end of the yield curve to stimulate the economy and prevent it from following the US lead into recession. In this I think it will be successful, much as it was in 2001/2.

At the current point in time I would judge there to be room for some further minor interest rate cuts in Canada with larger cuts in the US, where there are more serious problems. I don't expect much movement in the 91 day Treasury bill yield for the next six months, but after then I expect it to trend back to the 3% level. However, the over ten year bond yield is not so affected by current short term rates or current monetary policy and I expect it to stay around the 4.0% level or possibly increase by at most 0.50%. This is essentially the same as the Consensus Economics forecast which is for the 91 day Treasury bill yield to increase to 3.1% over the next year and for the ten year yield to be 4.1%.

The standard way of estimating the long Canada bond yield is then to take the ten year forecast and add the current spread between the 30 and 10 year bond. At the moment from Schedule 5 this is 51 basis points, so consistent with this approach I base my risk premium estimates on a long Canada bond yield of 4.75%.

Q. IS THERE A NORMAL SPREAD BETWEEN THE 10 AND 30 YEAR BOND YIELD?

A. No. As mentioned earlier long term bond yields reflect long term inflation and the fact that bond holders will live through many booms and recessions, whereas short term rates reflect what is going to happen in the short term. As a result short rates are much more volatile than long term rates and then gradually they become less volatile as the maturity increases. Further as the Bank of Canada tries to slow down the economy the yield curve usually goes flat in which case there is no spread between the 10 and 30 year bond yields or it sometimes *inverts* in which case the spread is negative. The following graph illustrates the spread between the two since 1982. Note that the spread is not constant as no financial theory would predict that it should be, in this respect the average spread of 0.30% just reflects average capital market conditions over the sample period, not a spread to match with current market conditions to forecast the long Canada bond yield .



The periods when the spread was negative were periods when the Bank of Canada was tightening monetary policy and pushing up interest rates to slow down the economy. This was in the late 1980s, the late 1990s and the last few years. The periods when the spread was the highest were the opposite where the Bank was pushing down interest rates to stimulate the economy, such as the early 1990s, the early 2000s and now.

Q. WHAT HAS BEEN THE RECENT STATE OF THE CAPITAL MARKETS?

A. A major player in the capital market is government, both federal and provincial. Their importance, however, has been receding. Overall government "lending," representing the aggregate of all levels of government, was running at the rate of over minus $60 billion during 1992 and 1993 or at its peak over 9.0% of GDP. Government net lending subsequently declined almost year by year as the economy recovered and governments finally got their spending under control. Schedule 4 graphs the government's net lending as a percentage of GDP.

The disastrous consequences of government fiscal policy starting in the early 1970s is obvious in Schedule 4, as governments started to run persistent deficits (net lending was negative indicating net borrowing). By the early 1990s interest payments were eating up over 30% of federal government revenues and government spending at over 50% of GDP was unsustainable. Since then it is clear that all layers of government have made serious efforts to restore some sanity to their finances. By 1997 lending had become genuine lending and governments in aggregate were in surplus for the first time in twenty-three years. In 2000 all layers of government in aggregate ran a surplus of $32 billion as tax revenues soared and expenditures on welfare, unemployment, etc., declined along with the unemployment rate. This amounted to over 3.0% of GDP, the biggest surplus since 1951, when governments were still actively paying down the war debt. Although the fluctuations in the economy have eroded the aggregate surplus since then, it is remarkable that the weakening economy of the early 2000's did not impose more pressure on government finances.

The overall decline in government "lending" has opened up room for private sector borrowing as corporations have returned to the equity and bond markets, following the strengthening of their balance sheets. Fuelled by healthy consumer spending, corporate profits have rebounded from the extreme cyclical lows of 1992-1994. Schedule 7 graphs the level of pre-tax profits to GDP. In 2000 pre-tax corporate profits reached 12.0% of GDP as the economy peaked. This level was higher than the last cyclical highs of 1988-1989 and only slightly below the resource boom fuelled highs of the 1970s. Although pre-tax profits dropped off to 11.0% of GDP for 2001 and 2002 as the economy weakened, they have subsequently spurted forward again on high resource prices and have sustained a high of approximately 13.75% of GDP for the last three years 2005-7. This profit data is mirrored in the capacity utilisation data in Schedule 8, where we can see the drop in utilisation in 2001 through the middle of 2004 as the economy slowed and the strong rebound since then with utilisation rates at all time highs until the recent levelling off in response to both interest rate increases and the strong value of the Canadian dollar.

The profit and capacity utilisation data provide the same signals as the inflation and interest rate data: the last peak in the business cycle was 2000 with a minor slowdown in 2001-2003. Since then we have been in the strengthening phase of the business cycle as the economy has been strong and we reached a peak in mid 2007. This combination of relatively low interest rates and booming corporate profits has lead to stronger equity prices and a strengthening value of the Canadian dollar. Schedule 9 graphs the C$ in terms of its US dollar value initialised to 1.0 in January 1995 when it was worth 71 cents US. We can clearly see its long run secular decline since then, when it was heading for a sub 60 cent US level. This decline was reversed in the Fall of 2002, after which is has increased by over 50% and recently been over 110 cents US.

There is no doubt that this strengthening value for the C$ has been due to better terms of trade and in particular stronger natural resource prices. Under the value of the C$ in Schedule 9 is the commodity price index also initialised to 1.0 in January 1995. Commodity prices started to increase at the end of 2002 and have subsequently increased by 130% dragging up the value of the C$ as Canadian exporters got higher prices for most of their natural resource exports.

This strength in the C$ has been mirrored in the performance of the TSX/S&P Composite, which has rebounded from its lows in 2002 with each year since showing strong equity market performance. Recently the TSX Composite hit all time highs of over 14,600 in October 2007 before sub-prime problems in the US caused it to retreat to the level of a year ago. However, like the leading indicator, the TSX Composite seems to have bottomed out in January 2008 as it has recovered from its recent lows to reach the 13,700 level as confidence has been partly restored.

Q. HOW DOES THE STATE OF THE ECONOMY AFFECT PROFITS?

A. Schedule 7 graphs the level of pre-tax corporate profits as a percentage of GDP. These profits are taken directly from corporate tax returns and so avoid all the one time only accounting losses that rocked Nortel, JDS Uniphase and others. Consequently, they are a more accurate measure of corporate operating profits than those in financial statements. The graph shows that profits are currently running at all time highs at about 13.75% of GDP.

Another way of assessing corporate profitability is to look at the aggregate data maintained by Statistics Canada (*Quarterly Financial Statistics for Enterprises*). Statistics Canada started reporting quarterly return on equity data in 1980 based on Standard Industrial Classifications (SIC) and then moved to North American Industrial Classifications (NAICs) in 1999. Schedule 11 graphs this average annual ROE against the spread between the yield on BBB debt and long Canada bonds from Scotia Capital's Handbook of Canadian Debt market Indices.

Schedule 11 shows that as of 1980 the average ROE was 15.05% and the yield spread, which rewards investors for holding BBB rated debt instead of default free Canada bonds, was very low at just over 50 basis points. “Corporate Canada’s ROE” then declined during the 1982 recession and investor fears over the recovery of their bond investments caused the yield spread to widen. The ROE then hovered around the 10% level during the growth oriented 1980's with a stable yield spread. As ROEs fell from 1989 onwards and the economy went into recession, investors again grew concerned about credit risk and the yield spread increased dramatically to almost 350 basis points in 1993. The profit recovery during the mid 1990s then caused the yield spread to contract only to widen in the early 2000s as ROEs weakened. Finally we can see the high ROEs of the last few years reflected in very low credit spreads with a small uptick in 2007.

The graph indicates the way in which the business cycle affects firms. During expansions, profitability increases and credit risk is lessened, causing investors to buy corporate bonds on narrower spreads over similar Canada bonds. During recessions the reverse happens: as profitability is reduced credit risk tends to increase causing spreads to widen as investors flee credit risky bonds and buy government bonds. This "flight to quality" is a regular part of the business cycle Profitability in this sense affects the market access of cyclical firms.

Schedule 12 shows spreads using the AA, A and BBB spread data from the Scotia Capital long bond indexes. The cyclical behaviour of spreads is again clearly visible. The BBB and to a lesser extent A and AA spreads over equivalent Canada bonds again clearly widened during the recession/slowdowns in the early 2000s before falling through July 2007. Since then we can clearly see the impact of the credit crunch as falling long Canada bond yields have been offset by wider spreads. This has been a significant concern in the US where the fear has been that even though the Fed has lowered interest rates, the cost of borrowing may increase due to these wider spreads and the lack of credit.

However, this is not a significant concern in Canada. In Schedule 13 are the actual yields on long Canada, A and BBB rated bonds. These clearly show that corporate bond yields are still at historically low levels. For example, the A spread has increased since August 15, 2007 from 120 basis points to 150 and the BBB from 185 to 280, numbers which seems very large. However, the actual yields have only increased from 5.46% to 5.71% and 6.37% to 6.77% respectively. What has happened is simply that the "flight to quality" has pushed down government bond yields and largely left high grade bond yields untouched.

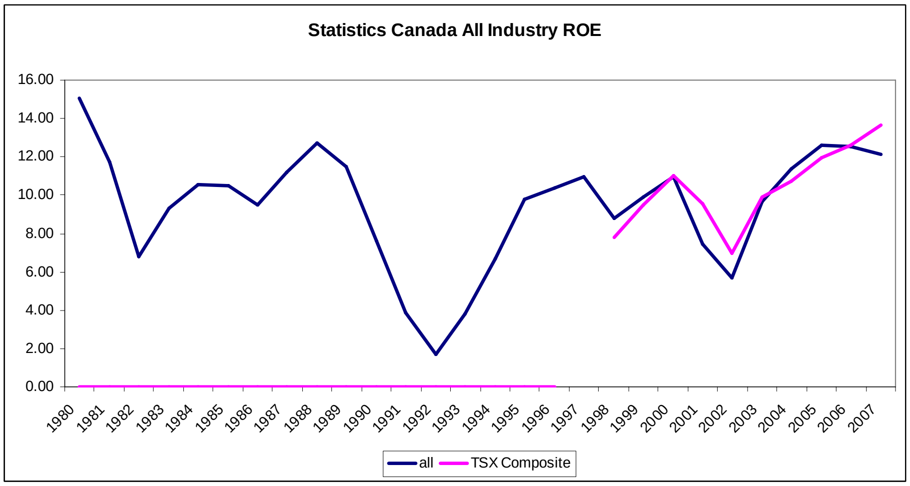
Schedule 14 shows the aggregate net new issues of corporate bonds and equities deflated by dividing by nominal GDP. The long run average is 0.77% of GDP. In 2006/7 financing dropped below this due to the strong profitability of Corporate Canada, but recently it has returned to the long run average. Overall, however there do not seem to be any serious financial market access problems.

Q. WHERE ARE WE IN THE BUSINESS CYCLE?

A. The last business cycle reached a peak in July 2007 and we are now on the downswing; whether we are in or about to go into a recession in the US and a slowdown in Canada is up to the statisticians to decide after all the data is in. For 2008 both economies are expected to slow in the first quarter and then begin a recovery in the second. The fact is that the Governor of the Federal Reserve has taken herculean efforts to offset the credit problems in the US and resorted to tools not seen since the Great Depression. Given that the problems are quite concentrated in the US sub-prime mortgage market, these efforts should be successful, while strong demand from India and China are expected to keep commodity prices strong and with them Canada's terms of trade. As in the slowdown in 2002 Canada is largely insulated from the problems caused by excesses in the US capital markets. However, it is quite remarkable how seemingly sophisticated financial players like Citigroup and Merrill Lynch could lose tens of billions of dollars on a financial product as simple as a residential mortgage. This brings home again how different are the US capital markets from those in Canada.

Q. DOES YOUR PROFITABILITY DATA HAVE ANY IMPLICATIONS FOR THE FAIR ROE?

A. Yes. The stage in the business cycle affects the level of corporate profits as Schedule 7 clearly indicated. However, expressing profits as percentage of GDP isn't useful for indicating what firms typically earn as ROEs. In Appendix B I provide data on the ten year average ROE for the 255 firms in the TSX Composite and for the firms included in the TSX60 sub-index. This appendix also includes a full discussion of the fair return standard and how these ROEs relate to the market opportunity cost or fair return. Below I graph the TSX Composite median ROE from 1998 along with the Statistics Canada ROE estimate for all firms from 1980.



We can clearly see the effects of the recessions in the early 1980s, 1990s, and 2000s; the increasing ROE in the recovery periods after then and the recent boom in 2004-2007 as higher resource prices have propelled ROEs to levels not seen since the last period of high resource prices, which ended in the early 1980s. Overall this FP and Statistics Canada ROE data reinforces the aggregate profitability data that we have passed the top of the business cycle and profits have peaked. For the whole period the average Statistics Canada ROE is 9.45%, which would be a biased high estimate of a typical ROE for a non-resource firm. For the period 1981-2004 the average ROE is 8.73% and removes the tail end of the 1970's commodity price boom and the last three years of the current boom.

Q. HOW DO ECONOMIC CONDITONS COMPARE TO THOSE IN 2003 WHEN THE BOARD REVIEWED ITS ADJUSTMENT MECHANISM?

A. In the *BC Electric* decision the Supreme Court of Canada adopted Mr. Justice Lamont's definition of a fair rate of return as enunciated in the *Northwestern Utilities Limited v. City of Edmonton* ([1929] S.C.R. 186) decision that:

> "By a fair return is meant that the company will be allowed as large a return on the capital invested in its enterprise (which will be net to the company) as it would receive if it were investing the same amount in other securities possessing an attractiveness stability and certainty to that of the company's enterprise."

Mr. Justice Lamont's definition embodies what a financial economist would call a risk-adjusted rate of return or "opportunity cost" and arose as a result of changed conditions in the "money" market.

The Board has accepted this requirement to allow an opportunity cost by linking the allowed ROE to conditions in the long Canada bond market through its adjustment mechanism. The Board imposed its *Draft Guidelines on a Formula-Based Return on Common Equity* and first applied them in EBRO 495 for Consumers Gas (EGDI). These guidelines were subsequently confirmed in RP-2002-0158 (Decision January 2004, section 142) with the decision that

> "Therefore, with respect to the first and primary issue of whether a new benchmark ROE should be established for EGDI and Union, we find that the current ROE Guidelines methodology continues to produce appropriate prospective results. We have not found any demonstrated need to set a new benchmark ROE."

If we look at current capital market conditions versus 2003 we have the following:

	2003	Now
GDP Growth	1.82%	2.65%
CPI Inflation	2.77%	2.20%
T Bill Yield	2.87%	1.79%
Long Canada Yield	5.29%	3.97%
Corporate Profits (pre-tax % GDP)	12.14%	13.75%
TSX Composite (March, 2008)	7,257	13,745
A Spreads basis points (December)	90	150
A Yields (December)	6.04%	5.45%

2003 was a pause year after the economy recovered from the stock market crash when Canada was hit by the perfect storm of the BSE incident, SARS, a weak US economy and a run up in the value of the C$. So 2003 was at the start of the current period of economic strength. Corporate profits had yet to hit their current peaks, while short term interest rates were marginally lower. As a result the TSX Composite at 7,257 was barely half the level of its recent highs. In the debt markets short term Treasury Bill yields were slightly higher than they are at present, since the Bank of Canada has now returned to stimulating the economy. Corporate A spreads were just under 1.0% and lower than they are now.

Overall I would assess the economic and financial market conditions as being slightly later in the business cycle than where we are now, that is, we are just off the top and beginning to recover, whereas in 2003 recovery was underway. However what is clear is that financial market conditions overall are not dramatically different from now. I do not see a decline in A spreads of 50 basis points as being significant given the fluctuations we have seen in the past. I can see nothing in the current conditions of the capital market that would indicate that the Board's allowed ROE adjustment formula needs to be re-evaluated. Further in its ***Report of the Board*** (December 20, 2006, page 17), the Board specifically stated

> "The Board has determined that the current approach to setting ROE will be maintained. ROE will be determined based on the Long Canada Bond forecast rate plus an equity risk premium (ERP)."

I regard this decision of the Board as consistent with the above remarks that there have been no changes in economic and financial market conditions of a sufficient magnitude to cause it to revisit the results of the 2003 hearing into its ROE adjustment formula.

3.0 THE REGULATORY FRAMEWORK AND UTILITY RISK

Q. WHAT RISKS DO INVESTORS FACE IN INVESTING IN UTILITIES?

A. Investors are interested in the rate of return on the *market value* of their investment. This investment can be represented by the standard discounted cash flow model,

$$P_O = \frac{ROE * BVPS * (1 - b)}{K - g}$$

where P_0 is the stock price, *ROE* the return on *book equity*, *BVPS* the book value per share, *b* the retention rate (how much of the firm's earnings are ploughed back in investment) and *K* and *g* are the investor's required rate of return and growth expectation respectively.[2]

Of the different sources of risk, we normally focus on the firm's *business* risk**,** its *financial* risk, and its *investment* risk**.** For regulated utilities we also add a fourth dimension, namely its *regulatory* risk**.** In terms of the above equation the firm's accounting return on equity **(ROE)** captures the business, financial and regulatory risk, which together we term income risk, whereas all the other factors are reflected in investment risk, which is the way in which investors react to the income risk and other macroeconomic variables. The regulator primarily affects income risk, whereas investment risk is determined in the capital market and reflects, for example the impact of changing interest rates.

Business risk is the risk that originates from the firm's underlying "real" operations. These risks are the typical risks stemming from uncertainty in the demand for the firm's product resulting, for example, from changes in the economy, the actions of competitors, and the possibility of product obsolescence. This demand uncertainty is compounded by the method of production used by the firm and the uncertainty in the firm's cost structure, caused, for example, by uncertain input costs, like those for labour or critical raw or semi-manufactured materials. Business risk, to a greater or lesser degree, is borne by **all** the investors in the firm. In terms of

[2] This equation is in every introductory finance textbook as *d/(K-g)* where *d* is the dividend or ROE*BVPS*(1-b).

the firm's income statement, business risk is the risk involved in the firm's earnings before interest and taxes (EBIT). It is the EBIT, which is available to pay the claims that arise from all the invested capital of the firm, that is, the preferred and common equity, the long-term debt, and any short-term debt such as debt currently due, bank debt and commercial paper.

If the firm has no debt or preferred shares, the common stock holders "own" the EBIT, after payment of corporate taxes, which is the firm's net income. This amount divided by the funds committed by the equity holders (shareholder's equity) is defined to be the firm's return on invested capital or ROI, and reflects the firm's operating performance, independent of financing effects. For 100% equity financed firms, this ROI is also their return on equity (ROE), since by definition the entire capital investment has been provided by the equity holders. The uncertainty attached to the ROI therefore reflects all the risks prior to the effects of the firm's financing and is commonly used to measure the business risk of the firm.

As the firm reduces the amount of equity financing and replaces it with debt or preferred shares, two effects are at work: first the earnings to the common stock holder are reduced as interest and preferred dividends are deducted from EBIT and, second the reduced earnings are spread over a smaller investment. The result of these two effects is called financial leverage. The basic equation is:

$$ROE = ROI + (ROI - R_d(1-T))\, D/S$$

where D, and S are the amounts of debt, and equity respectively in terms of book values. If the firm has no debt financing (D/S =0), the accounting return to the common stockholders (ROE) is the same as the return on investment (ROI). In this case the equity holders are only exposed to business risk. As the debt equity ratio increases, the spread between what the firm earns and its borrowing costs (R_d) is magnified. This magnification is called financial leverage and measures the **financial risk** of the firm. The simplest way to measure this financial risk is through the debt equity ratio.

The common stockholders in valuing the firm are concerned about the total "income" risk they have to bear, which is the variability in the accounting ROE. This reflects both the underlying business risk as well as the added financial risk. If the firm operates in a highly risky business, the normal advice is to primarily finance with equity, otherwise the resulting increase in financial risk might force the firm into serious financial problems. Conversely, if there is very little business risk, as is the case with regulated utilities, the firm can afford to carry large amounts of debt financing, since there is very little risk to magnify in the first place.

Business risk is then equivalent to variability in EBIT or the *ROI*, both of which reflect the variability in the firm's operating costs and revenues. To analyse this we normally look at how easy it is to forecast operating costs and how stable revenues are.

These comments mean that any regulatory authority has a variety of tools to manage the regulated firm's income risk. The ***first*** is it can manage the different components of business risk. The basic way that a regulatory authority can do this is by establishing deferral accounts. The essence of deferral accounts is simply to capture major forecasting errors. Instead of having the utility's stockholders "eat" any cost over runs in terms of a lower earned rate of return, the regulator can simply pass the extra costs to a balance sheet deferral account. The value of the deferral account is then charged to the ratepayers over some future time period. In this way "ratepayers" always pay the full cost of service and stockholder risk is lowered.

A **second** tool is for the regulator to alter the amount of debt financing. If the regulator feels that the firm's business risk has increased (decreased) it can reduce (increase) the amount of debt financing so that the total risk to the common stockholder is the same. Both of Canada's national regulators, the National Energy Board and the CRTC, have recognized this. When the CRTC opened up Canada's telecommunications market to long distance competition it specifically increased the allowed common equity component of the Telcos to 55% to offset their increased business risk. Similarly, when the National Energy Board decided to go to a formula based approach for the return on equity in 1994 it reviewed all the capital structure ratios for the major oil and gas pipelines and set the oil pipelines at 45% common equity, Westcoast at 35%, and the remaining mainline gas transmission companies at 30%. In each case the different equity ratio adjusted for differences in perceived business risks.[3] Most recently the Alberta EUB has also established different common equity ratios for a variety of different regulated utilities that include local gas distribution companies, pipelines, electricity Discos and electricity transmission companies.

The **third** tool available for the regulator is to directly alter the allowed rate of return, so that the stockholder only earns a rate of return commensurate with the risks undertaken. The CRTC, for example, has historically allowed Northwestel 0.75% more than the other Telcos primarily due to the "ruggedness" of its operating region. The BC Utilities Commission has allowed Pacific Northern Gas a premium over its low risk utility (Terasen Gas) and the Ontario Energy Board has allowed Union Gas a small premium over Enbridge Gas Distribution Inc.

Q. WHICH TOOLS DO YOU ADVOCATE USING?

A. It makes sense that any significant forecasting risks that are largely beyond the control of the firm should be managed though the use of deferral accounts. The reason for this is simply that they do not affect the efficiency of the utility and there are diversification gains by spreading the variability over a large number of customers. As a result, deferral accounts are a "win-win" solution as they reduce the operating risk faced by the company, thereby allowing a higher debt ratio and they lower overall cost of capital thereby benefiting customers. For this reason I have long argued that companies should have deferral accounts for the cost of short term debt, for example, since no-one can predict short term interest rates and otherwise there may be a tendency to over estimate them.

With a choice between capital structure versus ROE adjustments; my preference is to adjust for business risk in the capital structure for two main reasons. First, the market seems to consider any changes in the allowed capital structure to be a more permanent change, while it expects the ROE to change with capital market conditions. Since business risk is the primary determinant of capital structure, it is to be expected that a regulator will change an allowed capital structure relatively infrequently in response to significant changes in business risk. Second, allowing firms

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[3] Westcoast was allowed a higher common equity ratio because of the greater share of non-mainline assets in its rate base. The mainline tolls were based on a 30% deemed common equity.

to chose their capital structure and then adjusting the ROE to a fair return runs the risk that although the equity holders are getting a fair rate of return the overall utility income and thus rates are too high and unfair. An extreme example here would be a firm that “chooses” 100% equity financing. The regulator might then give a fair return, but rates are still unfair and unreasonable, since the company is forgoing the advantages of using debt financing.

One corollary to the decision of many regulators such as the National Energy Board and the Alberta EUB to adjust capital structures in response to business risk differences is that the risk faced by shareholders in utilities is very similar. To a great extent regulators have reduced differences in business risk by allowing the use of deferral accounts and altering equity ratios.

Q. WHY IS THE COMMON EQUITY RATIO IMPORTANT?

A. The firm’s capital structure has a direct impact on the overall cost of capital as conventionally defined in finance as the weighted average of the ***after tax*** sources of funds to the firm. Note that this is not the same thing as the utility weighted average cost of capital that does not consider these tax effects. In the following discussion wherever I use the phrase cost of capital I am referring to the conventional, that is, non-utility definition

This topic has been the subject of enormous academic inquiry over the last forty years and has generated two Nobel Prize winners in Professors Franco Modigliani and Merton Miller. However, for all the sophistication of the academic models, the most important issue is that certain types of financial instruments have a tax-preferred status. In Canada this status is accorded debt instruments, since interest payments are tax deductible to the firm, whereas equity dividends are not. As a result, there is a built-in tax advantage to any corporation using debt financing. This tax advantage goes to the ***shareholders*** of unregulated firms and to the ***customers*** of regulated firms, since the use of debt reduces the firm’s revenue requirement. As will be discussed later, this asymmetry in benefits for the regulated firm is a motivating factor behind regulated companies continually striving to increase their equity ratios.

The primary fact to remember is that equity costs are paid out of **after-tax** income, whereas debt costs are tax deductible. Hence, for example, if debt costs are 7.0% and equity costs are 9.0%, then at a 50% tax rate (for simplicity), the **pre-tax costs** are actually 18.0% for the equity

(.09/(1-.50)) compared to 7.0% for the debt. Conversely the after tax costs are 3.5% and 9.0%; either way the costs of debt versus equity have to be compared on the same tax basis. It is these "same tax" cost comparisons, whether before or after tax, that competitive firms make in deciding their financing. This implies that there is an incentive for competitive firms to finance with debt: as they replace expensive equity with "cheap" debt, their cost of capital goes down. Hence, for the same fixed amount of operating income, the stockholders benefit from the tax advantage of debt financing for competitive firms.

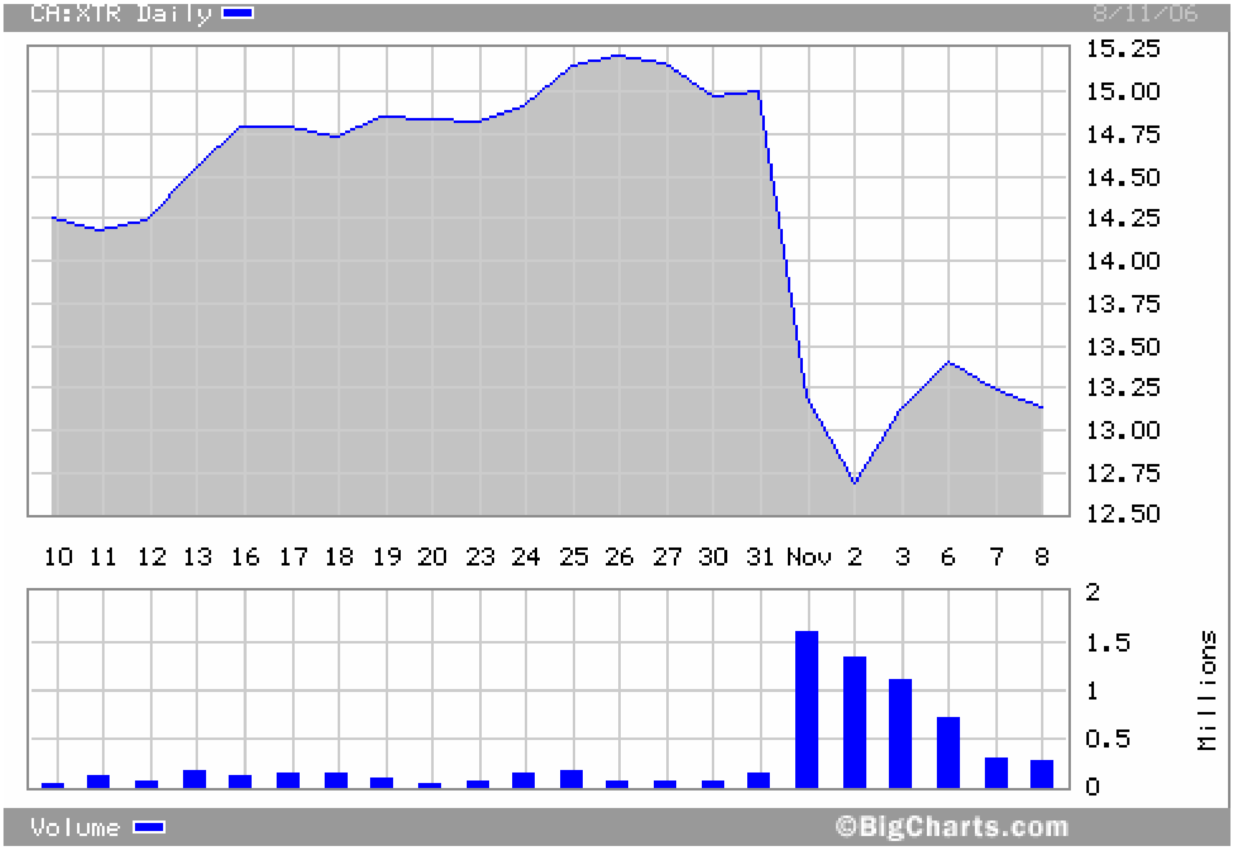
Q. HOW DO WE KNOW THERE IS A TAX ADVANTAGE TO THE USE OF DEBT?

A. Apart from the fact that a huge amount of corporate financing revolves around tax motivated transactions the recent announcement by the Government of Canada changing the tax status of income trusts is a vivid reminder of their importance.

Income trusts invest in both the debt and equity of an operating company, where the debt is structured to remove the income tax liability of the operating company. The trust is then non-taxable, since it is legally the same as a mutual fund, and flows the interest on the debt, the dividends on the equity, plus other non-cash charges like depreciation, through to the trust unit holders. The income trust structure, therefore effectively removes the corporate income tax.

Income trusts have been incredibly popular in Canada, since the absence of the corporate income tax allows more income to flow through to investors. However, government has lost increasing amounts of corporate income tax. Even though the conservative government in Ottawa campaigned on 'no changes to the tax treatment of income trusts,' their hand was forced by the announcement of Bell Canada that it was following the lead of Telus and converting to an income trust. There were also rumours that Encana and Suncor were planning $40 billion in income trust conversions of their oil and gas assets. The result was that on October 31, 2006 after the markets closed the Federal Minister of Finance, Mr. Jim Flaherty, announced that all new trusts would be subject to a 31.5% distribution tax to put them on the same tax status as corporations and that existing trusts would pay this tax in five year's time.

The importance of the income tax changes can be understood from the following graph that tracks the price of the exchange traded income trust fund, XTR.



Before the Minister of Finance's decision the income trust ETF was at $15 and the day after it had dropped to $13.25 and then on November 2 even further to $12.75 before rebounding slightly. Most analysts predicted that the tax changes would cause income trusts to drop in value by 20-25%, but the effect varies across different trusts depending on the proportion of Canadian to foreign income and the type of income, that is, how much is return of capital and how much newly taxable income. Plus the existing trusts would only be taxed after a four year grace period, that is, in five year's time.

Regardless the carnage on Bay Street caused by the changing tax rules vividly demonstrates that the corporate income tax has a huge impact on the valuation of shares. Another way of saying this is that removing the corporate income tax by financing with debt adds of the order of 15-20% to the market value of the firm. We can see this from the fact that the exchange traded fund would sell for $15 without the corporate tax and about $13 with the tax levied in ***five year's*** time.

The impact of the time until the tax is levied means that the true value of removing the corporate income tax is much greater than these price changes indicates.

Q IF DEBT IS SO MUCH CHEAPER THAN EQUITY WHY DON'T FIRMS USE MORE?

A. They try to use as much debt as they can, but unlike income trusts the debt is held by third parties. The beauty of the income trust structure is that the debt and equity is held by the same part (the trust) so if a firm has trouble making an interest payment it negotiates with the same party that owns the equity. However, for regular corporations the debt is owned by banks and public institutions, like pension funs etc., that are not identical to its shareholders. As a result, there are limits to the amount that firms can borrow due to the increased costs of financial distress that are associated with higher fixed financial charges. In extreme cases, the higher fixed financial charges can force a firm to be reorganised, or taken over, when it could probably have otherwise survived had it been financed with less debt. As a result, it is a basic rule of corporate finance that the financial risk is **layered** on top of business risk: firms with high business risk are advised not to issue too much debt, otherwise their solvency could be jeopardised in the event of adverse market developments.

This basic discussion is relevant since publicly traded firms are constantly re-assessing their capital structures ("improving their balance sheets") in light of changing market conditions and the changing risk of financial distress. It also explains why capital structures differ from one firm to another, since both the nature of their assets and expected cash flows are different. One firm with mainly hard tangible assets will use large amounts of debt, since these types of assets are easy to borrow against. Another firm that spends significant amounts on advertising will have relatively little debt, since it is harder to borrow against brand names and "goodwill." Yet another firm will use very little debt, since it is not in a tax paying position and cannot use the tax shields from debt financing. And finally a firm may use very little debt simply because it believes that its equity is cheap because its stock price is so high. In each case, the firm will solve its own capital structure problem based on its own unique factors.

This discussion puts the utility capital structure in perspective, since utilities have the lowest business risk of just about any sector in the Canadian economy. Consequently, they should have the highest debt ratios. There are several reasons for this:

> **First**, the costs and revenues from distributing natural gas are very stable so that the underlying uncertainty in operating income is very low. As such financial leverage is as I will show essentially magnifying almost non-existent business risk, and zero times anything is still zero!

> **Second**, in the event of unanticipated risks, regulated utilities are the **only** group that can go back to their regulator and ask for "after the fact" rate relief. As effective monopolies their rates can be increased in the event of financial problems, while demand is typically insensitive to these rate increases. In contrast, if unregulated corporations face serious financial problems they usually compound one another. This is because unregulated firms encounter difficulties raising capital and frequently suppliers and customers switch to alternates in the face of this uncertainty creating severe financial distress.

> **Third**, the major offset to the tax advantages of debt is the risk of bankruptcy. In liquidation there are significant external costs that go to neither the equity nor the debt holders. These costs include "knock down" asset sales, the loss of tax loss carry forwards, and the reorganisation costs paid to bankruptcy trustees, lawyers etc. This causes non-regulated firms to be wary of taking on too much debt, since value seeps out of the firm as a whole. In contrast, it is impossible to conceive of OPG's nuclear assets ever being ripped up and sold for scrap.

> **Finally**, most private companies have an asset base that consists largely of intangible assets. For example, the major value of Nortel was its growth opportunities; of Coca Cola its brand name; of Merck its R&D team. It is extremely difficult for non-regulated firms to borrow against these assets. Growth opportunities have a habit of being competed away; brand names can waste away, while R&D teams have a habit of moving to a competitor. Regulated utilities in contrast largely produce un-branded services and derive most of their value from tangible assets. Unlike intangible assets, tangible assets are useful for collateral, for example in first mortgage bonds, and are easy to borrow against.

Consequently, utilities have very low business risk; have reserve borrowing power by being able to return to the regulator, minuscule bankruptcy/distress costs and hard tangible assets that are easy to borrow against. In fact, in many ways, utilities are unique in terms of their financing possibilities,[4] and are prime candidates for using large amounts of debt to utilise their very significant tax advantages.

Q ARE THE ABOVE IDEAS STANDARD IN FINANCE?

A. Yes. A popular finance textbook is Fundamentals of Corporate Finance, McGraw Hill Irwin (3rd edition) by Brealey, Myers and Marcus). In chapter 15 the text discusses capital structure and notes the following:

- (Page 434) "Debt financing has one important advantage. The interest that the company pays is a tax deductible expense, but equity income is subject to corporate tax."
- (page 434 and 435) The interest tax shield is a valuable asset. Let's see how much it could be worth……………………If the tax shield is perpetual, we use the perpetuity formula to calculate its present value:

$$\textbf{PV tax shields} = \frac{annualtaxsheild}{r_{debt}} = T_c D$$

- (page 435, 436) How interest tax shields contribute to the value of stockholder's equity….

Value of levered firm = value of all-equity firm + T_CD

- (Page 444) For example, high-tech growth companies, whose assets are risky and mainly intangible, normally use relatively little debt. Utilities or retailers can and do borrow heavily because their assets are tangible and relatively safe.

These four particular comments are taken from the discussion of what is commonly referred to as the static trade-off model, where the tax advantages of debt financing are traded off against the costs of financial distress and loss of financial flexibility. They are referenced simply because there is little disagreement amongst academics that debt is valuable to the firm due to the tax shields it generates. This consensus has then been amply verified by the stock market's reaction to the changing status of income trusts. As the second point indicates if debt is rolled over, so

[4] When we analyse corporate financial decisions we normally include a number of explanatory variables and then add a "dummy" variable for whether or not the industry is regulated, since the mere fact of regulation is frequently the most significant feature of a firm's operations.

that the interest and tax shields are expected to continue indefinitely, then the value of the tax shield is the amount of debt times the corporate income tax rate. At a 36.12% tax rate this means that every dollar of debt adds 36.12 cents in value to the common shareholders. The third quote indicates that the value of the firm is increased by the present value of these tax shields. In fact the equation referenced there is part of an approach called adjusted present value approach (APV), which focuses heavily on the tax advantages to debt and which has been widely used to value financial engineering strategies involving leveraged buyouts etc that remove the corporate income tax. The final quotation specifically mentions utilities as companies that should borrow

Q. IF UTILITIES ARE FINANCED WITH A LARGE AMOUNT OF DEBT DOESN'T THIS MAKE THEIR EQUITY RISKIER?

A. Not in practice. While financial leverage (the use of debt) magnifies the business risk to the common shareholder, there has to be business risk to magnify in the first place. In practice the monopoly position of most public utilities and the effect of protective regulation in Canada has meant that Canadian utilities have not been put at risk in a meaningful sense. As a result, large amounts of debt have not magnified the risk to the shareholder in any material way.

In Schedule 15 is a table of earned vs allowed ROEs for the pipelines that are part of TransCanada Corporation form their surveillance reports and answers to information requests. There is a distinction between full cost of service pipelines regulated by the National Energy Board and those regulated on a forward test year basis. Foothills, for example, bills its shippers for its full costs and exactly earns its allowed ROE, to the extent that until very recently it only reported one number in its surveillance reports to the NEB. Over the last three years Foothills has been under incentives that have allowed it to over-earn its allowed ROE by about 0.50%. The TransCanada BC system (formerly ANG) is regulated on a similar basis to Foothills and I have always regarded Foothills and the TransCanada BS System as the lowest risk regulated entities in Canada, since there is very little income risk from their regulated operations. With very little business risk, both these pipelines can finance with large amounts of debt, in fact prior to RH-2-94 they were financed with 25-28% common equity with the balance conventional debt.

Unlike these two pipelines the TransCanada Mainline and TQ&M are regulated on a forward test year basis. This leaves the companies exposed to forecasting risk where the actual revenues and expenses may deviate from those expected and included in the revenue requirement. However, the use of deferral accounts and long term contracting with shippers that pay fixed demand charges, regardless of whether or not they ship, significantly reduces this forecasting risk. The result is that both the Mainline and TQ&M consistently over-earn their allowed ROEs. Over this whole period the Mainline only failed to earn its allowed ROE once and on average over-earned by 0.28%, whereas TQ&M over-earned by 0.34% and never failed to earn its allowed return.

In Schedule 16 is similar data for Union Gas, EGDI and Terasen Gas. This data is more difficult to get since it does not appear to be publicly available the way that surveillance reports on the NEB pipelines usually are. The data for Union and EGDI is based on weather normalised ROE's, since these utilities are not allowed deferral accounts for variances due to weather. In contrast, Terasen Gas is allowed a comprehensive RSAM, which is a complete weather normalization account, which takes into account not just the cost of purchased natural gas but also volume variances due to weather. Of note is that Terasen's "over-earning" is similar to that of the TransCanada Mainline.[5] In contrast Union and EGDI do not have as many deferral accounts and over-earned to a much higher degree than the TransCanada Mainline or Terasen, let alone the full cost of service pipelines. Gaz Metro's situation is different. It earned its allowed ROE until the Regie allowed it a series of incentive awards that have subsequently allowed it to over earn.

If risk is the possibility of incurring harm or a loss, the insight from the data in Schedules 15 & 16 is that regulated utilities in Canada have very little risk. It is also interesting that the degree of over earning decreases with the use of deferral accounts. The full cost of service pipes can be regarded as having 100% protection, since they neither over nor under-earn except if allowed "incentives." The Mainline and TQ&M have limited room to improve their earnings, since so many of their revenues and expenses are fixed. Similarly Terasen Gas with comprehensive deferral accounts looks a lot like the NEB forward test year pipes in having little room to over-earn. In contrast, the two Ontario natural gas LDCs with fewer deferral accounts have over-earned the most followed by Gaz Metro with its incentive regulation.

[5] Since 1998 Terasen's actual ROE is prior to earning sharing.

It is also interesting to contrast this performance of regulated assets with the utility holding companies (UHC) that actually face the market. For the major UHCs Schedule 17 gives their earned ROEs along with those for Foothills (minus incentives). For example, what investors invest in as "TransCanada" or TCPL is not the Mainline, but the combined entity including non-regulated as well as regulated assets. This can be seen in the greater variability of its ROE. For 1993-1997 TCPL consistently earned more than the Mainline, but then in 1998-2000 as TCPL reorganised it earned less. Throughout this period the Mainline underpinned TCPL's results and was a beacon of stability. One way of assessing this greater risk is simply to estimate the standard deviation in each firm's ROE. For Foothills as a full cost of service pipeline this was 1.09%.

As a benchmark for variability in ROEs consider the data in Appendix B, where I look at the profitability of the firms in the TSX Composite and TSX60. There I showed that the lowest risk firm in the TSX60 was Thomson Corporation whose standard deviation of its annual ROE from 1998-2007 was just over 1.0%. However, Enbridge is ranked 5th and TransCanada 9th and the bulk of the other low risk firms are the Banks with 6 financial institutions in the top 12. From there the firms get dramatically more risky with the 20th firm having a standard deviation of 6%, the 30th 9%, 40th 12% and 50th 18%. In contrast in Schedule 17 we can see that Foothills allowed ROE had a variability of 1.09% and the Mainline is of the same order of risk as Foothills since it simply consistently earns a bit more than its allowed ROE. However, neither of these estimates can be regarded as risk since they simply reflect the variability in the allowed ROE and not the ability to earn that allowed ROE, which as we have seen is close to 100%.

The result of looking at the data in Schedule 17 is that these UHCs would be regarded as very low risk firms. If they had the market capitalisation that would put them in the TSX60, all of these UHCs, except TransAlta would be among the ten lowest risk firms.[6] TransAlta is an exception since it is now an independent power producer and no longer classified as a utility and is included here for historic reasons. From this we can conclude that examining the risk profile of UHCs provides an ***upper bound*** for the risk of regulated operations.

[6] Obviously there would then be more than ten firms……

Q. WHAT COMPARATORS WOULD YOU USE FOR OPG?

A. Before the Alberta EUB in 2003 I compared the different utilities in the Alberta generic hearing on the following basis:

I: The major short term risks caused by cost and revenue uncertainty:

- On the cost side since regulated utilities are capital intensive most of their costs are fixed. The major risks are in *operations and maintenance* expenditures. However, over runs are usually under the control of the regulated firm and can be time shifted between different test years.

- On the revenue side the risks largely stem from rate design, critical features are:

    - Who is the customer and what *credit risk* is involved. For example, electricity transmission operators who recover their revenue requirement in fixed monthly payments from the provincially appointed TA, who is responsible for system integrity, have less exposure than the local gas and electricity distributors who recover their revenue requirement from a more varied customer mix involving industrial, commercial and retail customers.

    - Is there a *commodity charge* involved? The basic distribution function is very similar to transmission, except when the distributor buys the gas or electricity wholesale and then also retails the commodity. The distributor is then exposed to weather and price fluctuations depending on rate design.

    - Even if there is no commodity charge, how much of the revenue is recovered in a *fixed versus a variable usage* charge? Utilities that recover their revenue in a fixed demand charge face less risk than those where the revenues have a variable component based on usage.

II: The medium and long term risks are mainly as follows:

- *Bypass risk*. The economics of regulated industries are as natural monopolists involved in "transportation" of one kind or another. However, one utility may not own all the transportation system so that it may be economically feasible to bypass one part of the system. This happens for local gas distributors, when a customer can access the main gas transmission line directly, rather than through the LDC, or when a large customer may be able to bypass part of the transmission system. This is often a rate design issue: a postage stamp toll clearly leads to uneconomic tolls and potential bypass problems, whereas distance or usage sensitive tolls will discourage it. Similarly, rolled in tolling will encourage predatory pricing by potential regulated competitors.

- *Capital recovery* risk. Since most utilities are transportation utilities, the critical question is the underlying supply and demand of the commodity. If supply or demand does not materialise then tolls may have to rise and the utility may not be able to recover the cost of its capital assets. Depreciation rates are set to mitigate this risk to ensure that the future revenues are matched with the future costs of the system.

A common thread running through the above brief discussion is rate design and regulatory protection. There can be significant differences in underlying business risk that are moderated by the regulator in response to those differences. The lowest risk utility is then one with the strongest underlying fundamentals and the least need to resort to regulatory protection. In contrast, another utility may have similar short-term income risk, but only because of its need to resort to more extensive regulatory protection, so that it faces more problematic longer term risks.

On that basis and at that time I judged the lowest risk regulated utilities in Canada to be electricity transmission assets, since they had the following characteristics:

- Minimal forecasting risks attached to O&M
- Revenue recovery via the Transmission Administrator as a fixed monthly charge
- Limited (non existent) by-pass problems
- Minimal capital recovery problems, since there are many suppliers of electricity as a basic commodity.
- Deferral account for capital expenditures

and recommended 30% common equity ratios.

I then placed the gas transmission pipelines as the second lowest risk group. Here I classified Foothills and the TCPL BC System (formerly ANG) as of equivalent risk to electricity transmission assets with NGTL having marginally more risk than Foothills and the TCPL BC System, since it was exposed to bypass risk and recovered its revenues through a forward test year from a greater variety of shippers. I therefore judged that on its own NGTL could maintain its financial flexibility on the same 30% common equity ratio allowed mainline gas transmission assets. However, because NGTL was then allowed 32% and was almost “indistinguishable” from the TCPL Mainline, I recommended the same 33% common equity ratio then allowed the Mainline.

I then judged the local distribution companies (LDCs), including both gas and electric as the next riskiest. These companies were distinguished by their retail operations, which mean that their revenues are recovered from a large number of industrial, commercial and residential consumers. This exposes them to both the business cycle and weather fluctuations. This revenue recovery is largely a function of their rate design that may expose them to commodity charges and a fixed and variable recovery charge. Within this group the conventional yardstick for LDCs was that Enbridge Gas Distribution Inc and Union Gas were both allowed 35% common equity by the Ontario Energy Board. In contrast, whereas the Ontario Energy Board allowed a purchased gas variance account (PGVA) to ensure that the full costs of gas were recovered, both were still subject to volume variances due to weather. In contrast, the BCUC through its RSAM removed this risk from BC Gas (Terasen Gas), but only allowed it a 33% common equity ratio. With these yardsticks I recommended a 35% common equity ratio for a typical local distribution companies.

Finally, I recommended 42% as the upper end of a reasonable range for the common equity of ATCO pipelines, given that the BCUC allowed PNG, a smaller and much riskier pipeline, 36% common equity. However, this ranking was provisional being dependent on the EUB developing clear rules on intra Alberta pipeline competition and a rate design that lowered ATCO Pipeline's risk. Further it was my judgement that none of the Alberta utilities were as risky as Pacific Northern Gas (PNG) with a 36% common equity ratio or Gaz Metropolitain (GMI) with a 38.5% common equity ratio, where I regarded those two as the riskiest regulated utilities in Canada.

Q WHAT DID THE EUB ALLOW?

A. The AEUB's decision can be summarised in the following table:

Table 13 Board Approved Equity Ratios

	Last Board-Approved Common Equity Ratios (%)	2004 Board Approved Common Equity Ratios (%)	Change in Approved Common Equity Ratio (%)
ATCO TFO	32.0	33.0	1.0
AltaLink	34.0	35.0	1.0
EPCOR TFO	35.0	35.0	0.0
NGTL	32.0	35.0	3.0
ATCO Electric DISCO	35.0	37.0	2.0
FortisAlberta (Aquila)	N/A	37.0	N/A
ATCO Gas	37.0	38.0	1.0
ENMAX DISCO	N/A	39.0	N/A
EPCOR DISCO	N/A	39.0	N/A
AltaGas	41.0	41.0	0.0
ATCO Pipelines	43.5	43.0	(0.5)

The AEUB's risk ranking was essentially the same as mine although they allowed higher common equity ratios than I recommended. Electricity transmission facilities operators (TFO) were allowed 33% common equity, NGT was next with 35%, then electric distributors with 37%, gas distribution 38% and finally ATCO pipelines was allowed the highest common equity ratio at 43%. In each case non-taxable utilities were allowed more common equity due to the absence of the dampening effect of corporate income taxes. AltaGas is a very small rural utility and was allowed 41% common equity due this small size.

With risk adjusted through the common equity ratio the Alberta EUB then allowed all the utilities the same ROE determined through an annual adjustment mechanism similar to that used by this Board.

Q. WHAT HAS CHANGED SINCE 2003?

A. With the ROE route to higher profits closed, the only way to generate higher profits is for utilities to have more equity: consistent with the prior arguments this means they have to convince the regulator that they now face higher business risk. Consequently there has recently been a proliferation of hearings where utilities have claimed to face increased business risk. In my judgement there has generally been little justification for these claims, since the main source of risk to a utility is from the actions taken by the regulator and I see no sign that regulators in

Canada have deviated from a policy of reducing regulatory lag and responding quickly to emerging issues with frequent rate hearings.

One area where the NEB has found some justification for increased risk is for the pipelines leaving the Western Canadian Sedimentary Basin. With the maturing of the WCSB and increasing intra-Alberta demands on supply, particularly for oil sands development, the NEB has judged the long run recovery risk attached to pipeline investment to be higher than when it established a generic return procedure in the RH-2-94 Decision. The NEB has therefore increased the allowed common equity ratio of the TransCanada Mainline successively from 30% to 33% and then 36%,[7] and also increased the depreciation rate. This decision has been followed by similar increases in settlements for the other export pipelines, such as Foothills, Westcoast and the TransCanada BC System that similarly export natural gas from Alberta.[8]

Apart from the WCSB export pipelines there have been some very minor increases in common equity ratios for other utilities. These have usually resulting from negotiated settlements, where it is impossible to work out what was traded off to get the increase. For example, Union Gas negotiated an increase from 35% to 36% in its common equity ratio, a settlement that was then followed in a decision by the Ontario Energy Board for Enbridge Gas Distribution. In a 2005 hearing the BCUC increased the allowed common equity ratio of Terasen Gas from 33% to 35% to bring it into line with Union Gas and EGDI. Overall apart from the maturing of the WCSB together with increased intra-Alberta demand and its impact on the export pipelines as determined by the NEB, I can see no objective factor leading to a general increase in the business risk of Canadian utilities.[9]

With these common equity ratio changes, regulators across Canada have reaffirmed the validity of their ROE adjustment formula. The EUB decision was announced in 2004, which was also when the OEB announced its decision to continue its ROE formula after a generic hearing in 2003. The NEB also reaffirmed its adjustment formula while increasing the TransCanada

[7] I would view some of this increase in the common equity ratio as the result of the Mainline's decreased use of traditional preferred shares.

[8] The Mainline has recently negotiated a 40% common equity ratio in exchange for the redemption of its US$ junior subordinated securities (preferred securities). This generated a very large foreign exchange gain, due to the strength of the CDN$, which is been applied to reduce tolls.

[9] To some extent the increase in intra-Alberta demand reduces the risk for Alberta utilities.

Mainline's common equity ratio. The BCUC marginally changed its ROE formula when it increased Terasen Gas's common equity ratio to 35%. The substantive change was to change the ROE with 75% of the long Canada yield to bring it into line with other regulators, rather than the 100% adjustment it used previously. The OEB also reaffirmed its ROE formula in an August 2007 Hydro One decision, while the Regie confirmed its adjustment formula in an October 2007 decision on Gaz Metro.[10]

The important point is that almost all the regulators across Canada that have looked at their ROE adjustment formula have reaffirmed the fact that they are fair and reasonable.

Q. WHY HAVE YOU NOT DISCUSSED OPG's RISKS?

A. Because I don't think that they are material. I have heard many company witnesses discuss "increases" in risk faced by various regulated utilities since I first testified in 1985. However, the ability of Canadian regulated utilities to earn their allowed ROE has not been significantly impaired and I have yet to see any of these risks materialise to significantly harm a Canadian utility. In this respect Ms. McShane discusses risks that in my judgement have, or will be largely, transferred to ratepayers. The history of regulation in Canada is that when risks arise to potentially cause losses to utilities they are invariably transferred to rate payers as part of the dynamics of regulation. This dynamic is illustrated through:

- the adoption of forward test years;
- The removal of the commodity charge through fuel pass throughs;
- the removal of the merchant function;
- increasing focus on the core service where the utility has market power;
- the reduction in regulatory lag;
- the adoption of ROE formula adjustments;
- review of depreciation studies when stranded asset risk changes;
- flexible hearings to review unique risks.

All these policies have served to reduce the risk of regulated utilities in Canada. The fact is that regulation is a flexible process that moderates or shares these risks even if they do materialise to the extent that the regulated utility is rarely hurt. A case in point is Pacific Northern Gas (PNG), which I regard as the riskiest regulated utility in Canada.

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[10] Gaz Metro was allowed an increased risk premium due to the heightened competitive risk faced by natural gas from electricity in Quebec for space heating.

There is no doubt that PNG is extremely risky. It operates a tiny 600 kilometre pipeline from the Westcoast Transmission system through to Western British Columbia, where the economy is heavily dependent on forest products and a few cyclical industries. Until November 2005 almost 70% of PNG's throughput came from a few industrial customers with one, Methanex, overwhelmingly important. Unfortunately, Methanex closed its doors in November 2005 and PNG lost the load. Such a loss of load dwarfs anything that could conceivably affect Gaz Metro.

How has the BCUC responded to PNG's serious problems? In the first place the BCUC has allowed PNG a 0.65% premium to the ROE as well as 3% more common equity than that allowed its low risk benchmark (Terasen Gas). These more favourable financial parameters have been allowed on an ex ante base to reflect PNG's potential problems, since the risks attached to PNG's dependence on a limited number of industrial customers have been known for a long time. That is, PNG's shareholders were rewarded for its greater risk ex ante. However, as the risk increased the BCUC then allowed PNG a series of deferral accounts. First a comprehensive RSAM to remove weather induced variability in PNG's earnings. Second an industrial customer deliveries deferral account (ICDDA) to recover any deviations of actual deliveries from those forecast for PNG's large industrial customers. PNG has also taken $5.05 million of Methanex related assets out of its rate base and put these into a special deferral account to be recovered from other customers over a ten year period. Finally the BCUC has approved in principle the conversion of PNG into an income trust to help reduce costs.[11]

I will discuss the future of PNG shortly, but at this point the important fact to note is the active participation of the regulator, the BCUC, in helping PNG cope with a huge company threatening event. For example, although Methanex accounted for 62% of PNG's throughput the BCUC allowed PNG to offer a special discount rate for Methanex and rebalance its rates. As a result, before it closed Methanex only accounted for 7.6% of PNG's operating revenues, even though it was 62% of PNG's throughput. As the Methanex related assets are recovered from other customers it emphasises the fact that a regulated utility only faces two basic risks: short run forecasting risk and the possibility of a "death spiral."

[11] This is now obviously dead. In fact PNG had dropped the idea before Mr. Flaherty's Halloween announcement.

Forecasting risks can be removed by deferral accounts if the regulator sees fit as the BCUC and the NEB have. If a company is not allowed deferral accounts then it can manage these risks by deferring expenditures to consistently come in under forecast and over-earn. This seems to be the historic record in Canada, where over-earning seems to be positively correlated with the absence of deferral accounts.[12] The BCUC can and has used this regulatory protection for PNG, but it cannot prevent a death spiral. This occurs when customers leave the system and the reallocated costs cannot be recovered from the remaining customers, otherwise they too would leave the system or the costs would be regarded as unfair and unreasonable. For PNG this death spiral remains a possibility, where PNG's actual and allowed ROE have recently been as follows:[13]

	2007	2006	2005	2004	2003
Allowed	8.77	9.20	9.43	9.55	9.82
Actual	5.0	5.8	8.2	6.9	7.5

The PNG ROE data indicates a persistent problem with earning its allowed ROE despite the high amount of regulatory protection afforded it by the BCUC. The underlying reason for this is simply that PNG is a very small utility. For 2007 PNG had property plant and equipment of $174.3 million and 39,573 customers.

However, despite the most severe problems faced by any Canadian regulated utility how have PNG's shareholders fared? First, even after a "worst case" scenario arising, at year-end 2007 PNG's book value was $22.17 and its stock price $18. So an equity investor in PNG would have invested approximately $22.0 in PNG's assets, earned a reasonable ROE and yet still only seen the value of this investment drop by $4.00 despite the loss of 62% of PNG's throughput threatening the very survival of the company.

The example of PNG illustrates the basic proposition that regulation shields the utility from many of the problems it ostensibly faces. The reason is that should these risks arise the utility

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[12] Performance based regulation can then put in sharing mechanisms to allocate any over-earning between the utility shareholders and ratepayers.

[13] The allowed ROE is for the Fort St John region where the allowed ROE is the lowest so the shortfall is minimised.

invariably goes to the regulator and gets the costs allocated to ratepayers. PNG, for example, anticipates the costs of stranded Methanex related rate base assets being recovered from other ratepayers, ***not*** the shareholders. Another more recent example is the potential liability to EGDI caused by the Supreme Court of Canada with respect to late payment penalties and the July 20, 2006 settlement. On page 3 of the October 31, 2006 MD&A EGDI simply states

> "The company intends to apply to the OEB for recovery of the proposed payments resulting from the settlement of this action."

Again the major inference is that this is a "risk" not born by the company, but by the ratepayers.

As the actual versus allowed ROE data for the major utilities indicates none of the risks advanced in regulatory hearings involving those utilities have materially harmed their shareholders. Consequently, in my judgement utilities in Canada claim higher ROEs and common equity ratios on the basis of risks that they do not in fact bear. Moreover, in the future I expect this to continue and any future risks, should they materialise, will similarly be allocated to ratepayers and not born by shareholders.

Q CAN YOU DISCUSS OPG'S RELATIONSHIP WITH THE PROVINCE?

A. Yes. OPG was established in April, 1999 to hold the generation assets of Ontario Hydro when Hydro was reorganised into five successor companies. OPG was formed under the Ontario Business Corporations Act and its assets subsequently divided into rate of return regulated (prescribed) assets, subject to rate review by the Ontario Energy Board, and non-regulated operations. Its shareholder is the Province of Ontario and financing is obtained through the Ontario Electricity Financial Corporation. In a memorandum of understanding (MOU) between OPG and "the Shareholder" several key features of the relationship were laid out; of importance to this hearing is the following:

- OPG will operate on a commercial basis and operate its assets as efficiently and cost-effectively as possible;
- OPG's key nuclear objective is to ***reduce*** the risk exposure to the Province (italics added);
- OPG will ***not*** pursue investment in non-hydro-electric renewable generation unless specifically directed to do so by the Shareholder (italics added);
- The Shareholder may at times direct OPG to undertake special initiatives;

- OPG's annual performance targets and investment plan will be submitted to the Shareholder and the Minister of Finance for concurrence;
- OPG's Board of Directors and the Minister of Energy will meet on a quarterly basis, OPG's Chair, President and CEO and the Minister of Energy will meet on a regular basis, approximately nine times a year.

My reading of these and the other points in the MOU are that two principles are paramount. First the Province has specifically told OPG to minimise its risk level by focusing on Hydro development and reducing the risk exposure to nuclear. Second the Shareholder, aka the Province, is not a passive investor. Electricity generation and costs are a vital factor in the competitiveness of the provincial economy and what is clear is that it is not an arms length relationship between the province and OPG. OPG will continue to be an instrument of economic policy within the province both by taking on special initiatives at the request of the province and by meeting on a regular basis at the highest levels to determine the strategic direction of OPG. In such a situation it makes no sense to talk about a "standalone" relationship: OPG continues to be under the direction of the Minster of Energy.

It is also important to remember that OPG is not a regular corporation even though it is incorporated under the OBCA. As long as its sole shareholder is the Province of Ontario, OPG does ***not*** pay income taxes. Instead the Province has ***decided*** that it will make payments in lieu of income taxes, but this is not statutory the way it is for a regular corporation; it is simply the decision of the sole shareholder. This decision can be changed at any time, but it means that the return that OPG earns on its "shareholder's equity" for the Province is not its ROE, but its tax grossed up ROE; so for example if the tax rate is 36% and the ROE 8.0% the Province actually earns 12.4%. If the Province ever sells any of OPG, then it loses this tax status and becomes liable for regular corporate income taxes in which case these tax payments are split with the federal government.

It is for this reason that both DBRS and S & P refer to the implicit support of the Province underpinning OPG's A(low) and BBB+ bond (with a positive trend) bond ratings. This implicit support flows from the importance of these assets to the provincial economy and the way in which they are owned by the province and is a vital part of their business risk assessment which can not be ignored. This support can not be "subtracted" from OPG's bond rating as if it is an add-on, since it flows from the nature of the assets.

Q. HOW DOES THIS AFFECT OPG'S RISK?

A. Unlike Ms. McShane in my view this involvement ***reduces*** OPG's risk, since these are assets that can not be ignored: they are simply too large and important for the provincial economy. This is also reflected in the evolution of OPG as a company since 1999. Electricity is a largely non-storable commodity which means that supply has to match demand. This means that an efficient electrical system has to be centrally organised. Historically this was done through a single integrated utility that planned the system, built generators or power plants, determined which generators were online at any point in time, transmitted the power through high voltage "fat" wires and then stepped down the power for local distribution. These integrated utilities then operated a local monopoly and were regulated in terms of service. The claimed weakness of this system was the absence of consumer choice in terms of electrical supply and the tendency of "large" institutions to generate "large" expensive solutions to problems, rather than focusing on conservation or smaller scale, possibly more environmentally correct, solutions.

Historically the predecessor company, Ontario Hydro, relied on hydro electric power, but after the construction of the Beck II and Saunders power plants in the 1950s most of the obvious hydro sites had been exploited. The result was a shift towards fossil fuel power plants and ultimately the construction of the Pickering A nuclear power plant in the early 1970s, followed by Darlington and Bruce. However, these different power plants have different underlying economics. Hydro and nuclear plants have very low variable costs and very high costs, whereas coal and more recently natural gas plants have higher variable costs and lower fixed costs. This leads to the classification of plants as:

- Base-load capacity with largely fixed costs:
- Peaking capacity with high variable costs used to serve peak power demand;
- Intermittent capacity, which is in between.

The design of an electrical system is then largely based on predicting peak load demand and introducing shaping tools to shift demand and reduce the need for expensive peaking plants that are only intermittently used. A systems operator then dispatches generator plants by bringing them online as needed to match supply with demand and avoid brown outs, which is when the lights go out.

OPG's power plants reflect these basic economics:

- ***Hydro plants*** are primarily base-load, since variable costs are minimal. Depending on water flow some hydro plants are suitable for peaking by storing water behind a dam and running it through to meet peak demand. However OPG has better solutions for peaking than hydro.
- ***Nuclear plants*** are entirely base load, even though their variable costs are usually higher than hydro. This is because the costs of shutting them down and then starting them up again are high, since the process is "complex". Consequently it is most efficient to operate nuclear plants continuously and they are rated by their capacity and lack of outages.
- ***Fossil, mainly coal, plants*** have higher variable costs and are more flexible than nuclear plants in coming into and out of operation, so traditionally they have served base load as well as a peaking role in Ontario electrical generation.

An electrical utility then forecasts demand and which plants to take out of service for maintenance and tries to keep base-load units in service continuously, since they have the lowest variable costs. The problem is that electrical use has both daily and seasonal peaks. Demand peaks in the early morning and early evening, when residential use soars and peaking plants are needed; use then falls after 9.00Pm and is low until 6.00AM. Use then peaks seasonally on the coldest and warmest days of the year as heating and air conditioning use kicks in. New electricity metres that allow time of day pricing may reduce the need for the peaking plants for the daily peaks, but may have little impact on seasonal use.

Peaking plants are then the riskiest type of power plant. This is because the variable cost of the plant, coal for OPG and natural gas or oil for private plants, is largely determined in the market place and varies over time introducing earnings volatility.[14] Plus these plants take all the demand risk, since they are designed to meet the volatile peak demand, they therefore face the risk that they may not be needed at all if the winter is warmer than normal or the summer colder, yet there

[14] These price risks can be hedged on a short term basis.

are still the plant's fixed costs to cover. In contrast, base load plants have the most stable pricing, since the costs are almost all fixed with low variable costs. As a result, they are dispatched first and run continuously subject to standard outages for maintenance. They therefore face minimal demand uncertainty.

In reorganising Ontario Hydro, the baseload generating plants were assigned to the regulated assets, subject to rate of return regulation, with the Bruce nuclear plants leased to Bruce Power. The remaining intermittent and peaking plants were not subject to rate of return regulation. Currently OPG's generating assets are as follows (Fact sheet from OPG Web site at http://www.opg.com/investor).

Generation Data

	As at Dec. 31, 2007 Capacity (MW)	2007 Energy (TWh)
Regulated Nuclear		
Darlington	3,512	27.2
Pickering B	2,064	13.4
Pickering A *	1,030	3.6
	6,606	44.2
Regulated Hydroelectric by Plant group		
R.H. Saunders Station	1,045	6.6
Niagara Plant Group	2,287	11.5
	3,332	18.1
Unregulated Hydroelectric by Plant group		
Ottawa St. Lawrence	1,527	4.9
Northeast	1,324	4.6
Northwest	669	3.8
Evergreen Energy	120	0.5
	3,640	13.8
Unregulated Fossil		
Nanticoke	3,960	18.1
Lennox	2,120	0.8
Lambton	1,976	8.9
Thunder Bay	306	0.6
Atikokan	211	0.6
	8,573	29.0
Wind	7	--
Total	22,158	105.1

* Units 2 & 3 at Pickering A are being placed in safe storage.

The nuclear plants are all baseload as are almost all the hydro plants since unlike Manitoba and other provinces there is very little storage capability in the water system.

OPG provides about 70% of the Province's electricity with the Bruce power plants an additional almost 25% and the residual by private generation. The hope is that overtime the discipline of market forces will shift more generation into the private sector to be determined by market forces. Of OPG's generation, regulated installed capacity is 45% of the total and includes all of the 3 nuclear facilities and the major Niagara (Beck) and Saunders hydro plants.

Q. HOW RISKY ARE THE REGULATED GENERATING ASSETS?

A. In its generic hearing the Alberta EUB compared the gas and electricity distribution function on four criteria as follows:

- ***Credit risk***: The Board believes that AltaLink (electric transmission) faces lower credit risk compared to gas pipelines since its sole customer is a provincial authority;
- ***Supply risk***: Gas pipelines have greater supply risk due to depletion of gas basins. By contrast electricity generation is not a primary industry such as gas extraction and therefore more stable in output.
- ***Competition risk***: Pipe on pipe competition is a reality for many gas pipelines, whereas for electricity transmission assets, such risks are non-existent under the current and foreseeable regulatory environment in Alberta.
- ***Deferral accounts***: The typical gas pipeline company has both capital and operational deferral accounts that shield it from forecasting and unanticipated errors. By contrast, AltaLink has only capital deferral accounts, and therefore faces somewhat higher capital expenditure forecasting risk for a portion of its capital projects.

These four categories are useful for putting these generating assets into perspective once we also add production risk. Here it should be pointed out that the AEUB did not consider generating plants in its business risk assessment. This is because electricity generation in Alberta was deregulated several years before the Alberta generic hearing.

Q. WHAT DID THE AEUB DO WITH GENERATING PLANTS?

A. Like Ontario, Alberta wanted to introduce competition into the generating market and choice in terms of electricity supply. They therefore unbundled the generating, transmission and distribution components of TransAlta and Alberta Power which were the two integrated electric utilities. This is why in the generic hearing they set common equity ratios for the transmission and distribution assets, but not the generating assets. For the generating assets they faced the same problem as in Ontario, they wanted to open the system up to competition and yet still preserve the low cost existing power plants for ratepayers. They therefore took the existing plants and allocated normal generating capacity to existing customers through long term power purchase agreements (PPA's), to have the same effect as rate of return regulation for OPG's regulated assets. New plants or significant upgrades would then be deregulated and subject to market forces. There were therefore two steps involved. The first was to set the rates for the long term (20 year) PPAs so that the generators would get a fair and reasonable return on this generation. Second how to determine the interim rates as this process involved while TransAlta etc were still integrated utilities.

To deal with the second first, in U99099 TransAlta's witness Dr. Kolbe (page 232) stated

> From a first principles standpoint, I believe that the basic business risk of generation, legislated hedges aside, exceeds that of transmission and distribution. This is because generation has become more subject to economically viable competition than the other two functions (which is one of the major reasons North American power markets are becoming more competitive). Next highest in basic business risk is distribution, which has more opportunities for bypass and competitive pressure on margins than transmission. The lowest risk belongs to transmission, which must be operated as a single, integrated system.[277]

I agree with this statement and have also always used a basic ranking of electrical business risk from generation to distribution to transmission. However, note the key phrase used by Dr. Kolbe "legislated hedges aside." Again this indicates that the actions of the regulator can change the underlying business risk. In this case there was a risk transfer from generation to distribution, which the AEUB acknowledged in its decision (page 235),

> **Board Findings**
>
> The Board agrees with TransAlta and the COCI that the DISCO risk is currently greater than the GENCO risk due to the transfer of risk and the higher variance in revenues for the DISCO function in comparison to the GENCO function. To the extent that investors consider risks beyond the test years, the DISCO function will clearly be more risky than the GENCO function as a result of the brokerage and retailing functions required to be carried out by the DISCO in the provision of the Regulated Rate Option.

And decided (page 253)

> Thus, based on the Board's assessment of business risk of the GENCO for 1999 and 2000, the Board has determined that an acceptable range of common equity ratios for an investor-owned GENCO is in the range of 39-41%. This target range provides a mid-point of 40%, reflecting the slightly lower risk of the GENCO relative to the integrated utility. The Board notes that given an allowed common equity ratio of 39-41% (i.e., a mid-point of 40%) and an equity rate of return of 9.00-9.50% (determined in the Return on Equity section), TransAlta GENCO's before tax interest coverage will be 3.11-3.20 times for 1999 and 3.24-3.34 times for the year 2000. On an after-tax basis, TransAlta-GENCO's interest coverage will be 2.06-2.11 times for 1999 and 2.10-2.15 times for the year 2000.

So the AEUB awarded TransAlta 40% common equity for its generation (Genco) assets which was less than that for the integrated utility due to this risk transfer.

At about the same time the AEUB looked into the correct financial parameters for the PPAs so that the generators would get a fair return for their regulated power supply. These PPAs were for a fixed 20 year period so were inherently more risky than annual rate hearings to determine fair and reasonable terms. The IAT hired to examine this stated,

> "We have taken the Board's 1996 decision (U97065) as the starting point for our analysis. On cost of capital, the Board's key decisions were a maximum common equity to capital ratio of 40%, which was deemed for TAU…….The generation function is often assessed as being riskier than an integrated electric utility. This is, however, based on risks related to competition, stranded assets, alternative fuel sources and construction costs for new capacity, that are largely not applicable to Alberta generators in relation to their existing assets…….Our conclusion is that, for existing generation assets *under the current regime,* a just and reasonable range for the common equity ratio to total capital employed would be between around 35% and around 45% *in book value terms*. This range corresponds to the common equity ratio used in almost all gas and electric utility cases in Canada in recent years."

The IAT's recommendation again stresses *under the current regime* (italics in original), which I interpret as meaning the regulatory regime adopted by the AEUB, that is regulatory risk and the risk transfer from generation to distribution.

Q. SO HOW DOES THIS FIT YOUR RISK ASSESSMENT OF OPG?

A. OPG's prescribed assets are not a utility in the standard meaning since there is no obligation to serve, and the market they do serve has some of the elements of competition. Like the generation assets of TransAlta subject to the PPAs they are regulated on the basis that they were paid for by ratepayers, who have a claim on the low cost power they produce and preserving that low cost power is in the public interest. On this basis, the 40% benchmark for “Genco” common equity in a 35-45% range for an integrated electric utility places generation assets at the higher end of the business risk spectrum as indicated by the AEUB in its generic hearing. However, as always the actions of the regulator are crucial and indicate that you can not assess common equity ratios in isolation: what is often presented as utility risk has in fact been transferred to other parties through variance and deferral accounts as part of the regulatory dialogue.

In terms of the risk assessed by the AEUB my summary would be

- ***Credit risk***: Very minor as OPG’s revenue comes from the Independent Electricity System Operator (IESO), who allocates any defaults to other participants;
- ***Supply risk***: This is non-applicable as generators are the supply.
- ***Competition risk***: minimal as the regulated units are baseload and the nuclear plants were originally engineered for a 30 year life. Existing and committed baseload resources are anticipated to peak in 2012-3 at 136 TWh and fall thereafter. Given the projected shortfall and the wish to take coal fired plants out of service it is inconceivable that these plants face any significant competitive risks. Plus there are no significant substitutes for electricity for most uses.
- ***Deferral accounts***: These are critical since they involve the risk transfer and are specific to the generating technology.

Q. CAN YOU DISCUSS OPG’S DEFERRAL ACCOUNTS?

A. Yes. I will start with ***hydro***. People often think of hydro as low risk, after all the technology is stable and the plants have been around in many cases for almost a hundred years: build a dam and then let water fall over a turbine and you generate electricity. However, the supply of water very much depends on rainfall and thus weather. In March 2004 Manitoba Hydro reported a loss of $436 million due to poor water supply conditions across all of its major river systems forcing Manitoba Hydro to import expensive power from the US and to restart emergency thermal units. Similarly Great Lakes Hydro Income Fund owns hydro plants in Ontario (508MW), Quebec (249MW), New England (176MW) and BC (82MW) and had an

ROE of only 0.20% in 2007. Analysts are similarly concerned about “depressed water flows in Ontario,” and “poor hydrology in Quebec and Ontario.”

These weather effects would also impact OPG’s hydro plants. However, this risk has been transferred to ratepayers. In J1, T1, S1, P2, OPG states the following:

> **3.0 EXISTING HYDROELECTRIC VARIANCE AND DEFERRAL ACCOUNTS**
>
> In accordance with O. Reg. 53/05, OPG has established a variance account for the interim period to record capital and non-capital costs incurred and revenues earned or foregone on or after April 1, 2005 due to deviations from forecasts, as set out in the “Forecast Information (as of Q3/2004) for Facilities Prescribed under Ontario Regulation 53/05” as posted on the OEB website for the following hydroelectric matters:
>
> - Differences in hydroelectric electricity production due to differences between forecast and actual water conditions.
> - Ancillary service revenues.
> - Acts of God.
> - Costs associated with transmission outages and restrictions not otherwise recovered.

Essentially the first deferral account transfers all the weather related hydrology risk to ratepayers, while the other three capture a variety of other risks. I would therefore regard OPG’s regulated hydro plants as having minimal business risk as most of the risk has already been transferred to rqtepayers.

For ***nuclear*** there is an immediate tendency to regard them as risky. After all historically they have imposed huge financial losses on the province. The nuclear plants came into operation in the early 1970’s with a 30 year life expectancy, which was upgraded to 40 years in 1982. However, in the early 1990s they ran into serious operational difficulties with declining performance due to inadequate operational and maintenance procedures. In 1997 Ontario Hydro engaged a group of experts to review its nuclear operations and they were rated “minimally acceptable,” although the CANDU design was not regarded as factor in this assessment. As part of this review Pickering A and Bruce A were both placed in lay up and taken out of service for overhaul. The reorganisation of Ontario Hydro seems to be directly the result of the performance of these nuclear plants. In this reorganisation $20.9 billion in stranded debt was taken off the assets they were used to finance and the interest on the debt paid from the payments in lieu of taxes with a residual stranded debt charge paid by electricity ratepayers. ***Consequently all Ontario electricity ratepayers are already paying for the “risks” taken by OPG in its previous incarnation.***

Given these operational difficulties, the huge historic financial losses, the problems of spent fuel rods and decommissioning costs, the first reaction is that these nuclear plants are exceedingly risky. However, again the critical question is who bears the risk? Here the lesson on the stranded debt costs is very important. If a private corporation had taken the $20.9 billion hit that Ontario Hydro took it would probably have gone bankrupt and the shareholders taken the loss. However, with Hydro the loss was paid for by the ratepayers through payment in lieu of taxes that wouldn't otherwise have been paid and stranded debt charges. Again this is an example of a utility going back after the fact to layoff risks to ratepayers. In this case it makes little difference, whether the shareholder, ie., us as taxpayers, takes the loss and pays through higher taxes or the ratepayers, ie., us as electricity users takes the loss through higher electricity charges.[15] The fact is that if a similar loss materialised I would expect there to be a similar political decision, since the government is still intimately involved with all of OPG's affairs. This seems to be the reason why the MOU restrains senior management's freedom of action and requires constant consultation with the province.

So how have the key risks facing the nuclear plants been dealt with? In terms of capital projects and the risk of over-runs the regulations state that the OEB establish five deferral and variance accounts. The key deferral accounts are

- Pickering A return to service
- Decommissioning liabilities
- Cost to develop nuclear generation capacity

These deferral accounts capture the expenditures and roll them forward until such time that they can be included in rates as a fair and reasonable charge to current service, until that time they are an investment and the balance earns 6.0%. Darlington and Pickering B have incurred costs attached to refurbishment of those plants.

The two variance accounts are:

- Capacity refurbishment account

[15] Electricity rate increases are inherently regressive depending on rate design. Arguably it would have been "fairer" to pay the stranded debt costs through tax increases.

- Unforeseen variance account

The first variance account relates to capacity increases and captures deviations from forecast costs. The second variance account seems to catch all other variances from forecast costs including acts of god, changes in regulations, the impact of transmission outages not captured elsewhere.

In addition to these accounts that have been established by regulation, OPG is proposing new accounts to cover fuel cost variances from forecast; pension and post employment costs; and changes in taxes and rules account. Finally OPG states (J1, T3,S1, P15)

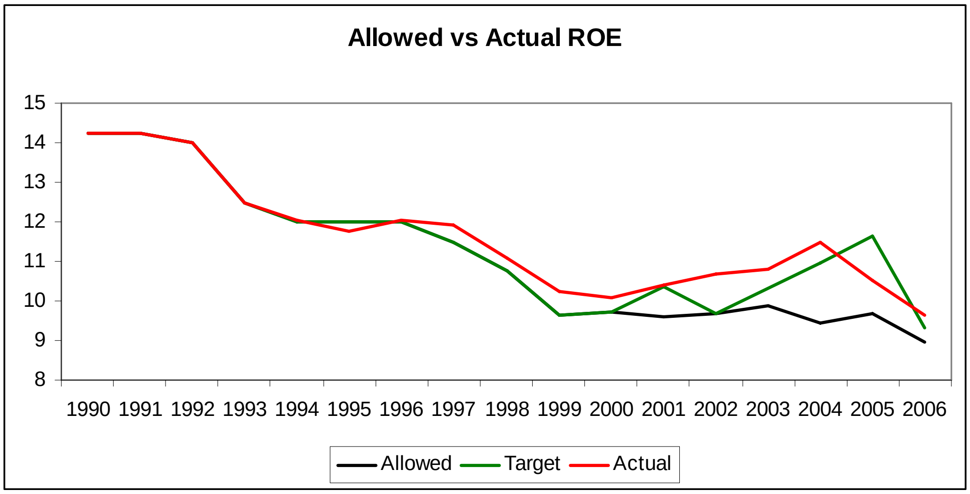
> "OPG wishes to bring to the OEB's attention that OPG may apply for a variance account via an accounting order application in the event unforeseen material events/activities occur."

OPG then goes on to list, unforeseen changes in technology; changes in regulatory requirements, acts of god; transmission restrictions; first nations settlements, and changes in gross revenue charges. OPG does generously state that it is not proposing to re-establish some deferral accounts envisaged in the regulations, but reserves the right to do so if anything material happens.

I would conclude from this review that as baseload power plants both hydro and nuclear are very low risk. The main hydrology risk that hydro is subject to has been passed on to ratepayers, while the complex environment in which nuclear operates has given rise to a host of deferral accounts that is more extensive than any that I have seen before. The fact that OPG has asked for so many deferral accounts on such minutia indicates to me that the risk has been reduced to at or below the level of most standard utilities. As often happens for Canadian utilities, the risk of OPG's operations is not borne by the shareholder, but by the ratepayer.

Q DOES THIS MEAN THAT OPG'S ASSETS HAVE NO RISK?

A. No. The Hydro assets have a rated baseload capacity of 1900 MWh per hour. OPG is paid market prices for output above this rated capacity, which gives OPG an incentive to produce excess power at peaking times when it is most valuable. OPG estimates (Ei1-T1-S1- P16) that this incentive is worth \$23 million over and above its revenue requirement. To this extent OPG's hydro operations look like standard utility operations faced with an incentive mechanism or performance based regulation. The experience of PBR in Canada has been that it has generally increased earned returns above those allowed ROE and not exposed a utility to any risk. For example, the following is a graph of Gaz Metro's allowed ROE, actual ROE and the incentives allowed by the Regie.



What is clear from the graph is that GMI has consistently earned more than the allowed ROE, although it has not always earned the full ROE incentive. I would expect the same sort of pattern from OPG's hydro assets: they will earn more than the allowed ROE with some variability but not expose OPG to any potential losses. In L1-T1-S3 the excess over the allowed ROE is pegged at between 0.30% and 2.21% depending on different assumptions, but what is clear is that incentives of this order of magnitude combined with the water deferral account places the hydro assets as very low risk.

Q. WHAT ABOUT THE NUCLEAR ASSETS?

A. Most of the risk of the nuclear assets seems to be covered through deferral accounts; the remaining risk seems to be related to outages being greater than planned and the fact that the revenue requirement is recovered through volumetric rates. In Ei1- T2-S1 OPG's requested rate structure includes a fixed component designed to recover 25% of the revenue requirement and a variable component to cover the balance. This is contrasted with its cost structure of 5% variable and 95% fixed and the fact that Union Gas and EGDI have a rate structure that recover 50% and 20% respectively through a fixed charge.

However, comparisons with Union and EGDI are not appropriate since both are exposed to weather induced variation in demand that through the variable charge directly feeds into revenue variability. OPG's nuclear assets, in contrast, are base load generating plants with negligible variable costs so dispatch risk and output variability should be minimal as compared to Union and EGDI. In this case the fixed charge mainly serves to reduce the cost of unforeseen or unexpectedly long outages.

Overall, it would seem that the risks of OPG's nuclear assets have been largely removed, while the risk of OPG's hydro assets is pretty low to start out with. On their own I would recommend common equity ratios for the hydro assets of 35% and slightly more for the nuclear assets. Given the risks of the emerging regulatory framework for OPG's nuclear assets I would recommend an overall common equity ratio of no more than 40%.

Q. DO YOU HAVE ANY OTHER RELEVANT RISK ASSESSMENT DATA?

A. Yes. The partial deregulation of the electricity industry has created a number of independent power producers (IPPs) that sell into the market both in Ontario and elsewhere. These IPPs bear most of the risks that OPG has passed on to ratepayers and a review of their operations highlights the contrast between the regulated utility mindset and competitive firms. RBC-Dominion in its Foundations equity research publication (March 2008) analyses the power sector and provides brief data on each company and values them using discounted cash flow, where the discount rate by definition is the required or fair rate of return. Key features are as follows:

- ***Primary Energy*** owns 4 power plants, debt $211million, equity $129 million, above average risk discount rate 9-10%;
- ***Pembina Pipeline fund*** has interests in 13 oil and liquids pipelines, debt $609 million, equity $853 million, average risk, discount rate 6-7%;
- ***Northland Power*** has an interest in 3 gas fired power plants, debt $162 million, equity $531 million, average risk, discount rate 6-7%;
- ***Macquarie Power and Infrastructure***, debt $$35 million, equity $297 million, average risk, discount rate 6-7%;
- ***Keyera Facilities Income Fund*** operates natural gas gathering system, stores and markets liquids, debt $347 million, equity $618 million, average risk, discount rate 6-7%;
- ***InterPipeline*** holds interests in 6 oil pipelines and 3 liquids facilities, debt $687 million, equity $1,198 million, average risk, discount rate 6-7%;

- ***Innergex Power Income Fund*** has an interest in 10 hydro plants with 130MW mainly in Quebec, debt $108 million, equity $213 million, average risk, discount rate 6-7%;
- ***Great Lakes Hydro Income Fund*** owns 1,015MW of power plants, debt$658 million, equity $418 million, average risk discount rate 6-7%;
- ***Fort Chicago Energy Partners*** owns natural gas pipeline, liquids plants and a power income fund, debt $1,602 million, equity $818 million, above average risk, discount rate 6.25-7.25%;
- ***Epcor Power*** owns 20 power stations with 1,311 MW, debt $934 million, equity $805 million, average risk, discount rate 7-8%
- ***Enbridge Income Fund*** has a 50% interest in Alliance Pipeline and other interests, debt $1,066 million, equity $297 million, average risk, discount rate 6-7%;
- ***Canadian Hydro Developers*** owns 20 green power plants, debt $316 million, equity$338 million, above average risk, discount rate 6-7%;
- ***Boralex Power Income Fund*** owns 10 hydro and wood chip power plants (159MW), debt $117 million, equity$437 million, average risk, discount rate 7-8%;
- ***Boralex Inc*** operates 22 power plants in France, Quebec and the US, debt $185 million, equity $184 million, above average risk, discount rate 7.5-8.5%;
- ***Atlantic Power*** has an indirect interest in 14 power plants in the US (924 MW), debt $821 million, equity $163 million.

These operations are mostly income funds or limited partnership since the stable cash flow and limited capital expenditures are ideal for such funds. Obviously they are all small relative to OPG but they have the virtue of being largely deregulated and what is of importance is the discount rate.

The discount rate is the investor's required or fair rate of return and in this case the analysts at RBC-DS reported the discount rate that they felt was fair in valuing these funds. This discount rate is the ***unlevered*** or ***asset*** required rate of return. For income funds this is the correct valuation procedure since they are structured to minimise taxes so their actual capital structure is not important. What happens with these funds is that the debt and equity is owned by the same fund so the debt does not generate the same risks that it would with arms-length contracting. As a result the analyst valued the combined cash flow stream with a rate of return that simply reflects the business risk of the cash flow stream and not how it is financed. What is important is that the

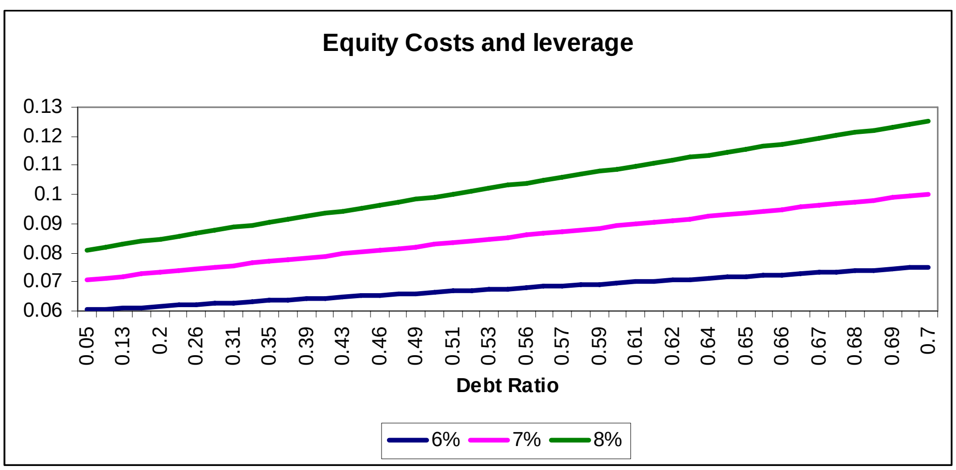
modal or typical discount rate is 6-7% for the average risk investment including power plants.[16] These power plants would include peaking gas fired plants and hydro plants and would generally be regarded as riskier than OPG's regulated power plants.

Q. HOW DO YOU GET A FAIR ROE FROM THIS DATA?

A. If 6-7% is fair for the unlevered assets we need to add a financial leverage risk premium to get a fair return for the equity holder, assuming that the debt is arms-length. To do this I can assume that the assets are held by a normal tax paying corporation and approximate the equity cost using the Modigliani and Miller tax corrected financial leverage equation. This equation states the following:

$$K_e = K_u + (K_u - K_d)(1-T)\,{}^{D}\!/_{S}$$

K's are the required rates of return, subscripted *e* for levered equity, *u* for unlevered, and *d* for debt; *T* is the corporate tax rate and *D/S* the debt equity ratio. The RBC-DS analysis placed the current unlevered equity cost at 6-8% depending on the risk level, while current debt costs are about 5.0% for an A issuer. I can therefore plug in different capital structures (debt-equity) ratios to estimate the fair equity return at different common equity ratios. This is graphed below:



[16] Interestingly they have average and above average, but no below average risk classes.

For the low risk 6% unlevered equity cost adding debt does not change the fair ROE very much since the debt cost of 5% is only marginally below the unlevered equity cost. Even at 70% debt financing the equity cost is only 7.5%. This is why low risk assets can be financed with so much debt. In contrast for the higher business risk assets that have an 8% unlevered equity cost, at the same 70% debt financing the equity cost would be 12.5% and for 7% the cost is in between at 10.1%. What this analysis shows is that even for debt ratios at 70%, which would be close to the lowest for a regulated Canadian utility, an equity cost of 7.5-12.5% for a private, competitive power firm would be reasonable.

For OPG's regulated assets, which I would rate as of lower or equivalent risk to the lowest in this sample, a 40% common equity ratio and 6% asset return would indicate a fair return to the equity holder of 7.0%. To this would be added a floatation cost or financial flexibility adjustment.

Q. IS THERE ANY OTHER OBJECTIVE DATA?

A. Yes. The Bruce nuclear facilities are leased to Bruce Power, where units 1 and 2 of Bruce A are currently laid up and being refurbished. On April 17, 2008 TransCaanda, one of the major partners in Bruce Power, released the following new report on Bruce Power.

TransCanada Provides Update on Bruce A Units 1 and 2 Restart Project

Last Update: 4/17/2008 8:31:47 AM

CALGARY, ALBERTA, Apr 17, 2008 (MARKET WIRE via COMTEX) -- TransCanada Corporation (TRP) (TRP) (TransCanada) today announced Bruce Power has completed its comprehensive review of costs to complete the Bruce A Units 1 and 2 Restart Project. The review, which was completed by Bruce Power, its owners and independent experts with significant experience in energy infrastructure mega-projects, included a thorough assessment of costs incurred to date together with a complete review of the remaining work. Based on the assessment the capital cost for the restart and refurbishment of Bruce A Units 1 and 2 is expected to be in the range of $3.1 to $3.4 billion, up from an original 2005 cost estimate of $2.75 billion. TransCanada's share is $1.55 to $1.7 billion compared to an original estimate of $1.375 billion. The project cost increases are subject to the capital cost risk and reward sharing mechanism under the agreement with the OPA.

"The Bruce Power restart and refurbishment project was carefully structured and is fully consistent with our disciplined approach to growth and value creation," said Hal Kvisle, TransCanada's president and chief executive officer. "Based on the new capital cost estimate of $3.1 to $3.4 billion for the Bruce A restart, TransCanada expects the unlevered after tax return on its investment to be in the middle of the previously announced range of 9.5 per cent to 13.5 per cent." He added, "In the event of a further 10 per cent increase in capital costs, our unlevered after tax return on the project would be approximately 10 per cent."

The Bruce Power restart is now projected to cost $3.1-3.4 billion and assuming a further 10% escalation in costs Mr. Hal Kvisle projects a 10% unlevered after tax return. This projected after tax return must be below the discount rate, or fair return that TransCanada and its partners are using, otherwise they would not be continuing with the project. This would correctly put the fair return for the Bruce Power start up at the top of the discount rates used by RBC-DS for more conventional power plants. Given that OPG's prescribed nuclear assets have more regulatory protection this would place the fair return at significantly less than this 10% unlevered equity cost.

Q. WHY IS OPG ASKING FOR A LARGER COMMON EQUITY RATIO?

A. If I use the AEUB benchmarks of 33% for transmission and 37% for distribution, this would place generating assets at 40%, similar to that found for Genco in U99099. In my judgment the Ontario Energy Board awards for transmission and distribution assets in Ontario allow too much common equity and are too "generous." When one considers the number of deferral accounts available to or applied for by OPG, it is difficult to see how these assets are much riskier than the predominantly coal generating assets to which the AEUB decision applied. I therefore judge a 40% common equity ratio to be consistent with the business, financial and regulatory risk faced by these assets.

To understand why OPG is requesting such a rich capital structure we have to remember that when OPG was part of Ontario Hydro and a crown corporation the distinction between debt and equity was moot and there were few ratepayer gains to using debt since Hydro was not paying taxes. Now that OPG is an OBCA corporation and paying the equivalent of income taxes it should act like a competitive tax paying corporation and use debt to minimise taxes. However, whereas the gains to using debt flow to the shareholders in a regular corporation, in a regulated utility they are a cost of service. So any reduction in income taxes due to the use of debt financing automatically reduces the revenue requirement and flows through to the ratepayers.

The Alberta EUB has noted the above (TransAlta EUB 2003-061, August 2003, page 103) where it stated:

> "The Board notes that since cost of capital recovery is provided for through its annual revenue requirements, a regulated utility, like AltaLink, would naturally wish to maintain low debt ratios. This allows the utility to minimize the financial risk imposed on equity investors, and to also maintain high debt ratings."

The use of debt financing is thus like any other efficiency gain in that the gains should be competed away and flow through to the customers. One would hope that the managers of a utility are professionals so that they operate the utility in a professional way to reduce costs. However, they have alternative incentives since under the OBCA

> "Every director and officer of a corporation in exercising his powers and discharging his duties shall:
>
> 1) act honestly in good faith with a view to the *best interests of the corporation*; and
>
> 2) exercise the care, diligence and skill that a reasonably prudent person would exercise in comparable circumstances."

Further the governance guidelines of the TSX (Where Were the Directors, 1994, the Dey Report) indicate that

> *"We recognize the principal objective of the direction and management of a business is to enhance shareholder value, which includes balancing gain with risk in order to enhance the financial viability of the business."* (S 1.11)

What this means is that the directors have a fiduciary responsibility towards the company's shareholders and not their customers. In this context the managers of OPG seem to be acting like the managers of any other private corporation in that they are acting in the best interests of their shareholder and not acting to reduce costs.

The dichotomy between managers having a fiduciary duty to act in the best interests of their shareholders while also being required to operate the utility at minimum long run average cost is the reason for the move towards performance based regulation. Without PBR it seems that many believe a utility's managers simply will not do what they are paid to do and operate the utility efficiently. It is striking in this context that in its February 21, 2006 decision on transmission the Board approved a 50:50 earnings sharing mechanism. OPG pushing for more common equity is simply another aspect of this dichotomy. One would have hoped that this problem would not exist in a utility owned by the people of Ontario serving those same people throughout the province, but it seems that OPG has lost sight of the duality between their shareholders and ratepayers and that ultimately their job is to serve the people of Ontario.

4.0 FAIR ROE ESTIMATES

Q. HOW DO YOU ASSESS THE RISK OF A REGULATED UTILITY RELATIVE TO THE MARKET AS A WHOLE?

A. Schedule 17 shows the estimates of the variability of the ROE over the period 1993-2007 for the major utility holding companies and pure play utilities in Canada. Of note is that although we use variability as a measure of risk, for utilities it is not a measure of business risk. However several points are important: first for TransCanada (TCPL) the holding company has more variability than the regulated Mainline; second in comparing these variability measures with those in Appendix B it is clear than even these UHCs are very low risk compared to Corporate Canada as a whole.

Note that the average standard deviation of the annual ROE for the TSX60 firms in Appendix B is 14%, but this is pulled up by the short history for Fording Canadian Coal Trust. The median is 9.53% so 9-10% seems reasonable for the typical standard deviation of the ROE for a large TSX60 company. With this base of reference Foothills would have relative risk of 10% of a typical TSX60 firm and TransAlta 46%, with most of the UHCs at around 15-20%. This is supported by the observation that the only firms with more than a few years data with similar standard deviations to the UHCs in Schedule 17 are the Chartered banks, Loblaws, Thomson and Canadian Tire. This relative risk assessment of about 20% based on the standard deviation of the ROE has been stable over time.

The weakness of this risk assessment is that it is based on the variability of the firm's accounting earnings, or total income risk. What investors are interested in is the risk of the securities they hold, which includes investment risk independent of the income risk. Moreover, since investors rarely hold single investments, they are interested in how the risk of their overall portfolio changes as a result of holding a particular security. This measure of risk is called the security's ***beta*** coefficient. The most common risk premium model is the capital asset pricing model (CAPM), which says,

$$K = R_F + MRP * \beta$$

that the investors required return (K) is equal to the risk free rate (R_F) plus a risk premium, which is the market risk premium (MRP) times the security's beta coefficient (β).

Why the CAPM is so widely used is because it is intuitively correct. It captures two of the major "laws' of finance: the time value of money and the risk value of money. I will discuss the third law of finance the tax value of money later, but the time value of money is captured in the long Canada yield as the risk free rate. The risk value of money is captured in the market risk premium, which anchors an individual firm's risk. As long as the market risk premium is approximately correct the estimate will be in the right "ball park." Where the CAPM gets controversial is in the beta coefficient since risk is constantly changing so too are beta coefficients, which makes testing the model difficult. However, it measures the right thing: which is how much does a security add to the risk of a diversified portfolio, which is the central idea of modern portfolio theory.

The CAPM is the premier model for estimating required or fair rates of return. However, when it was originally tested early results showed that it tended to over estimate returns for high-risk ($\beta>1$) stocks and under-estimate for low risk ($\beta<1$) stocks. However these tests suffered two major problems, which have never been overcome. First they used the Treasury bill yield as the risk free rate, which is only appropriate for very short horizon (91 days) investments. In regulatory hearings it is customary to use the CAPM with the long Canada yield, since equities have longer time horizons than even the longest maturity long Canada bond as they have no maturity date. The use of the CAPM with a long Canada yield will be referred to as the "classic" CAPM even though this is not the way that it is discussed in finance textbooks or tested. To the extent that long Canada bonds earn a maturity premium of about 1.0% over the average Treasury bill yield, this classic CAPM automatically increases the risk free rate and adjusts for the bias noted in these early tests of the CAPM.

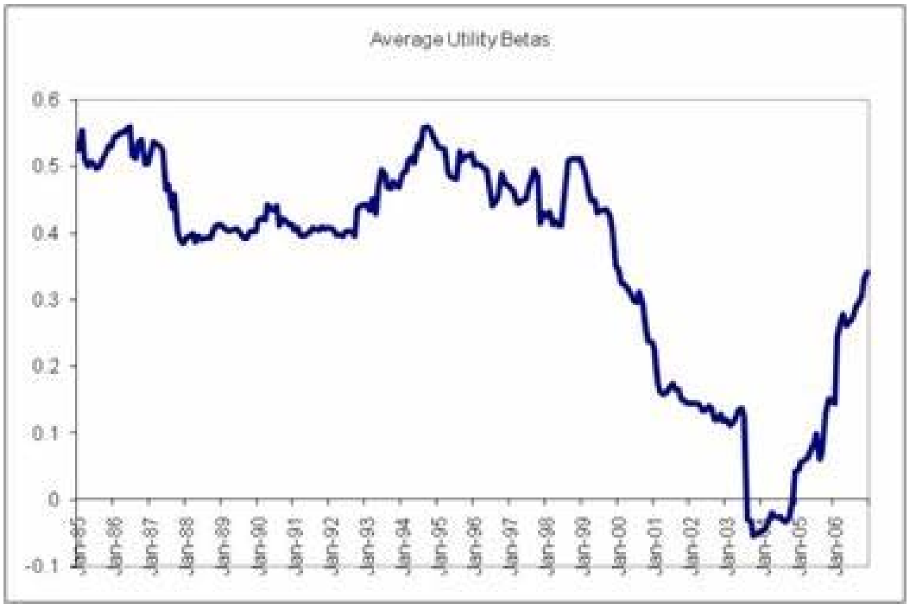
The second problem is that these tests used actual betas and were simply mechanical: whatever was the beta over the previous five year period was used in the test as a forecast beta. As we will see this is not how betas have ever been used in a regulatory context, where more judgment based or adjusted betas are used.

To illustrate the betas for the major Canadian utilities for each of the 5-year periods ending 1985 through 2007 are as follows:

	CUL	EMERA	Enbridge	Fortis	GMI	PNG	Terasen	TransAlta	TransCana	Utility beta
12/31/1985	0.60			0.66	0.29	0.55	0.21	0.62	0.79	0.53
12/31/1986	0.61			0.52		0.38	0.14	0.53	0.85	0.50
12/31/1987	0.32			0.25		0.46	0.47	0.22	0.59	0.39
12/30/1988	0.36			0.30		0.45	0.52	0.20	0.63	0.41
12/29/1989	0.36			0.25		0.42	0.56	0.22	0.60	0.40
12/31/1990	0.37			0.21		0.47	0.56	0.27	0.59	0.41
12/31/1991	0.38			0.25		0.46	0.54	0.28	0.54	0.41
12/31/1992	0.50			0.38		0.35	0.47	0.40	0.55	0.44
12/31/1993	0.58		0.39	0.37		0.56	0.47	0.47	0.45	0.47
12/30/1994	0.61	0.54	0.54	0.45		0.45	0.60	0.56	0.58	0.54
12/29/1995	0.49	0.54	0.48	0.51	0.47	0.45	0.63	0.58	0.53	0.52
12/31/1996	0.49	0.51	0.50	0.38	0.48	0.29	0.57	0.57	0.48	0.47
12/31/1997	0.61	0.40	0.44	0.31	0.38	0.44	0.48	0.46	0.34	0.43
12/31/1998	0.57	0.56	0.47	0.49	0.37	0.59	0.46	0.53	0.56	0.51
12/31/1999	0.54	0.43	0.25	0.34	0.20	0.52	0.33	0.27	0.25	0.35
12/29/2000	0.38	0.29	0.07	0.24	0.18	0.49	0.23	0.07	0.18	0.24
12/31/2001	0.28	0.22	-0.10	0.16	0.11	0.45	0.16	0.08	-0.05	0.14
12/31/2002	0.24	0.17	-0.18	0.15	0.08	0.47	0.10	0.10	-0.07	0.12
12/31/2003	0.14	-0.05	-0.40	-0.04	0.01	0.36	0.01	-0.06	-0.42	-0.05
12/31/2004	0.13	-0.01	-0.31	0.03	0.15	0.46	0.00	0.14	-0.21	0.04
12/30/2005	0.23	0.06	-0.18	0.19	0.19	0.48		0.41	-0.18	0.26
12/29/2006	0.34	0.08	0.21	0.46	0.43	0.51		0.41	0.29	0.34

For the market as a whole the beta is 1.0, so these beta estimates indicate that these utilities and utility holding companies (UHCs) are lower risk than the typical stock which is what we would expect given their ability to earn their allowed ROE and the associated income certainty.

We can also group firms into industries and examine their betas over time. In this way the random behaviour of one firm is reduced in importance. The last column in the prior table gives the average for the UHCs, which can be regarded as an “industry” beta. This average beta is then graphed below.



The data shows that for the five-year period ending in 1985 the average beta was 0.55[17]. The average then drops through to 1992 before increasing back to 0.55 for the period 1991-1995 before dropping from the 0.50 level in the late 1990s to negative for 2003 before increasing back to 0.26-0.34 for the most recent five year periods. Over this long period the average beta for the utilities has been in a range from a negative number to 0.55. The top of this risk assessment is higher than that obtained by examining the variability of accounting ROEs alone, reflecting the fact that some of the risk is investment risk, independent of the income risk. The bottom of the range reflects some unique factors from the stock market bubble of the late 1990s.

Another way of looking at the data is to look at the betas of the relevant TSX/S&P Composite sub-indexes. These are graphed in Schedule 18. The great advantage of the sub-index betas is that they include more companies than the individual estimates and the data is more readily available.[18] This is particularly important due to the fact that a large number of regulated firms, like Consumers Gas, Maritime Electric, Island Tel etc., have disappeared through corporate reorganisation. Although, this means that their individual company betas have also disappeared,

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[17] Betas are estimated over five year periods of monthly data so the 1985 estimate covers the period 1980-1985.

18 Index data is available at the end of the month, whereas company data is only available in May-June of the following year. The TSX sub index data ends in May 2002. The Telcos were removed from the utility sub index as part of this reorganisation.

it does not mean that their economic impact has disappeared. Consumers Gas now shows up as part of Enbridge, Island Tel as Aliant and BCE etc., so their economic impact continues to show up in the sub index betas. However, there are two disadvantages: the first is the impact of BCE's non regulated operations on the sub index betas; the second is that the sub indexes are weighted according to the TSE weights for each company. Consequently, these are not simple averages but market value weighted averages, so that big companies like BCE have a disproportionate weight.

The Telco, Gas and Electric, Pipeline and utility sub-index betas up to the end of 2002 when the TSE sub indexes were changed are as follows:

	Gas/Electri	Telco	Pipes	Utility
DEC/96	0.52	0.60	0.54	0.60
DEC/97	0.47	0.61	0.44	0.59
DEC/98	0.53	0.80	0.42	0.83
DEC/99	0.37	0.96	0.18	0.96
DEC/00	0.21	0.82	0.06	0.80
DEC/01	0.17	0.87	-0.14	0.83
DEC/02	0.14	0.85	-0.18	0.80

The sub-index betas largely tell the same story: Telco risk has undoubtedly increased as competition has been introduced, particularly long distance, and consequently they have been removed from ROE regulation. This has caused the betas for both the Telcos and the Utility sub-index to increase, since BCE has been such a large part of the Utility index. This has been exaggerated by the fact that the sub indexes are based on market value weights so that BCE has a huge influence on both the Telco and the Utility sub-indexes. However, the recent behaviour of the Gas and Electric and Pipeline sub-indices require explanation.

It is important to remember that betas are simply a statistical estimate of the extent to which a stock moves with the general market over a particular period of time. By convention, betas are estimated over a five-year period. This means that if a critical event happens during the estimation period, then the beta estimate will pick it up. However, once the event "passes out" of the five-year estimation window, the impact of the event will disappear from the beta estimate. For example, the graph in Schedule 18 shows that beta estimates were trending to a common average until 1987, after which the pipeline beta increased and the others decreased. This lasted for five years until they again came together.

If I had estimated betas during the period ending say in 1990, I would have estimated that gas and electric betas had dropped and pipeline betas increased. However, is it reasonable to say that gas and electric risk dropped during this period? The answer is no. What happened was that there was a large stock market crash in October 1987 (-22.0%) and this was such a significant factor that whatever happened in that one month affected all the beta estimates for the next five years until October 1992, when the October 1987 results were no longer in the sample period.

Professional judgement would indicate that it is unreasonable to just use the statistical estimate without recognising the underlying events that caused it, and then to make appropriate adjustments. It is my judgement that betas tend to revert to their long run average levels: for the market as a whole this is 1.0, but for regulated firms from Schedule 18, this is about 0.5-0.6.[19] There is no indication from Schedule 18 that the non-Telco betas are reverting to 1.0.[20] Consequently it is illogical to weight them with 1.0, since there is no expectation that their risk is increasing to that of an average firm. So what explains the current betas?

The answer is Nortel and the Internet bubble. During the late 1990s, the technology and internet boom were driving North American markets. Nortel was controlled by BCE, so that BCE's stock price was being driven by Nortel and the internet boom. In fact, this was driving the entire Canadian stock market as Nortel and JDS Uniphase became an increasing part of the market and at one point made up almost 35% of the value of the TSE300. As the prices of Nortel and JDS Uniphase stock increased, so did the Telco and Utility indices and the TSE300. When this boom turned into a crash and Nortel declined from $124 to under $1, Nortel took the Canadian market and the Telco and Utility indices down with it. This is what caused the high beta estimates for the Telco and Utility indexes in both 2000 and 2001.

In contrast, the gas and electric and pipeline betas declined. The reason for this was that as the market went on a technology driven boom and bust, these stocks were largely ignored. In the case of the Pipeline sub index, the collapsing share price of TransCanada Pipelines during 1999

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[19] This is also the accepted in the literature. Gombola and Kahl, "Time series properties of utility Betas," Financial Management, 1990, come to the same conclusion.

20 The Telcos have been reclassified out of utilities since they are no longer ROE regulated.

and its recovery during 2000, was against a strong equity market in 1999 and a weak one in 2000. This movement of TransCanada's share price against the general market movement induced a negative correlation and the low beta estimate for the pipeline sub index.[21]

For the last several years the story in the Canadian equity markets has been recovery from the "bubble" in Nortel's stock price. Unless a similar bubble is expected in the next few years, taking the recent beta estimates at face value makes little sense. It is my professional judgement that after examining the behaviour of the betas we will not have another Internet bubble in the stock market over the next few years. Further, the betas of gas and electric companies will revert to a level around 0.50 once the data from this anomalous period has passed out of the estimation window.

Q. HAVE THESE INDEX BETA ESTIMATES CONTINUED TO BE AT LOW LEVELS?

A. Yes. The tables of individual beta estimates go to the end of 2006 and show that betas are still at relatively low levels except for that for Fortis. In addition although the TSE discontinued the most useful sub indexes in 2002, the new S&P/TSX indexes do have a utility index. There are problems in the coverage of the new S&P/TSX sub indexes since they reflect S&P's world wide view of what constitutes a utility sub index as both Enbridge and TransCanada are classified in energy rather than as utilities. However, Schedule 19 shows that the betas of the new utility subindex continued to decline through 2003 before trending upwards to a beta around 0.20 by the end of 2006.

For further information on the effect of the stock market bubble on betas I have graphed the betas of all the major TSX sub indexes from 1992 until the end of 2006 in Schedule 20. We can see the dramatic impact of the information and technology (think Nortel and JDS Uniphase) sub index beta, which increased dramatically from about 1.5 to over 3 before dropping in 2006. As this beta increased, by construction other betas had to decrease, since they have to sum to 1.0. The important point is that low utility betas in the early-mid 2000's are not an anomaly; they

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21 This stock market reaction was due to the poor performance of TransCanada's non-regulated operations in 1999 and the programme of retrenching and selling them off in 2000.

reflect the fact that during this period the market was IT driven and utilities and other low risk sectors of the market were not affected by the same factor. Consequently, they offered diversification benefits to investors holding information technology stocks.

Q. WHAT ADDITIONAL EVIDENCE HAVE YOU LOOKED AT?

A. One of the most important investment characteristics of utilities is their high dividend payouts. This is why they appeal to Canadian investors who can use the dividend tax credit and why their shares are generally held by Canadian and not foreign investors. This means that utility share prices are driven by interest rates as well as common market factors and suggests a two-factor risk premium model, where there are two risk premiums: the market risk premium and a term spread risk premium that reflects exposure to interest rate risk. Interest rate risk is the risk of investing in long Canada bonds, instead of treasury bills. As interest rates increase returns from long Canada bonds go down and vice versa. This exposure to interest rate risk also characterises utility stocks since there dividend rich returns makes them “interest sensitive.”

I therefore estimated a two factor model for utilities where their returns were driven by the common market factor, the TSX Composite return, as well as the return on the long Canada bond. The beta from this two-factor model along with the conventional beta estimate is graphed in Schedule 21. As can be seen the one and two factor beta estimates for the gas and electric and pipeline subindexes show essentially the same behaviour over time. Given the measurement error involved in any statistical estimation and the sensitivity of the estimates to economic conditions, I discount the current estimates and judge a reasonable range for normal market conditions going forward to be 0.45-0.55.

Q. WHAT IS YOUR RISK PREMIUM OVER BONDS ESTIMATE?

A. From Appendix E the Canadian market risk premium of equities over long-term bonds since 1956 has been in a range 1.84-3.12% based on annual holding periods. If I extend the data back to 1924 the range increases to 4.81-5.37%. However, conditions in the bond market prior to 1956 were substantially different from what they have been since and most of the decline in the market risk premium has been caused not by a decline in equity returns but an increase in bond market returns, commensurate with their increased risk. My Appendix F shows that similar changes have occurred in the US, where the US market risk premium since 1956 has similarly been in a range 3.58-4.45%, which is a substantial drop from the estimates from 1926.

My assessment is that much of the drop in the market risk premium has been caused by an increase in the risk of investing in long government bonds. The twin problems of government deficits and inflation drove up market yields in the 1970s and 1980s and caused the risk of investing in government bonds to approach that of investing in equities. One way of looking at this is to chart the yield on the real return bonds, which is in Schedule 22. Of note is that from 1991 through the end of 1996 the yield on the real return bond was around the 4.50% level. This is the period when the government deficit and borrowing was approaching 10% of GDP. This crowding out in the bond market created a significant risk that the government would inflate itself out of its deficit problems causing bond investors to demand higher yields to protect themselves. Significantly, as the government deficit began to fall so too did the yield on the real return bond. Notably since government moved into surplus the yield on the real return bond has been in free fall and has recently been well under 2.0%.

The impact of government financing problems has primarily been in the government bond market where this inflation risk has been most obvious. In Appendix F Schedule 5, I graph government bond betas from 1926-35 until the end of 2007. From this data it is clear that bond betas increased dramatically until the mid 1990s when they peaked at over 0.50. Since deficits have been tamed (at least in Canada) government bond betas have decreased accordingly and this reduction in risk has lead to commensurate declines in real and nominal government bond yields. At a bond beta of 0.50, at their peak, government bonds had at least a 200 basis point risk premium embedded in them, a level similar to that of low risk utilities. This is why at that time I was recommending very low risk premiums. This risk premium has now largely been removed from government bond yields, as the yield on real return bonds has declined by a similar amount.

I currently estimate the market risk premium at 5.0%. This is significantly higher than the experienced market risk premium earned in Canada over the last 48 years, but takes into account the influence of the earlier data, the recent unexpected performance of the bond market, due to declining long Canada bond yields, and the reduction in risk in the bond market compared to a few years ago. From the previous discussion of the risk of a typical regulated utility, I would place a reasonable beta estimate at 0.50. This would imply a risk premium of 2.5%. Adding this risk premium to the long Canada yield forecast of 4.75% produces an estimate of the required rate of return for investing in a typical utility stock at approximately 7.25%.

Q. HAVE YOU ESTIMATED ANOTHER RISK PREMIUM MODEL?

A. Yes. The CAPM is a single factor model, where all that matters is the risk of holding securities in a diversified portfolio. However, the two-factor model indicates that the CAPM does not capture all of the risks that affect securities. It has been known for some time that the CAPM, when used with Treasury Bill yields as the risk-free rate, tends to give low estimates for certain types of securities, which is partly why for regulatory reasons it is normally used with the long Canada bond yield.[22] However, this practice caused many of the problems in regulatory awards in the mid 1990s when the long Canada bond yield was so high due to inflation concerns, government deficits and the large risk premium embedded in government bond yields, which did not have a counterpart in the equity market.

The exposure of utility returns to this interest rate factor I call "gamma" to contrast it with the beta which is the exposure to the market risk. Schedule 23 graphs the gammas of the gas and electric and pipeline sub indexes up until 2002. These gammas are more stable than the equivalent beta estimates and show that on average gammas are about 0.50. As a result I judge utility stocks to have about half the exposure to the equity market as the average stock and half the exposure to the bond market as the long Canada bond.

The two-factor model partly adjusts for the known estimation problems of the CAPM by directly incorporating the risk of the long Canada bond through a term or interest rate risk premium. For example, the data indicate that utilities have about half as much interest rate risk as the long Canada bond and half as much risk as the stock market. If yields on long Canada bonds increase and the return on the long Canada bond is only 2.0% while the stock market increases by 10%, then the return from holding the utility stock will be 6% over the risk-free rate: 5% due to exposure to the market factor and 1% from exposure to the interest rate factor. In Schedule 24 is

22 This is also why the market risk premium is normally estimated over the long Canada bond return, rather than over Treasury Bills returns.

a graph of the utility interest sensitivity or gamma using the new TSX utility subindex. The main message is that gamma is still at the 0.50 level that I estimated earlier.

However, incorporating interest rate risk into the risk premium model means that other adjustments are necessary as well. In particular, since the interest rate or term premium is the premium over Treasury Bill yields, the market risk premium must be estimated in the same way. In Appendix E (Schedule E1) I show that the realised return difference between long Canada bonds and Treasury Bills was 1.19% using arithmetic returns over the period 1957-2007, which is also approximately the average yield difference. The market risk premium over Treasury bills would therefore be on average about 1.19% higher than over long Canada bonds. Consequently the 4.75 that I am using for the market risk premium over long Canada bonds should be increased to about 5.94% as a risk premium over normal Treasury Bill yields. The utility risk premium would therefore be 0.5*5.94% or 2.97% for the equity market risk premium plus 0.5*1.19% or 0.59% for the interest rate risk premium. The overall risk premium would then be 3.56% over the long run normal Treasury Bill yield.

The long run Treasury Bill yield is simply the rate that is expected to be earned from rolling over treasury bills yields for thirty years, equivalent to the long Canada bond maturity. The best estimate for this is simply the forecast long Canada bond yield minus this 1.19% interest rate risk premium. Consistent with the 4.75% forecast I estimate this at 3.56% for an overall two factor required return estimate of 7.12%, which is marginally lower than the CAPM estimate.

Q. PLEASE SUMMARISE YOUR ESTIMATES.

A. The risk premium testimony is based on two models: a ‘classic’ CAPM risk premium model and a two-factor model. The ‘classic’ CAPM estimate is based on an historic average market risk premium “adjusted” for the changing risk profile of the long Canada bond. The two-factor model takes into account the interest rate sensitivity of utility stocks. Both models have been estimated over individual firm data as well as sub-index data and over extensive periods of time. As more estimation procedures and larger data sets are used, there are of course more estimates. However, by examining the impact of different economic conditions, as well as the risk return relationship in the US and Canada, I can be confident that the fair return is bracketed by the estimates. The methods provided the following fair return estimates:

Classic CAPM estimate:	**7.25%**
Two-factor model estimate:	**7.12%**

I put equal weight on both estimates and judge that the point estimate of the required rate of return is 7.19%, which means a real return of about 5.2% with a long-run inflation forecast of 2.0% and slightly lower for the next few years. This 5.2% represents a real return only slightly less than that earned by the TSE300 index as a whole since 1956. Note that in my Appendix E, Schedule 1, I estimate the real return on the TSE300 since 1956 at 11.09% minus inflation of 4.11% (arithmetic return estimates) or a real return of 6.98%, so awarding 1.78% less for a low risk generating assets seems reaonable.

Q. IS THIS YOUR RECOMMENDED ALLOWED RETURN?

A. No, regulated firms should be allowed to recover their issue costs in the allowed return in the same way that issue costs attached to debt are included in the embedded debt cost. The equity issue costs are made up of a number of components including in house costs, which are passed on as general administrative costs plus the costs paid the investment banker. These costs are made up of two kinds: the out of pocket reimbursement of expenses plus the under pricing of a new issue to ensure a successful offering. Overall these costs run up to 5.0% for a normal issue, although they can be smaller for larger issues since there are economies of scale.

The conventional way of working out the extra return that is required is to use the constant growth model and recognise that because of these costs the firm has to earn a higher return on its net proceeds than the nominal amount of stock that it has sold. For example, assuming a stock with a 4% expected dividend yield and 4% growth, the cost of equity is 8.0%, that is

$$K = \frac{d}{P} + g = 4.0\% + 4.0\%$$

However, if the firm only receives a net of 90% of the current stock price, that is, 10% issue costs then the equity cost is

$$K = \frac{d}{P} + g = \frac{4.0}{0.90}\% + 4.0\% = 8.44$$

which is 8.44% or 44 basis points more.

In the example, if the investor wants a fair return of 8%, the firm has to be allowed an 8.44% return on the net proceeds of 90% of the issue size. In this way 8.44% on 90% of the proceeds provides the 8.0% return on the amount paid by the investor. Clearly, the higher the dividend yield component and the less growth, the higher the impact of the new issue costs. For example if the dividend payout is 100%, then the flotation cost allowance would be 88 basis points. This is because the firm, by definition, is being forced into more new issues than a firm that reinvests more.[23]

Once the tax deductibility of some of these costs is considered, a true "flotation or issue cost" allowance of less than 44 basis points is reasonable plus the out of pocket expenses. However, I normally add 50 basis points as a cushion to the direct estimates in line with this practice of many regulators. This is mainly to ensure that there is no dilution and stock prices are more variable than a 10% floatation cost allowance would indicate. Adding 0.50% to my estimates and rounding produces a fair ROE estimate of 7.75% for a 300 basis point utility risk premium over my 4.75% forecast long Canada bond yield.

[23] Note that with 5% issue costs, the idea is that the stock should sell at a market to book ratio of 1.053, so that it will net out book value on any new issue. With utility market to book ratios vastly in excess of 1.052 it is difficult to rationalise any flotation cost allowance, since it is unlikely that there will ever be any dilution.

5.0 REASONABLENESS OF THE ESTIMATES

Q. THIS ESTIMATE IS LOWER THAN THE COMPANY'S REQUESTED ROE. DO YOU HAVE ANY CORROBORATING EVIDENCE?

A. Yes. First it has to be pointed out that the size of the equity risk premium is usually estimated from historic data and in the U.S. it has been pegged at 6.00% using the Ibbotson et al data. This became very controversial when people started doing simple tests of reasonableness. For example, in Schedule 25 is a simple future value chart showing how one dollar compounds at 6.00%, 10.5% and 12.0%. By year thirty, an investment at 6.0% would have grown to $5.74 whereas an investment at 10% would have grown to $19.99 and an investment at 12% to $29.96. These are staggeringly large premiums for the 10 and 12% returns that proxy for the equity market versus a lower "bond" market return, which leads to the natural question of how risk averse do people have to be in order to require these huge premiums. Mehra and Prescott[24] argued that the degree of risk aversion was unreasonably high. As Siegel[25] points out, "the historical (equity) return has been too high in relation to the return on risk-free assets to be explained by the standard economic models of risk and return without involving unreasonably high levels of risk aversion." The high earned returns phenomenon is now known as the "Equity Risk Premium Puzzle," since people have been at a loss to understand the historic U.S. record.

There have been two major approaches to explaining the puzzle. First, Siegel has shown that the US results are time specific. He estimates the following risk premium estimates over long bonds:

	Geometric[26]	**Arithmetic**	**Real Return**
1802-1998	3.5	4.7	3.5
1802-1871	2.2	3.2	4.8
1871-1925	2.9	4.0	3.7

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[24] R. Mehra and E. Prescott, "The Equity Premium Puzzle," *Journal of Monetary Economics*, (March 1985)

[25] Jeremy Siegel, "The Shrinking Equity Premium," *Journal of Portfolio Management*, (Fall 1999).

[26] The difference between arithmetic and geometric returns is discussed at length in my Appendix E.

1926-1998	5.2	6.7	2.2
1946-1998	6.5	7.3	1.3

From the above data there seems to be a U.S. market risk premium of 6.7-7.3% since 1926, which is the type of data normally presented by company witnesses in rate hearings. However, as the time period is lengthened, the equity risk premium drops significantly. For the longest available period the equity risk premium in the U.S. is only 4.7%. This leads to the question of why so much reliance is placed on US data since 1926? The answer to this is that Fisher and Lorie[27] of the University of Chicago started the data-base at 1926 simply to capture the huge run up in stock prices prior to the Great Crash of 1929. Further their original data-base is the foundation for most of the subsequent capital market data and research. If they had used all of the data that was available to them at the time, subsequent US market risk premium estimates, as Siegel shows, would have been much lower.

The final column of Siegel's table shows the real return on Treasury Bonds (Nominal minus actual inflation). Over the whole period the actual real return has been 3.5%, but over the periods since 1926 and 1946 it has been only 2.2% and 1.3% respectively. This is the root of the puzzle, not that equity returns have been so large but that bond returns have been so low for such a long period of time. This is the theme of Appendices E & F, that the enormous increase and volatility of interest rates in the post war period has lead to unreasonably low estimates of realised historic bond returns. Siegel points out that the introduction of Treasury Indexed Securities or TIPS in 1997 in the U.S. has lead to the direct observation of the US real bond return at 4.0%, which compared to the 1926-1998 actual returns indicates that the realised bond return was 1.8% less than expected. This means that, but for this bias, the U.S. market risk premium should have been 4.9% (6.7-1.8) or essentially the long run average U.S. market risk premium.

It is important to note that much of the debate about the market risk premium in the US stems from the fact that until 1997 they have not had an inflation indexed bond and the above bias was not obvious. In contrast, this has been well known in Canada, since we have had a real return

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[27] L. Fisher and J. Lorie, "Rates of Return on Investments in Common Stocks," *Journal of Business*, 37-1, 1964.

bond since 1991. In fact, many of Siegel's arguments were previously made by me in a 1995 paper in the *Canadian Investment Review*.[28] In this case, following historic US evidence amounts to the "one-eyed following the blind."

The second way of resolving the puzzle has been to estimate a forward looking model using the discounted cash flow (DCF) model to estimate the equity return and then subtract the long bond yield. In most applications the Gordon constant growth model[29] is used where the equity cost is the forecast dividend yield (expected dividend d_1 divided by current share price P) plus the expected capital gain or growth yield (g).

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

Q. DO YOU PROVIDE A DCF ESTIMATE?

A. My Appendix C presents data for all US utilities followed by Standard and Poors as well as the electric and gas utilities. This data is used to estimate a DCF required rate of return that is then subtracted from the US government bond yield to estimate the utility risk premium appropriate for these U.S. utilities. This estimate of the utility risk premium is that it has been in a range 1.84-2.05% over ten year US Treasury bond yields and falling. This is supported by the increase in the market to book ratios of these companies indicating that the market has been paying higher and higher prices for the same stream of utility earnings. That is, the required rate of return has fallen faster than allowed rates of return.

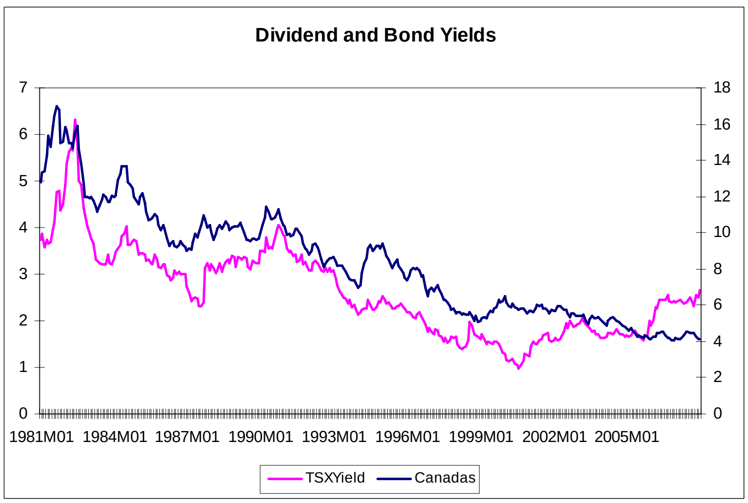
However, to be conservative, I have also estimated the utility risk premium assuming both a higher return on equity and a higher retention rate than has actually been the case. These adjustments serve to increase the forecast growth rate and also the utility risk premium to up to 2.60%. The highest of these estimates would broadly confirm the risk premium estimates from the one and two factor models, since if the risk premiums are valid for Canada, they would imply

[28] Laurence Booth, "Equities over Bonds, but by how much?" *Canadian Investment Review*, Spring 1995.

[29] Developed in Appendix C.

a fair return of 7.35% (long Canada yield forecast of 4.75% plus the 2.60% risk premium) plus the 0.50% flotation cost. This is slightly higher than my direct estimates from the CAPM and two factor models, but needs adjusting for the yield gap between ten and 30 year debt yields.

We can also look at the DCF estimate for the Canadian market as a whole. The dividend yield on the Canadian market is currently about 2.6% and has recently increased quite significantly partly due to the inclusion of income trusts in the TSE300 index. However, traditionally the dividend yield on the equity market has followed the yield on the long Canada bond down as interest rates have fallen. The following chart indicates just how closely the yield on the TSX Composite and that on the long Canada bond track each other. The graph also picks up the income trust effect since they were included in the TSX Composite.



The important point about the above graph is that unless forecast growth rates have miraculously increased to offset the declining dividend yield, the implication is that investor's required rates of return have fallen in line with market interest rates. This is what we would expect given that long Canada bond yields are an objective measure of the investors' required rate of return.

Adjusting for the income trust effect I would forecast the dividend yield to be about 2.75%, consistent with the recent profitability of Corporate Canada. Further some have argued that share repurchase provides a surrogate for corporate dividend payments. This has not been as significant in Canada as the US because of the income trust market, but it may be that the forecast dividend yield understates the expected cash return from holding stocks by up to 0.50%.

If this is the case a *maximum* forecast dividend yield might be 3.25%. This leaves the critical question: what is a reasonable growth estimate?

From the previous graph the current dividend yield on the TSX Composite (left hand scale) is 1.44% less than that on the long Canada bond (right hand scale). This 1.44% is the obvious break-even growth rate indicating that with risk aversion equity investors must be expected share price growth of at east 1.44%. For individual firms there is a huge forecasting error attached to estimating growth rates, but for the market as a whole there is less error. This is because many of the gains made by some firms are at the expense of other firms. Holding a diversified portfolio removes this risk and leaves the investor exposed to the overall level of profits and dividends. At the economy level there is then a constraint on how much of the national income (GDP) can go to profits, since as the profit share increases it does so at the expense of personal incomes, which in turn leads to higher wage demands.

In Schedule 7 I provided a graph of annual pre-tax corporate profits as a share of GDP. In Schedules 26 is the dividend payout based on the earnings and dividends of the TSX Composite firms where both are adjusted to their index weights. Typically dividend payouts have been about 50% for these large firms with a slight downward trend, except for the undefined payouts in the early 1990s and in 2002 when huge corporate losses caused the payouts to be negative, that is, positive dividends paid out of negative earnings. One of the problems with the data in Schedule 26 is that it is drawn from accounting statements, so that the losses in 2002 for example, were not cash losses but simply the write-off of bad acquisitions made primarily by Nortel and JDS Uniphase.

Schedule 27 graphs dividends and after tax profits as a percentage of GDP where the after tax profits are those reported for tax purposes and do not reflect all the accounting games that go into GAAP profits. As is to be expected, aggregate dividends are more stable than aggregate after tax profits. While profits plummeted during the recessions in 1981, the early 1990s and marginally in the early 2000s the effect is not nearly as pronounced as indicated by Schedule 26. In fact it is quite clear that the losses in 2002 were not widespread, nor reflective of true operating earnings.

From Schedule 27 dividends on average are around 2.3% of GDP and after tax corporate profits about 6.0%, but much more variable. Further there is no obvious upward or downward trend.

Corporate profits tend to peak at around 7-8% of GDP at the top of the economic cycle and then fall back. Likewise dividends are more stable, but rarely exceed 3.0% of GDP. This pattern has been disrupted lately due to the huge profits made by resource firms that are largely unrelated to economic factors and driven by events outside of Canada. However, 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 that in the short run, there is considerable volatility! Given that the average real Canadian growth rate since 1961 has been about 3.6%[30] and the Bank of Canada's operating band for inflation centres on 2.0%, this implies long-run growth rate in dividends and earnings at about 5.70% (1.02*1.036). If this is combined with the 3.25% maximum forecast dividend yield the DCF equity return for the Canadian market is about 8.95%. I would judge this to be marginally high due to the income trust effect in dividend yields.

Schedule 28 shows the dividend payout of the aggregate dividends from aggregate after tax profits. Again the recessions of the early 1980's, 1990s are clearly evident, although not the slowdown of the early 2000's. However it is obvious from this aggregate data that the aggregate payout is closer to 40%, implying a 60% retention rate. With a normal corporate ROE of about 10% from Schedule 1 and a recent high of 12.0%, this would imply dividend growth rates of 6.0%-7.2% (*b*ROE*), which exceeds the nominal GDP growth rate for the economy as a whole reflecting the recent surge in commodity price related profits. Although this above trend growth rate can not continue indefinitely, it would imply a DCF equity cost for the market as a whole of 9.0%-10%. With a forecast long Canada bond yield of 4.75% the market risk premium estimate is 4.25-5.25%%, which is consistent with my current estimate of the market risk premium.

Of note are two quite recent independent estimates of the Canadian market risk premium by industry professionals. The first was a recent report by TD Economics (January 2006) "rates of return for the long haul," which estimated long run rates of return at cash (T. Bills) 4.40%, long bonds 5.60% and common equities 7.30-7.80%. The 7.30% lower end to the range came from looking at long run earnings and dividend growth in Canada and the top end from the US. This recent TD estimate confirms the observation of many that Canadian risk premiums are lower

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[30] The Bank of Canada pegs Canada's potential GDP growth rate as lower than this at about 2.80%.

than in the US and that my estimate of 9.0%-10% is high compared to TD's estimate of 7.30-7.80%.

The second was a report by Rajiv Silgardo the chief investment officer of Barclays Global Investors Canada Ltd, who in a summary published in the Canadian Investment Review (Summer 2003) reported the following equity market risk premiums:

Canada	US	UK	Japan	Aus	Europe
3.75%	4.50	5.75	2.50	4.50	5.00

Mr. Silgado estimated the equity risk premiums by using a modified growth model, but the critical points again are a lower equity market risk premium in Canada than the US and the much lower level of equity market risk premiums than those used by company experts.

The above types of analyses are not specific to Canada. Arnott and Ryan,[31] two finance "professionals," that is, non-academics, estimated the real growth rate in US dividends at 1.0% from 1926-1999. This is well below the real growth rate in US GDP, implying that US aggregate dividends grow at a slower rate than the corresponding values for Canada. They also produced the following table for international growth rates from 1969-1999:

Arnot and Ryan DPS and EPS Growth Rates

	US	**Canada**	**UK**	**Japan**
Real GDP	2.3%	2.9%	2.1%	1.6%
Real EPS	1.4%	-2.2%	1.3%	-3.4%
Real DPS	1.3%	-0.9%	2.2%	-1.6%
Average	1.3%	-1.5%	1.7%	-2.5%

This data shows more pessimistic growth rates than the earlier Canadian data alone, since the time horizon is shorter. It is possible to make dividends grow faster than earnings by companies increasing their dividend payout, which is what happened in the UK. However, across all these major economies, the Arnott and Ryan data indicates that corporate profits and dividends have

[31] R. Arnott and R. Ryan, “The Death of the Risk Premium,” *Journal of Portfolio Management* (Spring 2000).

not kept up with GDP and that the average GDP growth rate is much less than the 3.60% used above for Canada.

Arnott and Ryan argued that the actual returns on the U.S. equity market came from a reduction in the required rate of return. As the investor reduces the required rate of return, market prices increase causing a change in the valuation of the same dividend or earnings stream. They show that 2.0% of the U.S. real equity return came from this change in the basis of valuation and make the obvious point that this cannot continue forever. They conclude

> "More important still, our 3.2% outlook for real returns falls short of the real return available in inflation-indexed government guaranteed bonds. For the first time in U.S. capital markets history, the equity risk premium is probably negative, barring some very aggressive assumptions regarding economic growth and the share of growth that makes its way to the investor in today's enterprises."

I am not as pessimistic as Arnott and Ryan are for the US, since I think you have to take a longer historic perspective and account for share repurchases, but they are the sorts of estimates that have been circulating in the capital market. It is also clear that a DCF model results in required return estimates considerably below the actual realised equity returns earned since 1926, which again reflects the very high ex post, that is, after the fact returns that have been experienced in the equity market.

Q. DO YOU HAVE ANY ANALYSTS' "FORWARD LOOKING" ESTIMATES?

A. No. It is generally accepted that analysts' earnings forecasts are biased high. There is increasing concern that with the decline in fixed commissions, security analysts no longer get paid for the quality of their research. Instead, analysts have received a share of investment banking fees stemming from corporate underwritings and mergers and acquisitions. In such an environment it is difficult for an analyst to be objective with their earnings forecasts or place a sell order on a stock. To do so would cut the analyst's firm off from future underwritings. Consequently they have effectively become part of the sales team for equities. This conflict of interest has been most evident in the Internet and Technology fiascos of the late 1990s, when prominent analysts issued strong buy recommendations on the way up and kept them in place on the way down and got sued in the process.

Academics have long recognised the bias inherent in analyst forecasts. However, this bias has also long been recognised in the professional investment strategy reports. The difference between the strategy reports from investment banks and the analyst reports is that the strategy reports are concerned with overall market values. Consequently, the strategy reports will offer a "sell" signal on equities in general (or changes in the asset mix towards bonds) while the same company's analysts continue to recommend "hold" on the individual equities. The reason for this of course is that the company with a sell recommendation on its stock will rarely do investment banking business with an investment bank that has a negative analyst. On the other hand, a general recommendation to lighten equities and move towards bonds doesn't target individual firms and thus does not alienate corporates and jeopodise future investment banking business.

For example, on September 28, 2001, Credit Suisse First Boston (CSFB) issued a substantial report on whether equity markets were over or under valued in response to September 11, 2001. They relied on several valuation measures, one of which was a standard DCF model. They used analyst forecasts (Institutional Brokers Estimation Service or IBES) out to five years and then trend earnings thereafter. Using trend earnings moderates any bias in the analyst forecasts since they are not projected out to infinity as is often the case. CSFB then equated this earnings stream to the current market value to determine the implied equity risk premium. Their equity risk premium estimate for the U.S. market was 5.3%, but they added:

> ***"We would remind readers that over the last ten years IBES earnings numbers have on average been 6.0% too optimistic 12 months prior to reporting date."***

They then "stress tested" their estimates using more reasonable numbers and the equity risk premium dropped to 3.0%-3.8%. Even at this level they warned that because of the bias in analyst forecasts, "Some of our assumptions may be overly optimistic."

In a later section of the same report, CSFB valued the U.S. market using the DCF model. In this case they inputted their cost of equity estimate for the U.S. market and used this to discount the stream of earnings generated by the consensus economic growth rate. Their estimate of the US market equity discount rate was 8.5%, which was broadly consistent with their 3.0-3.8% market risk premium. It is also pretty much the same as my own estimate for the Canadian market using the same approach.[32]

There has also been independent academic corroboration of the CSFB approach. Claus and Thomas[33] used IBES earnings forecasts similar to CSFB, but unlike CSFB they noted the bias in the forecasts but did not reduce them, so the estimates are high.[34] Their market risk premium is then the estimated discount rate minus the yield on the ten-year bond. Schedule 29 provides their estimates for the last ten years for the U.S. and some other countries. Note these estimates are higher than would be used in a regulatory hearing for two reasons. First, in a regulatory hearing the risk premium would be over the thirty-year bond yield, so these risk premiums need to be reduced by the spread between the ten and thirty year bond yield (about 30 basis points). Second, as mentioned the earnings growth forecasts would have to be adjusted for the analyst bias.

Despite these qualifications, there are two important conclusions from the Claus and Thomas research. First, their average for the US of 3.40% is consistent with the CSFB stress tested estimate of 3.0-3.8%. Second, the Claus and Thomas estimates for Canada are for an average risk premium of 2.23%, which is 1.17% less than their US estimates. This is consistent with the independent evidence that I have provided where I conclude that the US market risk premium is higher than in Canada.

Finally in terms of analyst forecasts I would like to reiterate again that it is well accepted that these estimates are biased high and any DCF estimates produced by using unadjusted analyst growth forecasts are seriously in error. Most recently Easton and Sommers[35] have documented the bias at 2.84% and in their conclusions (page 1012) state:

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[32] Note in a recent report (August 7, 2005) on valuing oil sands investments RBC-DS estimated the equity cost of these (risky) investments using a required rate of return of 9.75%

33 J. Claus and J. Thomas "Equity premia as low as 3%? Evidence from analyst's earnings forecasts for domestic and international stock markets," *Journal of Finance,* October 2001.

34 They noted (page 1657) "We considered a variety of biases that may exist in the IBES forecasts but found only the well-known optimism bias to be noteworthy."

[35] "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.

> We show that, on average, the difference between the estimate of the expected rate of return based on analysts' earnings forecasts and the estimate based on current earnings realizations is 2.84%. When estimates of the expected rate of return in the extant literature are adjusted to remove the effect of optimistic bias in analysts' forecasts, the equally weighted estimate of the equity risk premium appears to be close to zero. We show, however, when estimates are based on value-weighted analyses, the bias in the estimate of the expected rate of return is lower and the estimate of the expected equity premium is more reasonable, 4.43%.

Easton and Sommers 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]

Of importance is that their estimate of the US market return of 9.67% is almost smack in the middle of my 9-10% range and their US market risk premium estimate of 4.43% is marginally below mine.

This optimism in analyst forecasts has been accepted by utility regulators. The Alberta EUB stated in Decision U99113 (page 49)

> "Both the IAT and ATCO used forward-looking estimates of investor expectations. ATCO utilized IBES investor surveys, which the Board considers overly optimistic."

The optimism bias of analyst forecasts clearly biases up DCF equity cost estimates where growth is estimated using analyst forecasts.

Q. CAN YOU COMPARE YOUR ESTIMATE OF THE MARKET RISK PREMIUM TO THOSE IN RECENT STUDIES?

A. Yes. Estimating the market risk premium became a "cottage industry" in the early 2000's after the Internet bubble burst and people questioned the "stocks for the long run" argument. In Schedule 30 is a table showing my estimate of 5.0% for the Canadian market risk premium together with some of these studies as well as more recent ones showing alternative estimates derived by both academics and non-academics. The table shows for each study whether the estimate of the market risk premium is based on arithmetic or geometric return estimates and whether it is an historic or forward looking estimate. In a few instances, these classifications are not applicable (n/a). In the Claus and Thomas study, for example, a DCF model is employed in which the authors use IBES earnings growth data to estimate the market return from which the yield on 10-year US Treasuries is deducted to arrive at the market risk premium. Similarly, in the Fama & French and Arnott & Bernstein studies, the authors also employ growth models while in the Graham & Harvey study, the authors use CFO forecasts of the market risk premium one year and ten years forward.

What is clear from Schedule 30 is that the 5.0% market risk premium estimate is high when compared to these studies. These estimates are based on historic realised data, forward-looking methodologies, and evidence from both the US and Canada. Further in Schedule 31 is a table from the CFMRC data base that is the main source of data on Toronto Stock Exchange listed securities. The table performs similar analysis to that contained in my Appendix E, where I estimate market risk premiums for different time horizons. Since the data is largely the same, so to should be the results and they are. In Table 7 is the market risk premium estimated over long term government bonds from 1950 ending at various points. For the 1988 end point the market risk premium estimate is 5.696% and then it declines as more data is added until by 2006 it is 3.736%. This should be compared to my Schedule 4, which graphs the market risk premium earned starting in 1924 and finishing at various end points, which shows a similar decline; the only difference is that my risk premium is higher since it starts in 1924 rather than 1950 and declines more slowly since the more recent values are averaged in with more higher values. However, the critical fact is that these estimates are available to all subscribers to the most basic stock market data base available in Canada.

The picture that emerges is that my 5.00% market risk premium is a reasonable input for the determination of a fair return on equity for a low risk utility. To get higher values requires that you take the most extreme values that have been put forward, often by people who are not impartial.

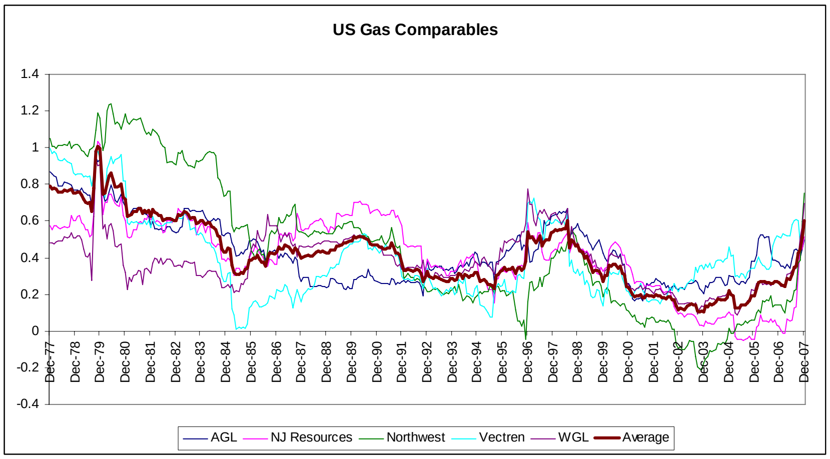
Q. DO YOU ADJUST YOUR ESTIMATES FOR THE "INTERNATIONALISATION" OF THE WORLD'S CAPITAL MARKET?

A. No. These issues are discussed in more detail in Appendix D. However, it is undoubtedly true that investors are more aware of international investment opportunities now than say twenty or thirty years ago. At that time the world was characterized by currency restrictions, investment controls and very limited international investing opportunities. Since then most currencies have become freely convertible, most investment restrictions have been removed and there has been an increase in the coverage of international stocks among investment advisors. This latter coverage has been enhanced by international collaboration between investment banks and the growth of some major international investment banks. Hence, it is inevitable that investors will increasingly invest in different stock markets to diversify their risk. However, this diversification *reduces* risk and with it the risk premium. In the same way that diversification across stocks in a domestic market reduces risk, then so too diversification across international markets reduces risk. Consequently, the removal of pension limits on foreign investments, and the gradual reduction in tax restrictions etc, should decrease the equity market risk premium in both Canada and the US. I am not aware of any basis in financial theory for simply averaging the US market experience with that in Canada on the assumption that relaxing investment restrictions will increase risk premiums: ***except in pathological cases financial theory states the exact opposite.***

Further it has to be pointed out that Canadian stocks have always been affected by what happens in the US equity market. One obvious linkage is that the standard barometer of the US equity markets, the Standard and Poors 500 index has always included Canadian stocks. In fact, it wasn't until July 10, 2002 that S&P cleaned up its S&P500 index to exclude foreign stocks and make it a 100% US index. Prior to that time there had been many Canadian stocks included in the Index, like Inco and Barrick, and Alcan. Similarly some Canadian stocks have at times been part of the Dow Jones index. Hence, taking the performance of US indexes as representing only US stock market performance is incorrect.

Q. DO YOU HAVE ANY COMMENTS ON U.S. UTILITY RISK?

A. Yes, in Appendix G I look at the betas of different samples of US utilities. Increasingly Canadian utilities are relying on US experts who enter testimony based on US capital markets in an attempt to get the higher ROEs that are often being earned by U.S. utilities, despite the fact that Canadian utilities generally have significantly more regulatory protection and as good if not better bond ratings and market access. One key piece of evidence is Schedule 3 of that appendix reproduced below.



These are the betas of a sample of US natural gas utilities that represent the intersection of two samples presented on behalf of Ontario Power Generation (Ms. McShane) and TransQuebec and Maritime Pipelines (Dr. Vilbert). The critical message is simply that the average betas of these low risk US utilities have been well under 0.60 for the last 25 years and you have to go back to the inflationary period of significant regulatory lag in the 1970's into early 1980's to get average betas above 0.60. From this I conclude that if asked to provide testimony on the risk of a US utility I doubt very much that I would use much higher beta estimates, if at all, than the 0.45-0.55 range I use for Canadian utilities

Q. DO YOU ADVOCATE THE USE OF AN ROE ADJUSTMENT MECHANISM?

A. Yes. As a point of comparison the National Energy Board formula ROE for 2008 is 8.74% based on a forecast long Canada bond yield of 4.55% for a utility risk premium of 4.19%. The NEB allowed ROE formula has been the gold standard in Canada and was originally based on a 9.25% forecast long Canada yield (RH-2-94) and a 300 basis point risk premium. This ROE is then adjusted annually based on 75% of the change in the long Canada forecast yield. Similar adjustment mechanisms are in use by the BCUC (BC), the Regie (Quebec), the PUB (Manitoba), the AUC (Alberta) and the OEB (Ontario). Although it is my judgment that the currently allowed

ROEs are too generous and exceed a fair ROE, the fact that they have been used for so long and reviewed without major changes by so many regulators indicates that they have merit and are in the zone of reasonableness. They have also generally tracked the fair ROE downwards as lower long Canada bond yields have caused a reduction in the risk premium in the long Canada yield and a corresponding increase in the market risk premium. As a result the 75% adjustment of ROEs to long Canada rate changes has been remarkably accurate. I would therefore judge the ROE formulas to be successful and recommend that they continue to be used with some minor downward adjustment in the level of the ROE.

Q. HAVE YOU ANY COMMENTS ON THE EFFECT OF AN ROE ADJUSTMENT MECHANISM ON RISK?

A. Yes. In my judgement the adoption of an automatic adjustment mechanism has turned the common equity of a regulated utility into a form of floating rate, preferred share. Traditional floating rate preferred shares can be described as follows:

> 'Floating rate preferreds offer a hedge against rising interest rates. Their dividend will adjust (according to a formula) to a change in interest rates, subject to any stated maximum or minimum yield. The variable dividend yield is designed to allow the preferred's price to remain relatively stable during a fluctuating rate environment.'

This description is very similar to the results of the application of an adjustment mechanism to a utility's allowed rate of return.

The objective of regulation is to treat investors fairly. This is accomplished by awarding a fair return such that the share price should only increase by the amount of earnings retained within the firm and not paid out as a dividend. If a utility paid out 100% of its earnings as a dividend, the share price should approximate its book value, as long as it continues to be awarded its fair return. In this case, similar to floating rate preferreds, the annual reset of the allowed return allows the price to remain relatively stable during a fluctuating interest rate environment. By making the annual reset a function of long Canada yields, through the adjustment mechanism, utility shares then offer a similar hedge against rising rates, since the utility's ROE will change with the long Canada bond yield.

The only substantial difference between utility shares on an ROE adjustment mechanism and floating rate preferred shares is that only part of the utility's ROE is paid out as a dividend and the adjustment, for example using the NEB formula, is to 75% and not 100% of a fixed income yield. These differences between floating rate preferred shares and ROE adjustment mechanism utility shares do not, however, negate the fact that they have much in common. One critical feature is that the dividend income has favourable tax treatment. As George Lewis of RBC-Dominion Securities points out,[36]

> "The Canadian tax code, in an effort to mitigate the effects of double taxation, taxes dividends received by individuals and corporations at a lower rate than interest income. Since dividends are paid out of after-tax corporate earnings (whereas interest is a tax deductible expense of companies), corporations receive dividends free of income tax, while individuals' dividend income is taxed at a lower effective rate (under the dividend tax credit system) than their interest income. This means that a given dividend yield on a common share results in a higher after tax income than the same numerical yield (interest rate) on a fixed income (i.e., bond) instrument."

At the time of his analysis, George Lewis put the pre-tax equivalent yield (PTEY) at 1.37; that is a 10% dividend yield was equivalent to a 13.7% bond yield. He further noted that the prices of Canadian utilities tended to increase as they increased their dividend payout.

The tax effect is well known in capital markets. BMO- Nesbitt-Burns produces a Preferred Share Quarterly that tracks the performance of the preferred share market. In the June 2004 issue of their Preferred Share Quarterly BMO-Nesbitt Burns provided the following yields:

	June 2004
Retractable Preferreds (%)	
Dividend yield	4.01
Mid Canada yield	4.09
After tax spread (corp)	1.77
After tax spread (indiv)	0.63
Straight Preferreds (%)	
Dividend yield	5.48
Long Canada yield	5.34

[36] Chapter 11 in Joe Kan (editor) *Handbook of Canadian Security Analysis*, John Wiley & Sons Canada, 2001.

After tax spread (corp)	2.54
After tax spread (indiv)	0.98
Floating Rate Preferreds (%)	
Dividend yield	3.42
BA (3 month)	2.12
After-tax spread (corp)	2.25
After-tax spread (indiv)	1.22

The retractable preferreds are compared to mid Canada bonds since the retraction feature shortens their maturity as compared to a long bond. The traditional straight preferreds are compared to long Canada bonds, while the floating rate preferreds are compared to 91-day Bankers acceptances (BAs), since their dividends are usually reset quarterly.

The important point about the comparison is that what we observe in the capital market is a yield. This is determined by both risk and taxes. Take the straight preferreds, for example, in June 2004 the long Canada bond had a yield of 5.34%, while straight preferreds had a yield of 5.48%. Clearly the preferreds would be regarded as riskier than the long Canada bond, since the corporate issuer can default. However, the yield on the preferred shares was only 0.14% higher. The reason is that the dividend income gets more favourable tax treatment than the interest income from the long Canada bond. The correct comparison is the after tax yield difference, which BMO-Nesbitt-Burns gives as 2.54% in favour of the preferred shares for corporates and 0.98% for individuals, which is the correct result: that on an after tax basis the riskier preferreds give a higher yield.

This yield spread between preferred shares and government bonds has changed recently as the flight to quality has pushed down government bond yields, so that the pre-tax yield spread has now increased to significantly above 0.14%, but the fact remains that the proper comparison is with the after tax yield spread since the tax treatment of interest and dividends is not the same. Risk matters in the capital market, but so too do taxes. This is the third law of finance: the tax value of money.

This also points out that the correct comparison with an ROE adjustment mechanism is to a similar floating rate preferred share. In this respect an annual adjustment mechanism would put a utility's ROE in between the quarterly floating rate preferreds and the retractable, generally five year, preferreds, since the reset is annual. This would indicate that the true risk premium is much higher than the 3.00% that I am recommending. This comparison also renders US comparables of doubtful value, since due to these tax implications the utilities are predominantly "Canadian stocks," or as George Lewis of RBC-Dominion Securities, stated:

> "However, while the impact of institutional and foreign investors can have a significant impact on the trading levels of utility companies, in general a typical utility will have a greater proportion of individual and domestic shareholders than the typical Canadian company."

Hence one of the features of the adjustment mechanism is that it makes the equity return analogous to a form of floating rate preferred share, which lowers investment risk. Also the very fact that a formulaic adjustment is used removes some regulatory risk due to delayed ROE awards as well as the possibility of a punitive award.

The combination of an adjustment mechanism over long Canada bond yields without explicit recognition of either the tax preference for preferred shares or the higher interest rate risk of the long Canada bond makes the current formulas attractive to investors and more than fair. To emphasis this, at the current point in time BMO Capital markets is using a 1.407 gross up to put preferred share yields on the same pre-tax basis as long Canada bond yields. This means that my recommended 7.75% fair ROE is worth 10.90% on a bond equivalent basis or a risk premium of 6.15% over my 4.75% forecast long Canada bond yield after adjusting for the differential tax treatment.

Q. IS THERE ANY EVIDENCE THAT THE FORMULA ROES AND CURRENT ALLOWED COMMON EQUITY RATIOS ARE HARMING UTILITIES?

A. Not that I am aware of. In the final analysis "fair" is determined in the equity market by the reaction of investors. It is a basic principle of regulation that equity investors invest money up front and then rely on the regulator awarding them a fair ROE. In this case if the equity investor invests one dollar in regulated assets, there is an implicit contract that they will be given the opportunity to earn a fair ROE, such that the dollar that is invested is still worth a dollar, that is, that there is no confiscation of wealth by subsequently awarding a sub-standard ROE. This is the basic meaning behind Mr Justice Lamont's definition of a fair ROE.

What this means is that once a dollar has been invested in a regulated utility, the investor has to be given the opportunity to earn what he could earn in the market on other investments of equivalent risk, if he still had the dollar to invest. This process is akin to someone investing in a savings account where a judge has to determine the correct savings rate each period that can be withdrawn from the fund. The important implication is that if the judge (regulator) is successful then the savings will always be worth their original investment. This is the meaning of the basic result in finance that fair means that the market to book ratio equals one. The only thing different about utilities, as compared to the savings example, is that there is some very minor business risk, although as I showed earlier full cost of service pipelines like Foothills have no income risk and exactly earn whatever ROE the NEB allows.

In Schedule 31 is a table of earned ROEs, preferred stock yields and market to book ratios for a sample of ROE regulated Telcos up until 1996.[37] This sort of data was previously included by Professor Berkowitz and myself in estimates of risk premiums over preferred stock yields. These risk premiums were then consistent with the above remarks about preferred share yields being the correct tax comparison. Note that for 1970-1983 their market to book ratios were hovering around 1.0 and at times were significantly below 1.0, as the combination of high inflation historic test years and regulatory lag exposed these Telcos to significant risk. As interest rates fell from the early 1980s highs, the market to book ratios of these utilities increased significantly as allowed ROEs were not cut sufficiently to reflect these market changes. The point is that observing the market to book ratio is a valid way of assessing how investors are reacting to utility allowed ROEs.

Schedule 32 is a graph of the market to book ratios for a sample of Canadian utility holding companies (UHCs). The key implication is that, except for PNG, the market to book ratios are all well above 1.0. For PNG it is clear that despite the efforts of the BCUC to reduce PNG's risk, the market is still sceptical of the company's long run prospects. These market to book ratios include to a differing degree the impact of non-regulated operations, but there is a clear indication that

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[37] Source data is from my paper, The Importance of Market to Book Ratios in Regulation, <u>NRRI Quarterly Bulletin</u>, Winter 1997.

none of these companies have suffered a loss of financial flexibility as regulators have moved to the use of adjustment mechanisms.

Further there is direct evidence of the value of regulated assets from sales between firms. For example,

- TCPL purchased the 50% of Foothills that it did not own at a market to book of 1.6 based on the common equity. Moreover since TCPL already owned 50% of Foothills the number of potential buyers was limited, which reduced the price.
- Aquila purchased TransAlta's distribution and retail business at a market to book of 1.5 based on a total rate base of $472m (premium of $238m);
- Fortis purchased Aquila's Alberta interests for a premium of $215 over a rate base of $601mm.
- AltaLink purchased TransAlta's transmission business for a $200mm premium over a rate base of $644m.
- In 2005 Kinder Morgan purchased Terasen Inc for 2.7X book value,
- In 2006 Gaz Metro sold GMLP units for $16.48 when their book value was less than half that.
- In 2007 Fortis paid 1.2X rate base or $3.7 billion for Terasen Gas and assumed $2.3 billion in debt for an implied equity market to book of about 1.80X.

Note that in most of these cases, the market to book ratio, based on the equity, is much greater than that based on the total rate business, since the debt is normally assumed and is valued at close to its book value. For example in Fortis' purchases from Aquila it paid $1.3 billion for total rate base assets of $943mm (in Alberta and BC) for an overall premium of $357mm over rate base and an overall market to book of 1.38X. However, it "assumed" the existing debt which was 60% of rate base, so effectively Fortis assumed about $565.8mm in debt and paid $734.2mm for the 40% book equity of $377.2 mm. The market to book ratio based on equity was therefore about 1.96X. The final value depended on closing transactions, but the point is that the market to book based on the common equity was well above the indicated values based on total rate base.

Q. IS THERE ANY EVIDENCE SUPPORTING FINANCIAL ACCESS FOR CANADIAN UTILITIES?

A. Yes. In a presentation scheduled to be made at CAMPUT in April, 2008 Mathew Akman, Managing Director, Equity Research - Energy Infrastructure at Macquarie Capital Markets indicated (Schedule 33) that Fortis, Enbridge and TransCanada between them had raised $3.6 billion in common share financing. These funds were for corporate use and acquisitions but the underlying assets backstopping the financing were the utility assets. This is evidenced by the fact that no long form prospectus has been issued for any of these offerings to indicate that they are in any way special and not backed by the underlying utility assets. $3.6 billion is by any means an insignificant amount of money and demonstrates that the equity markets have no problems with the financial health of these three UHCs.

There is also evidence that debt issues by utilities continue to be attractive. In the Fall of 2006 Enbridge Gas Distribution (EGDI) came before the OEB and requested an increase in its common equity ratio to 38%. EGDI claimed (E2-1-1, in EB2006-0034)

> The purpose of this evidence is to clearly identify the need for a higher equity thickness in the Ontario Energy Board (the "Board") approved capital structure for the utility. This need results from changes in Enbridge Gas Distribution's current business risk environment and financial risk position. The evidence will show that the utility's business risks have increased since the last time these risks were assessed in EBRO 479 for the 1993 test year. Most importantly, the increased business risk has occurred at the same time as a dramatic decline in the Company's financial strength resulting in: 1) a challenge to the Company's ability to raise term debt when required; and 2) a real risk of a further downgrade in the Company's credit rating.

The OEB gave EGDI an increase in its common equity ratio to 36%, the same that had been negotiated by Union Gas in a settlement shortly before. In December 2007 EGDI issued $200 million of ten year medium term notes at a yield of 5.162% when the ten year Canada yield was 4.09% for a spread of 107 basis points. From this I conclude that even in a period of "flight to quality" where firms are facing a significant "credit crunch," utilities in general and EGDI in particular can raise debt capital on very advantageous terms. The fact is that there is no evidence of the "dramatic decline" in EGDI's financial strength claimed by the company and it can still raise capital on advantageous terms with the OEB formula allowed ROE and a 36% common equity ratio. I would regard the OEB regulated generating assets on the same formula ROE and a 40% common equity ratio to have similar market access and financial flexibility.

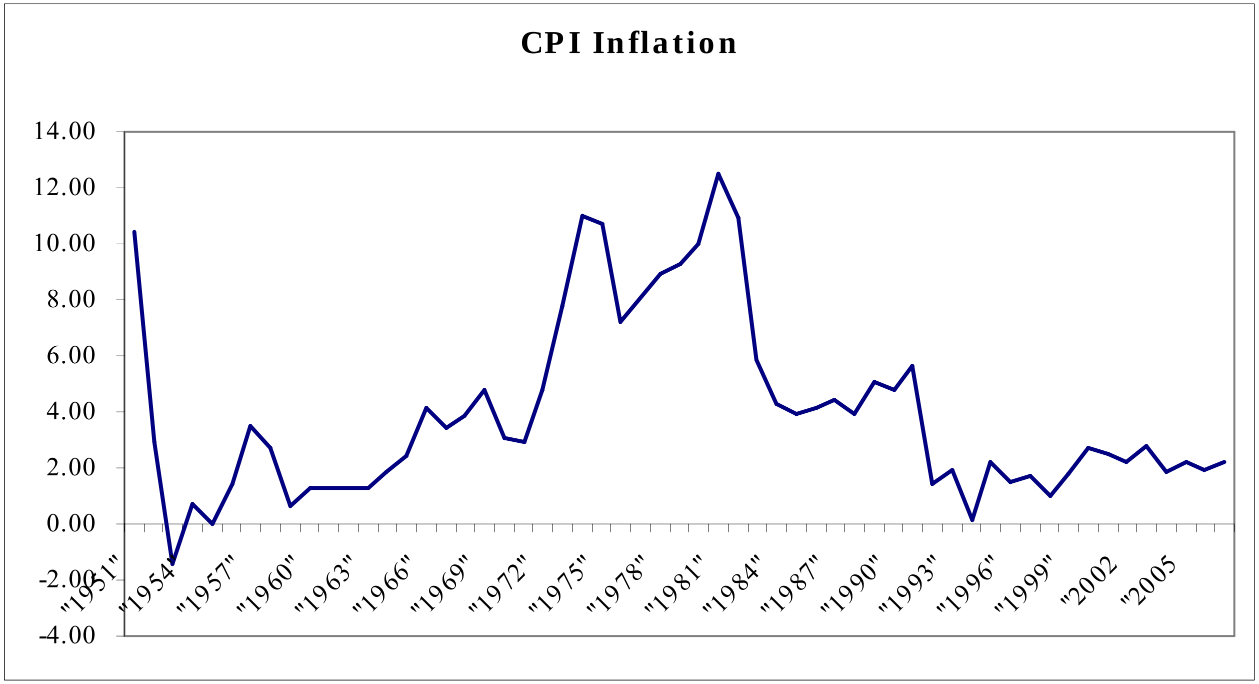
Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

MACROECONOMIC DATA

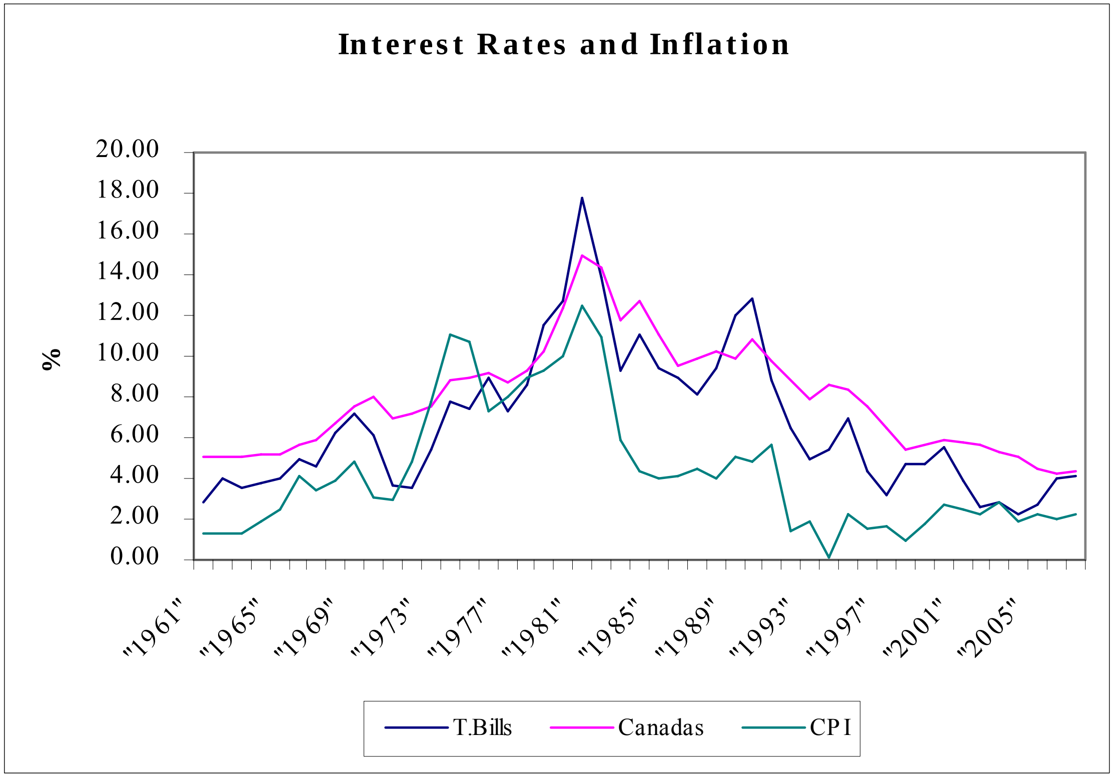
	GDP GROWTH	UNEMP RATE	T BILL YIELD	LONG CANADAS	EXCHANGE RATE	PROFITS %GDP	AVG ROE
1983	2.72	11.9	9.32	11.77	.811	8.93	9.34
1984	5.81	11.3	11.10	12.75	.772	10.16	10.53
1985	4.78	10.5	9.46	11.11	.733	10.24	10.47
1986	2.42	9.6	8.99	9.54	.720	8.82	9.49
1987	4.25	8.9	8.17	9.93	.754	10.36	11.19
1988	4.97	7.8	9.42	10.23	.812	10.58	12.71
1989	2.62	7.5	12.02	9.92	.845	9.07	11.51
1990	0.19	8.1	12.81	10.85	.857	6.61	7.59
1991	-2.09	10.4	8.83	9.81	.873	4.80	3.87
1992	0.87	11.3	6.51	8.77	.828	4.66	1.68
1993	2.34	11.2	4.93	7.85	.775	5.65	3.82
1994	4.80	10.4	5.42	8.58	.732	8.49	6.69
1995	2.81	9.5	6.98	8.36	.729	9.41	9.78
1996	1.62	9.7	4.31	7.54	.733	9.60	10.35
1997	4.22	9.1	3.21	6.47	.722	9.96	10.94
1998	4.10	8.3	4.74	5.45	.674	9.41	8.77
1999	5.53	7.6	4.70	5.68	.673	11.27	9.93
2000	5.23	6.8	5.48	5.92	.673	12.63	10.94
2001	1.78	7.4	3.85	5.79	.646	11.47	7.74
2002	2.92	7.7	2.56	5.67	.637	11.73	5.70
2003	1.88	7.6	2.87	5.29	.716	11.91	9.64
2004	3.07	7.3	2.23	5.08	.770	13.10	11.39
2005	2.10	7.0	2.71	4.41	.826	13.77	12.59
2006	3.37	6.6	4.02	4.29	.882	13.75	12.52
2007	**2.34**	**6.2**	**4.17**	**4.32**	**.935**	**13.74**	**12.14**

SCHEDULE 2



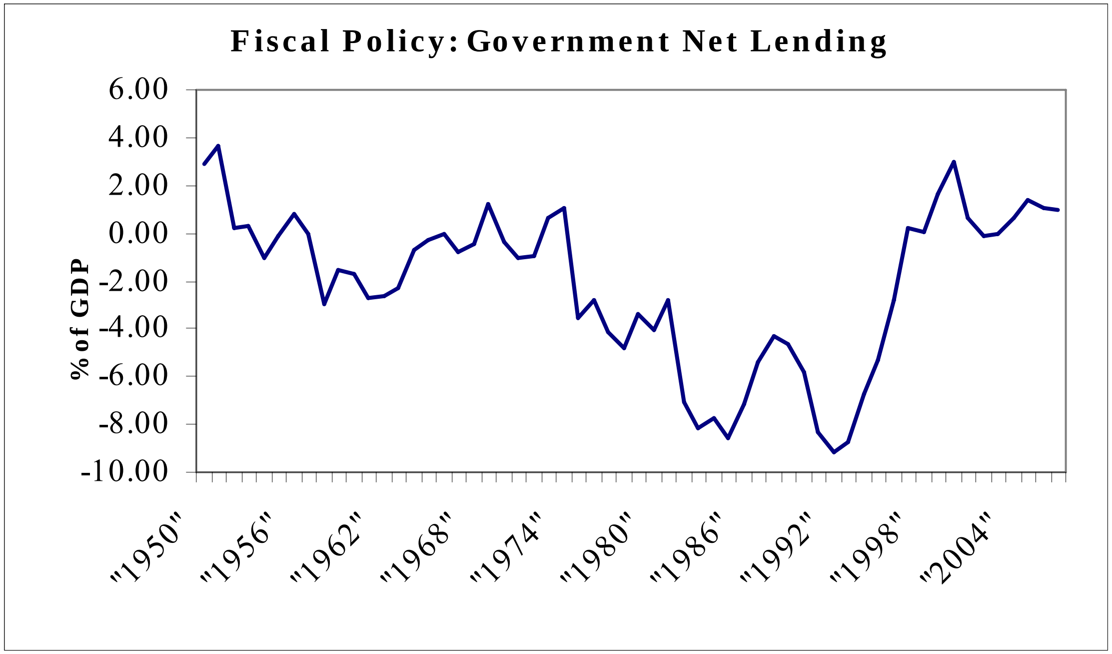
CPI Inflation
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
"1951"
"1954"
"1957"
"1960"
"1963"
"1966"
"1969"
"1972"
"1975"
"1978"
"1981"
"1984"
"1987"
"1990"
"1993"
"1996"
"1999"
"2002
"2005

SCHEDULE 3



Interest Rates and Inflation
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
"1961"
"1965"
"1969"
"1973"
"1977"
"1981"
"1985"
"1989"
"1993"
"1997"
"2001"
"2005"
T.Bills
Canadas
CPI

SCHEDULE 4



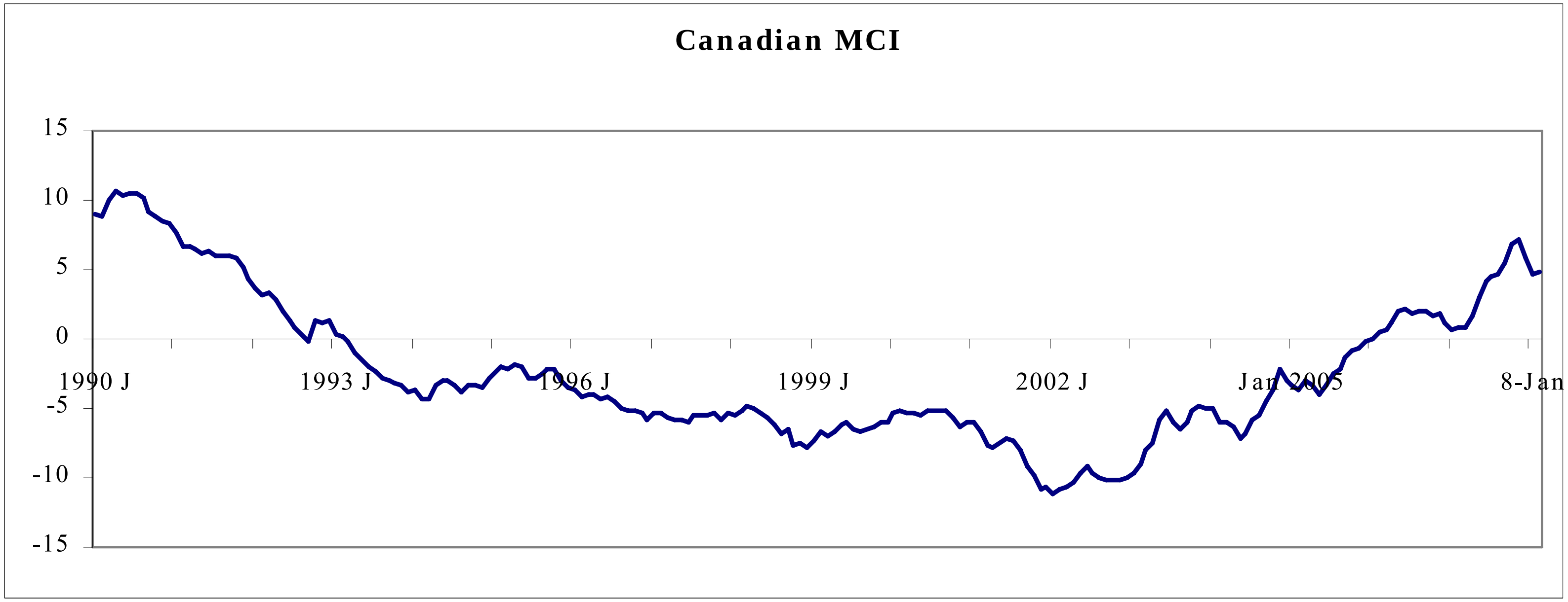
Fiscal Policy: Government Net Lending
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
% of GDP
"1950"
"1956"
"1962"
"1968"
"1974"
"1980"
"1986"
"1992"
"1998"
"2004"

CANADA BOND YIELDS

Overnight money market rates		3.50
Benchmark bonds		
Canada	91 day Treasury Bill yield	1.72
Canada	Six month Treasury Bills	2.20
Canada	One year Treasury Bills	2.55
Canada	Two year	2.57
Canada	Three year	2.64
Canada	Five year	2.92
Canada	Seven year	3.12
Canada	Ten year	3.46
Canada	Long term (30 year)	3.97
Canada	Real return bonds	1.65
Marketable Bond Average yields		
Canada	1-3 year	2.59
Canada	3-5 year	2.86
Canada	5-10	3.23
Canada	Over tens	3.92

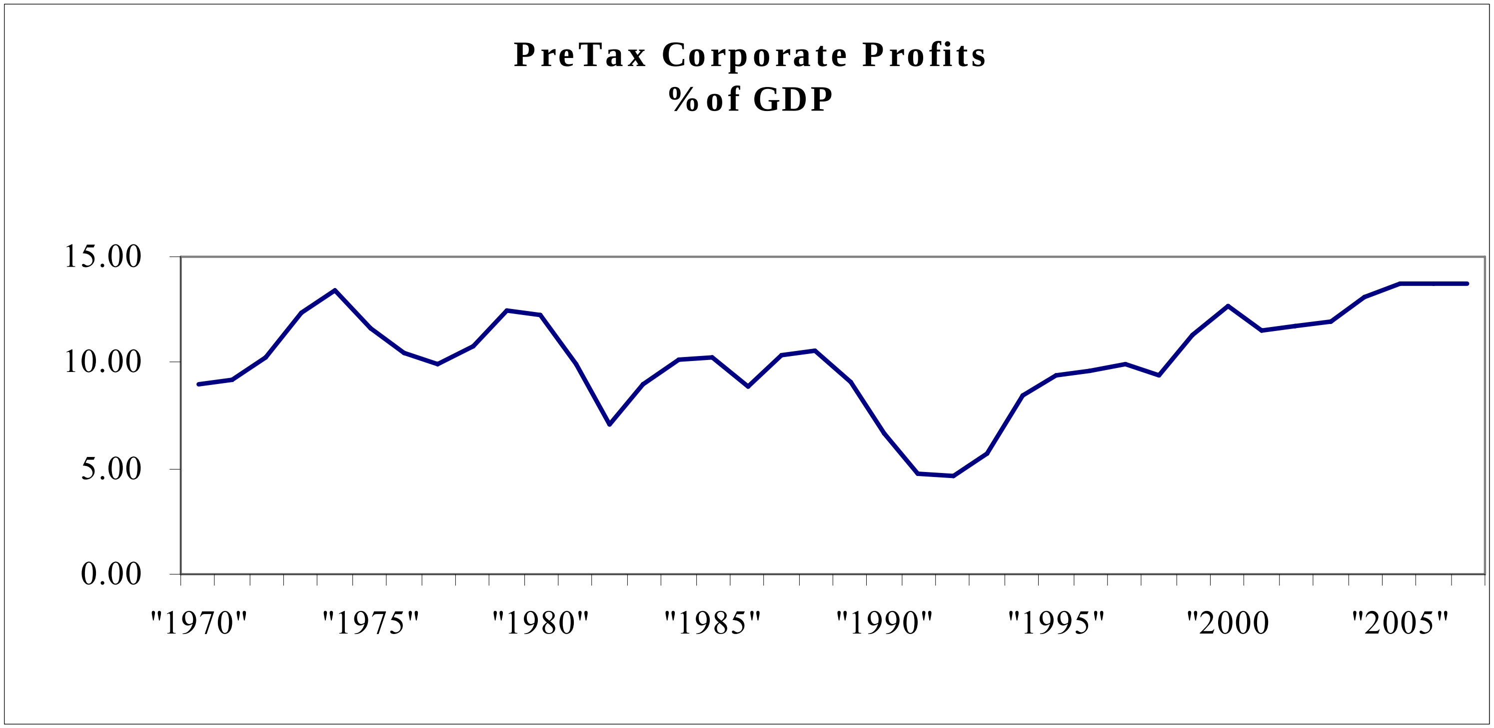
Source: Bank of Canada's web site at http://bankofcanada.ca/en/securities.htm, for March 28, 20008.

SCHEDULE 6



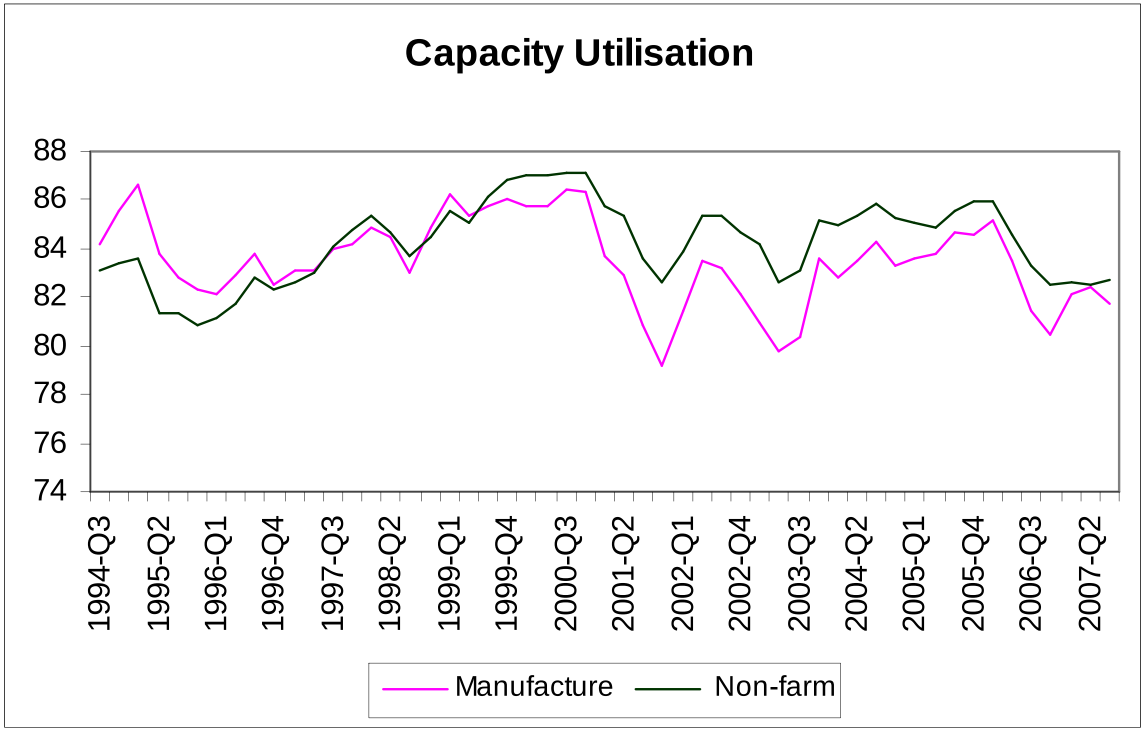
Canadian MCI
15
10
5
0
-5
-10
-15
1990 J
1993 J
1996 J
1999 J
2002 J
Jan 2005
8-Jan

SCHEDULE 7



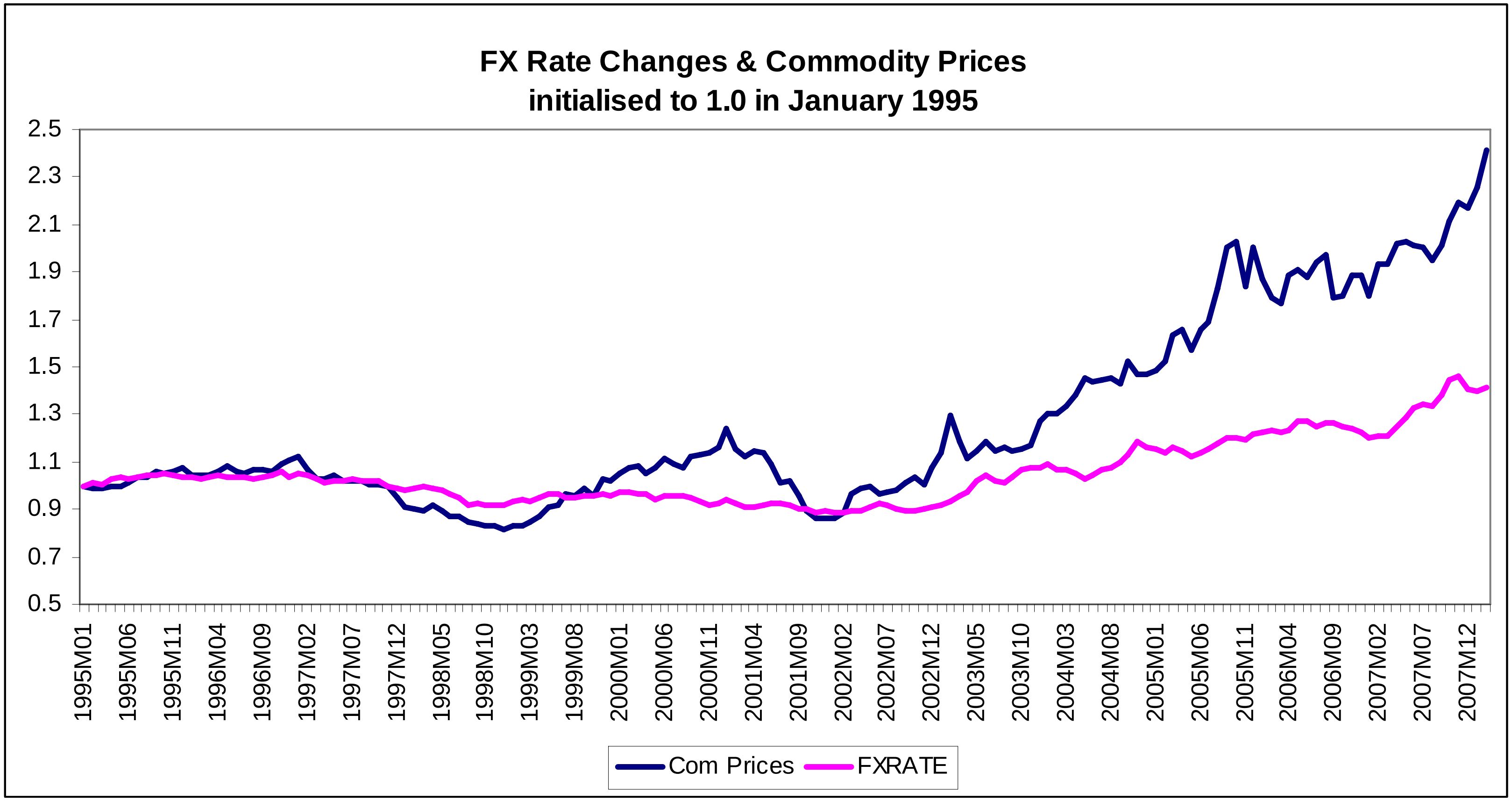
PreTax Corporate Profits
% of GDP
15.00
10.00
5.00
0.00
"1970"
"1975"
"1980"
"1985"
"1990"
"1995"
"2000
"2005"

SCHEDULE 8



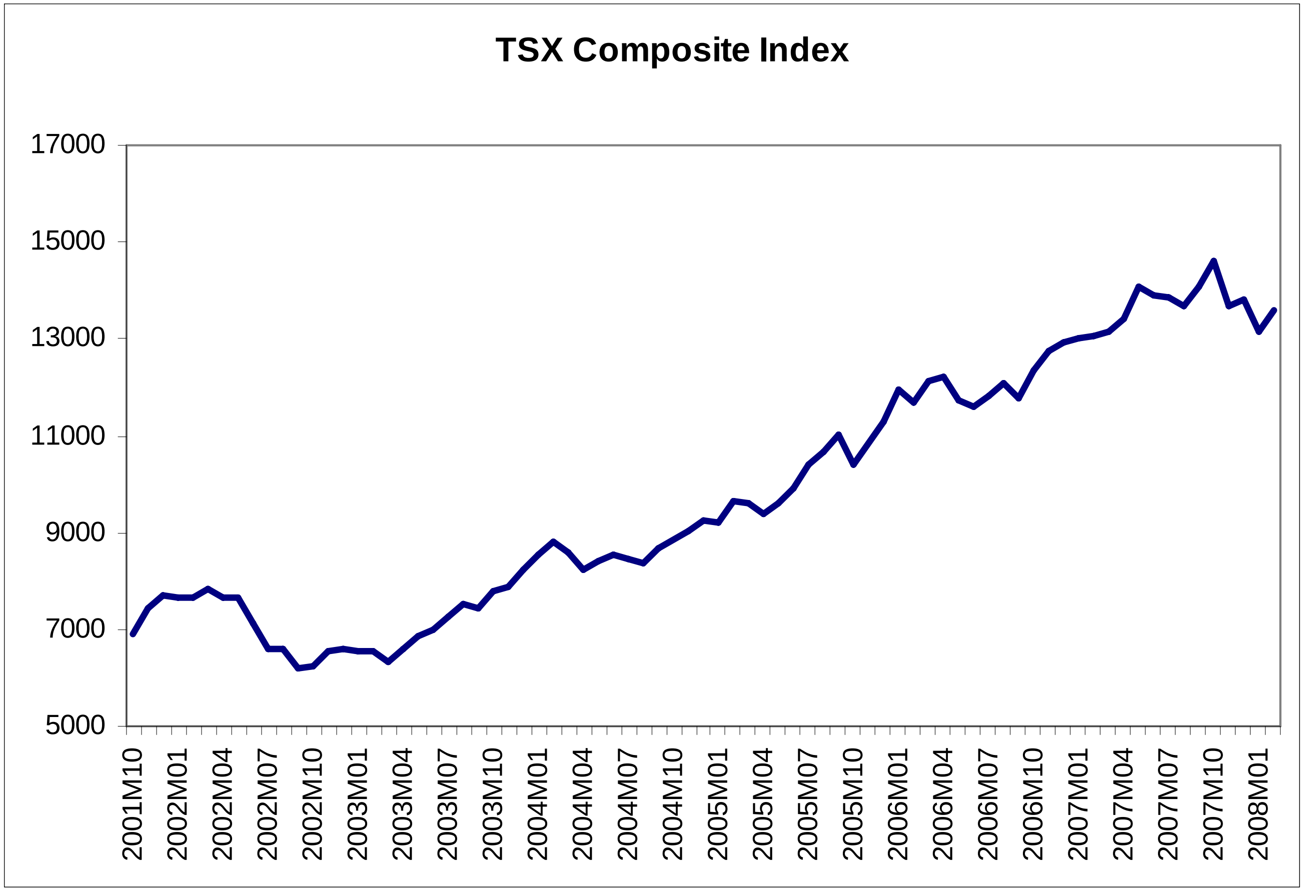
Capacity Utilisation
88
86
84
82
80
78
76
74
1994-Q3
1995-Q2
1996-Q1
1996-Q4
1997-Q3
1998-Q2
1999-Q1
1999-Q4
2000-Q3
2001-Q2
2002-Q1
2002-Q4
2003-Q3
2004-Q2
2005-Q1
2005-Q4
2006-Q3
2007-Q2
Manufacture
Non-farm

SCHEDULE 9

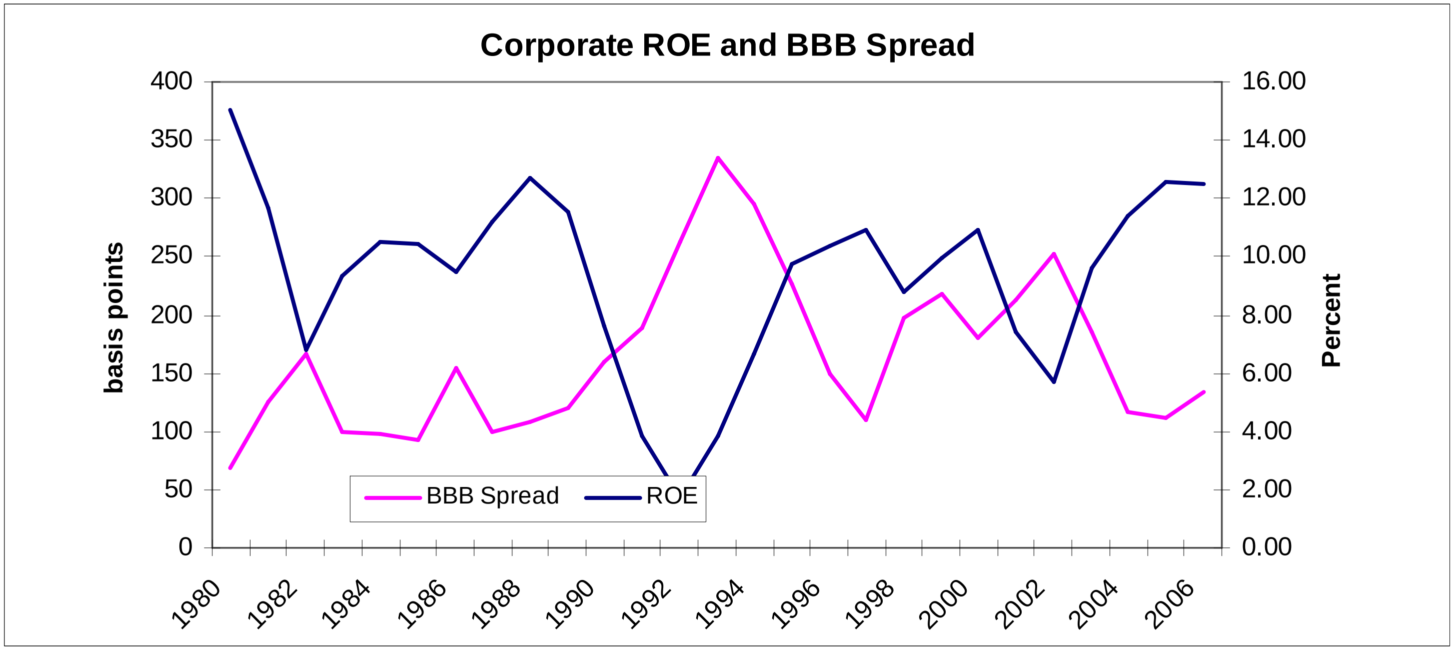


FX Rate Changes & Commodity Prices
initialised to 1.0 in January 1995
2.5
2.3
2.1
1.9
1.7
1.5
1.3
1.1
0.9
0.7
0.5
1995M01
1995M06
1995M11
1996M04
1996M09
1997M02
1997M07
1997M12
1998M05
1998M10
1999M03
1999M08
2000M01
2000M06
2000M11
2001M04
2001M09
2002M02
2002M07
2002M12
2003M05
2003M10
2004M03
2004M08
2005M01
2005M06
2005M11
2006M04
2006M09
2007M02
2007M07
2007M12
Com Prices
FXRATE

SCHEDULE 10

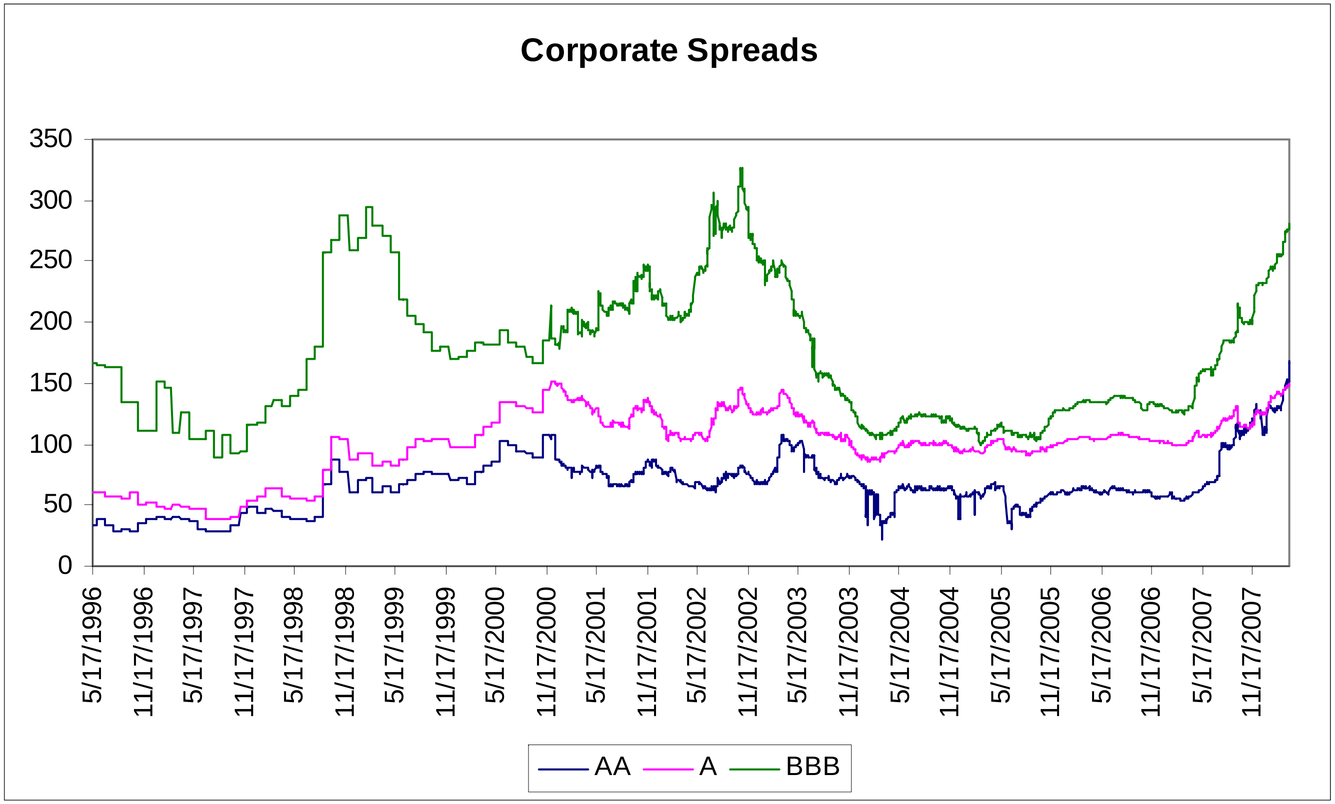

TSX Composite Index
17000
15000
13000
11000
9000
7000
5000
2001M10
2002M01
2002M04
2002M07
2002M10
2003M01
2003M04
2003M07
2003M10
2004M01
2004M04
2004M07
2004M10
2005M01
2005M04
2005M07
2005M10
2006M01
2006M04
2006M07
2006M10
2007M01
2007M04
2007M07
2007M10
2008M01

SCHEDULE 11



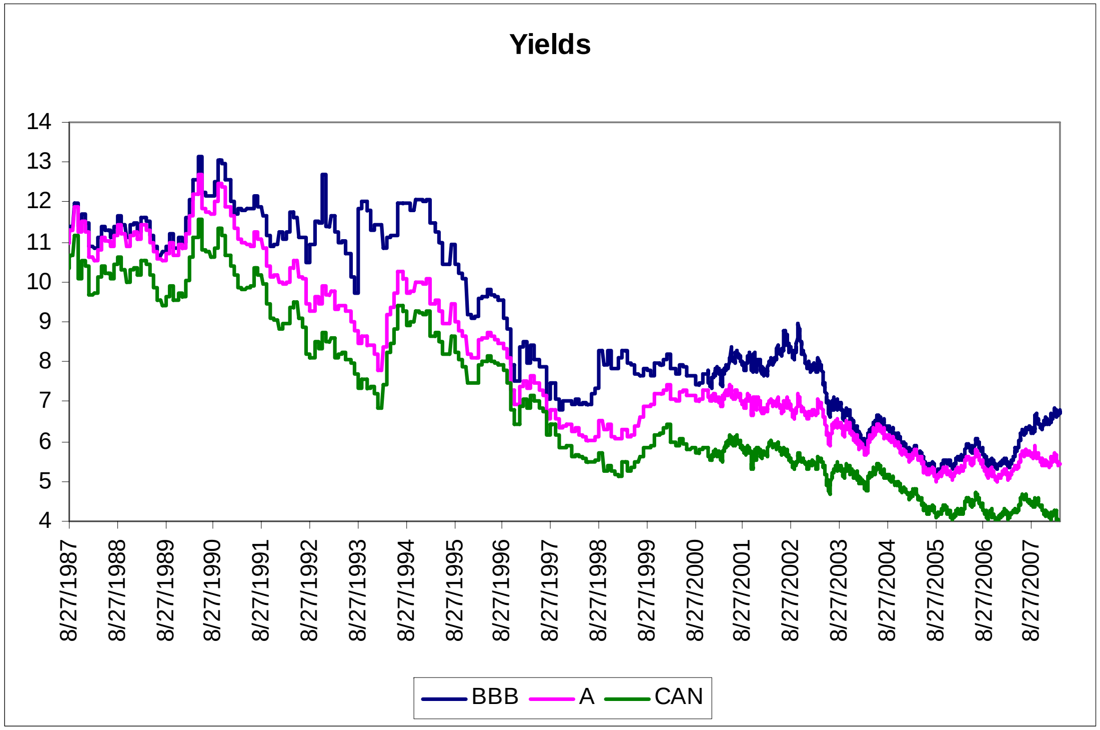
Corporate ROE and BBB Spread
400
350
300
250
200
150
100
50
0
basis points
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Percent
BBB Spread
ROE
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006

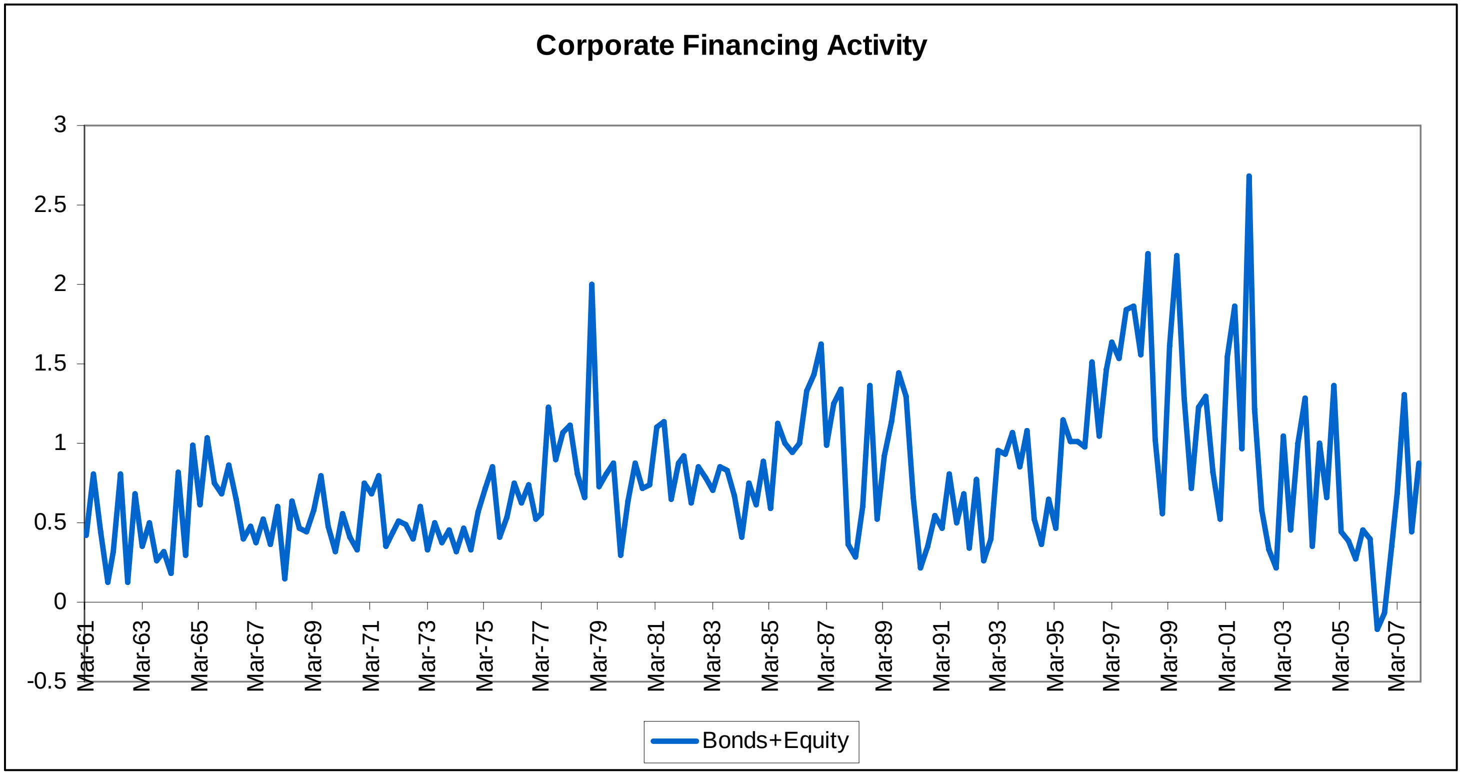
SCHEDULE 12



Corporate Spreads
350
300
250
200
150
100
50
0
5/17/1996
11/17/1996
5/17/1997
11/17/1997
5/17/1998
11/17/1998
5/17/1999
11/17/1999
5/17/2000
11/17/2000
5/17/2001
11/17/2001
5/17/2002
11/17/2002
5/17/2003
11/17/2003
5/17/2004
11/17/2004
5/17/2005
11/17/2005
5/17/2006
11/17/2006
5/17/2007
11/17/2007
AA
A
BBB

SCHEDULE 13


Yields
14
13
12
11
10
9
8
7
6
5
4
8/27/1987
8/27/1988
8/27/1989
8/27/1990
8/27/1991
8/27/1992
8/27/1993
8/27/1994
8/27/1995
8/27/1996
8/27/1997
8/27/1998
8/27/1999
8/27/2000
8/27/2001
8/27/2002
8/27/2003
8/27/2004
8/27/2005
8/27/2006
8/27/2007
BBB
A
CAN


Corporate Financing Activity
3
2.5
2
1.5
1
0.5
0
-0.5
Mar-61
Mar-63
Mar-65
Mar-67
Mar-69
Mar-71
Mar-73
Mar-75
Mar-77
Mar-79
Mar-81
Mar-83
Mar-85
Mar-87
Mar-89
Mar-91
Mar-93
Mar-95
Mar-97
Mar-99
Mar-01
Mar-03
Mar-05
Mar-07
Bonds+Equity

EARNED ROE vs ALLOWED

	Mainline		Foothills		TCPL BC (ANG)		TQM	
	Allowed	Actual	Allowed	Actual	Allowed	Actual	Allowed	Actual
1990	13.25	13.34	14.25	14.25	13.25	13.25	13.75	14.87
1991	13.5	13.65	14.25	14.25	13.38	13.38	13.75	13.94
1992	13.25	13.43	13.83	13.83	13.43	13.43	13.75	13.97
1993	12.25	12.31	11.73	11.73	12.08	12.08	12.25	12.5
1994	11.25	11.16	11.5	11.5	12	12	12.25	12.55
1995	12.25	12.56	12.25	12.25	12.25	12.25	12.25	12.65
1996	11.25	11.83	11.25	11.25	11.25	11.25	11.25	11.83
1997	10.67	11.15	10.67	10.67	10.67	10.67	10.67	10.94
1998	10.21	10.63	10.21	10.21	10.21	10.21	10.21	10.32
1999	9.58	9.64	9.58	9.58	9.58	9.58	9.58	9.94
2000	9.9	9.99	9.9	9.9	9.9	9.9	9.9	9.96
2001	9.61	10.01	9.61	9.61	9.61	6.86	9.61	10.21
2002	9.53	9.95	9.53	9.53	9.53	9.53	9.53	9.8
2003	9.79	10.18	9.79	9.79	9.79	8.21	9.79	10.21
2004	9.56	10.18	9.56	9.56	9.56	8.51	9.56	9.84
2005	9.46	9.66	9.46	10.14	9.46	9.46	9.46	9.82
2006	8.88	8.92	8.88	9.53	8.88	8.47	8.88	8.91
2007	8.46	9.13	8.46	8.89			8.46	8.74
Average	10.70	10.98	10.82	10.92	10.87	10.53	10.83	11.17
ovrearn		0.28		0.10		-0.34		0.34

NEB Regulated pipelines controlled by TransCanada Corporation, data is from surveillance reports. Foothills and the BC System have been on incentives.

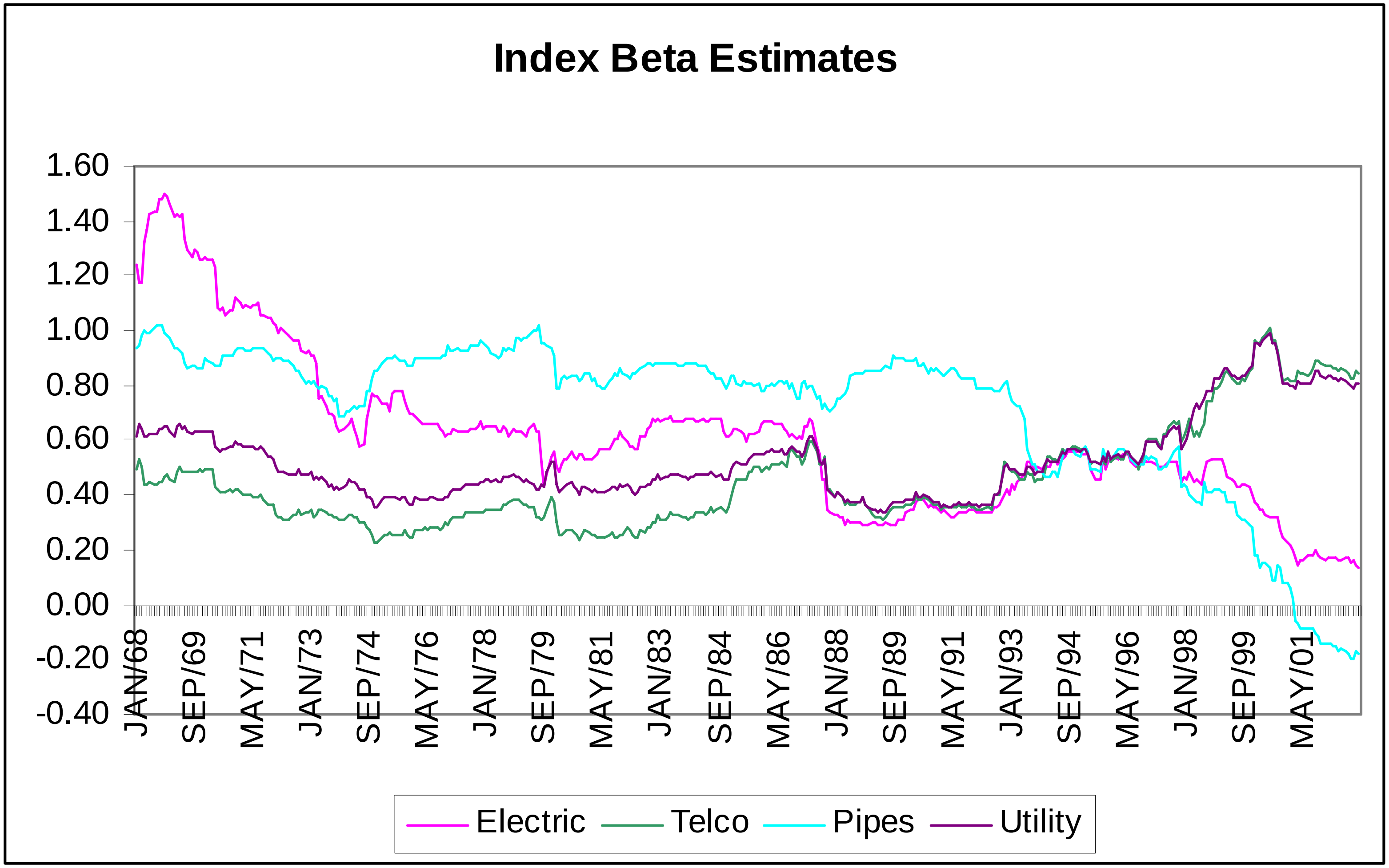
Earned vs Allowed ROEs

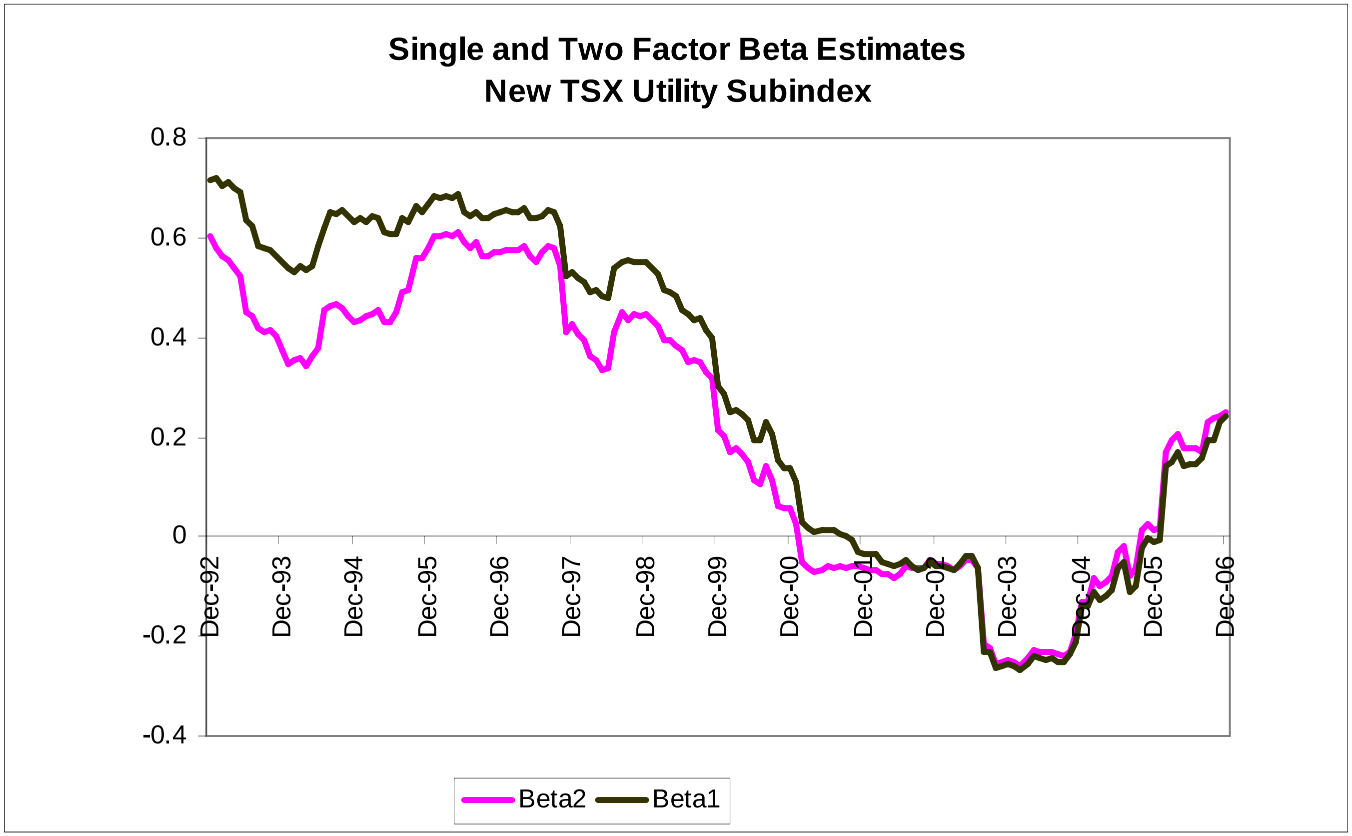
		EGDI		UNION		Terasen	GMI	
	Allowed	Actual	Allowed	Actual	Allowed	Actual	Allowed	Actual
1990	13.25	13.60	13.50	13.40			14.25	14.25
1991	13.13	13.29	13.50	12.50			14.25	14.25
1992	13.13	13.40	13.00	13.70	12.25	9.06	14	14
1993	12.30	14.43	12.50	14.30	na	11.91	12.5	12.5
1994	11.60	12.49	11.75	12.14	10.65	9.73	12	12.04
1995	11.65	12.66	11.75	12.12	12.00	12.03	12	11.78
1996	11.88	13.14	11.75	12.52	11.00	11.80	12	12.04
1997	11.50	13.00	11.00	12.26	10.25	11.27	11.5	11.9
1998	10.30	11.97	10.44	11.14	10.00	9.41	10.75	11.09
1999	9.51	10.77	9.61	10.10	9.25	10.70	9.64	10.22
2000	9.73	10.83	9.95	10.11	9.50	10.75	9.72	10.06
2001	9.54	10.03	9.95	11.45	9.25	9.38	9.6	10.38
2002	9.66	11.81	9.95	12.36	9.13	10.03	9.67	10.67
2003	9.69	13.14	9.95	12.08	9.42	10.23	9.89	10.82
2004	9.69	10.66	9.62	10.45	9.15	9.46	9.45	11.47
2005	9.57	9.46					9.69	10.51
2006							8.95	9.66
	11.01	12.17	11.21	12.04	10.15	10.44	11.17	11.63
Over		1.16		0.83		0.29		0.46

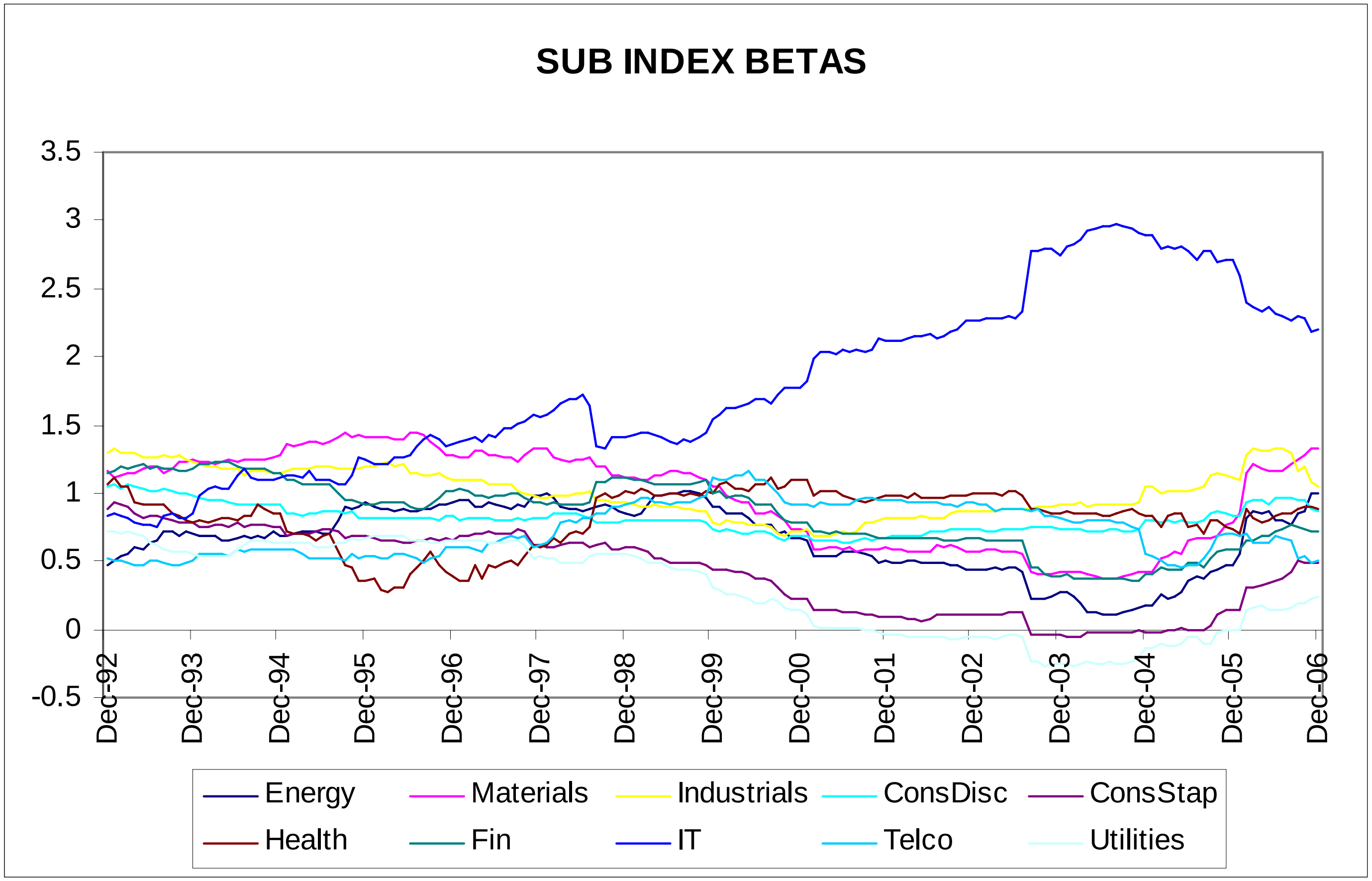
Terasen data is from the company's response to the BCUC information request #1 in the BCUC review of its adjustment mechanism. The data for EGDI is from VECC #45 in its Business risk hearing 2006, Union Gas data is from Appendix B Schedule 10 of the pre-filed testimony of Dr. William Cannon in RP-2002-0158 updated with interrogatory answer J2-31 in its 2006 business risk hearing, Gaz Metro data is from Q28.1 from the Regie in its 2007 rates hearing. Gaz Metro, Terasen and EGDI have recently at times been on performance based regulation. EGDI and Union data is based on normalised weather.

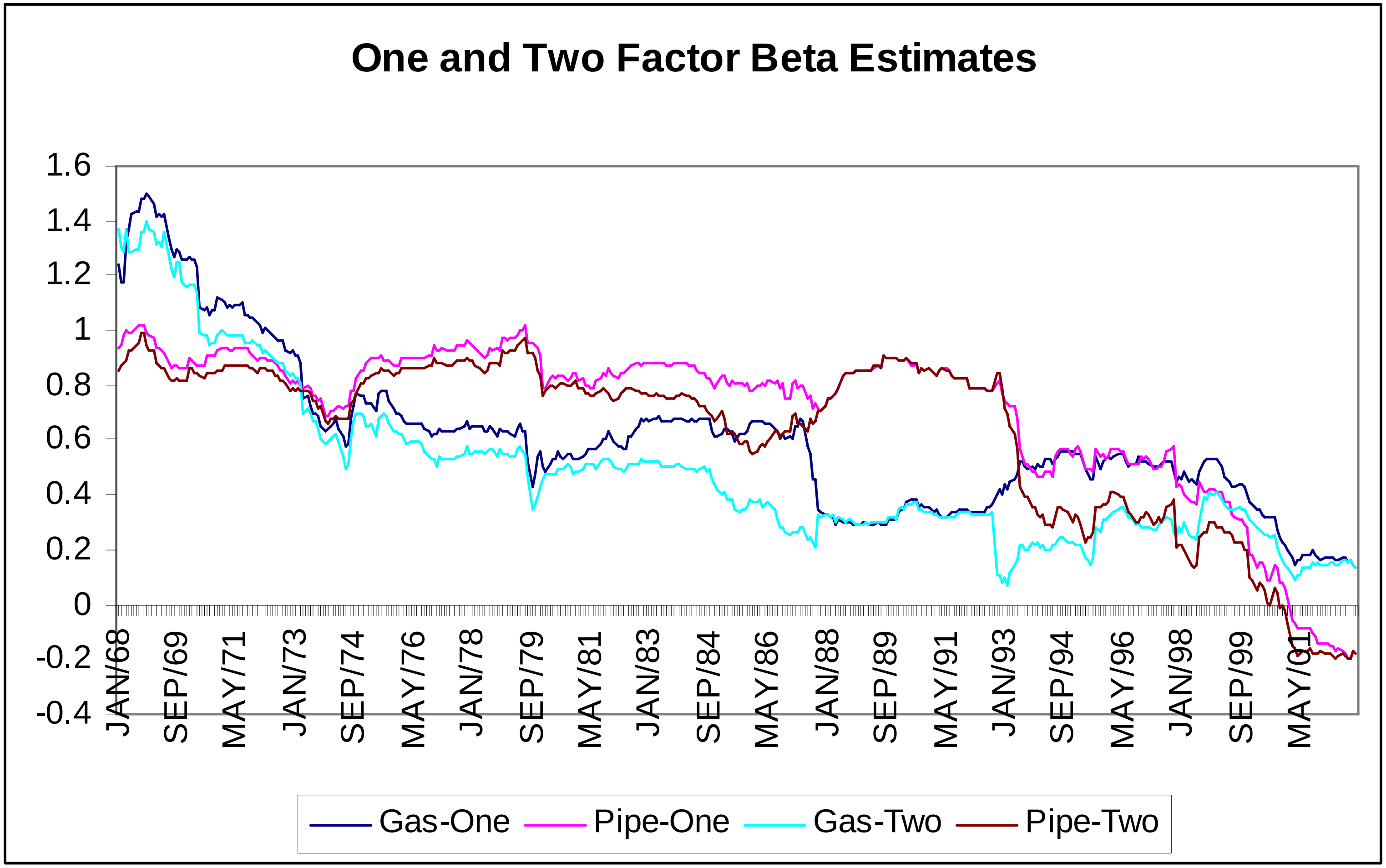
Earned Utility Holding Company (UHC) ROEs

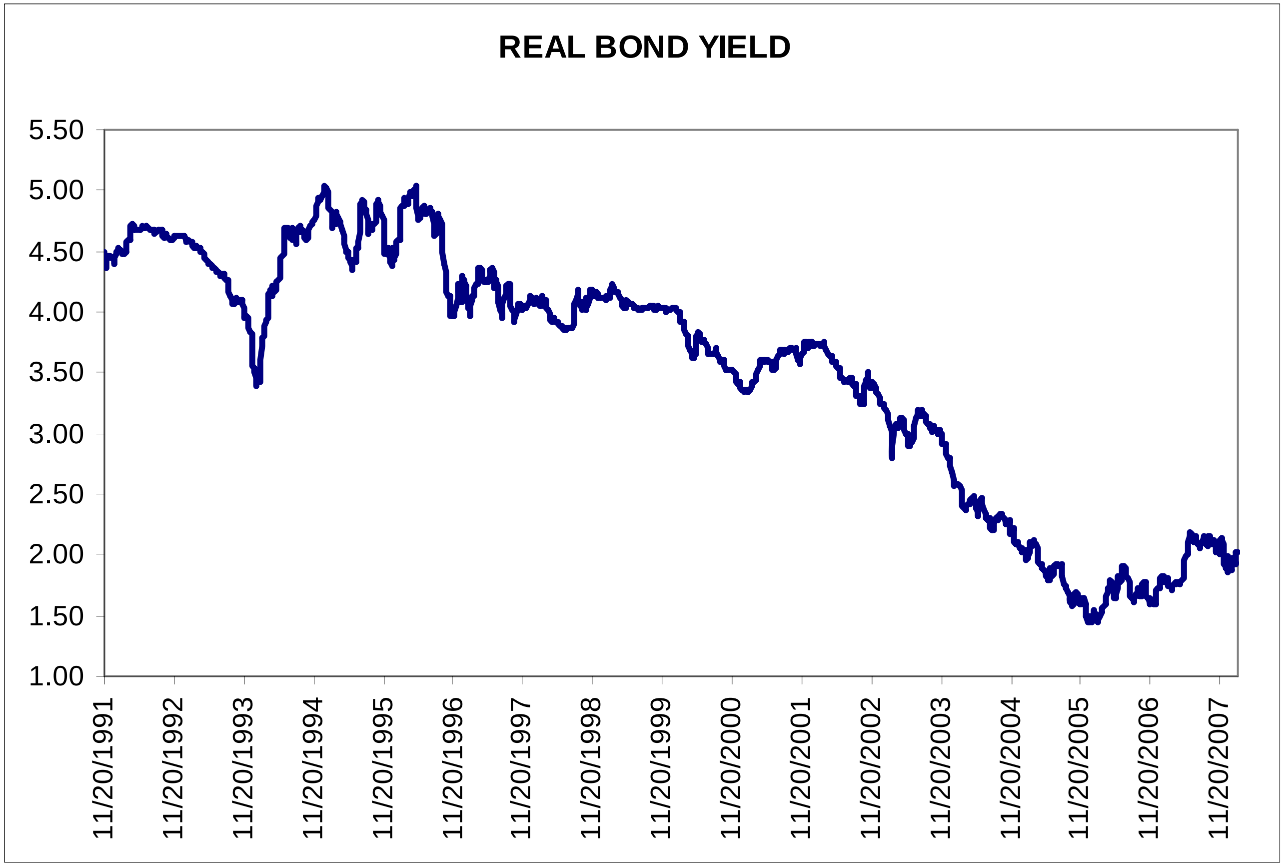
	CU Ltd	Emera	Enbridge	Fortis	GMI	PNG	Terasen	TransAlta	TCPL	Mainline	Foothills
1993	13.37	12.02	17.53	11.84	19.29	12.92	10.82	16.00	14.01	12.31	11.73
1994	13.71	11.90	9.59	10.71	19.73	13.44	7.24	15.10	12.86	11.16	11.5
1995	14.12	11.55	16.91	10.74	19.50	11.77	8.51	14.00	13.20	12.56	12.25
1996	14.86	10.59	14.47	9.61	19.91	13.32	17.59	13.24	12.33	11.83	11.25
1997	14.87	10.56	14.04	9.43	18.91	13.32	8.34	12.84	11.25	11.15	10.67
1998	14.75	9.47	13.25	7.16	19.11	10.14	12.09	16.41	7.04	10.63	10.21
1999	14.54	10.83	13.35	8.56	17.66	10.79	13.35	4.88	7.42	9.64	9.58
2000	15.44	10.88	15.65	9.71	17.93	9.75	15.16	8.14	8.44	9.99	9.9
2001	14.96	10.58	14.90	12.25	17.45	7.50	10.26	7.23	10.89	10.01	9.61
2002	17.56	6.65	10.11	12.24	18.91	5.94	9.59	2.31	11.93	9.95	9.53
2003	13.71	9.77	17.31	12.28	18.05	7.59		8.67	12.80	10.18	9.79
2004	15.19	9.80	16.43	11.25	18.21	6.97		5.97	15.49	10.18	9.56
2005	12.24	9.03	13.90	12.39	16.94	8.34		7.45	17.56	9.66	9.46
2006	14.24	9.07	14.26	11.83	15.80	5.86		1.81	14.10	8.92	8.88
2007	15.96	10.93	14.53	9.96	13.31			13.07	13.99	9.13	8.46
STDEV	1.22	1.36	2.31	1.57	1.73	2.82	3.28	4.89	2.90	1.10	1.09


Index Beta Estimates
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
-0.20
-0.40
JAN/68
SEP/69
MAY/71
JAN/73
SEP/74
MAY/76
JAN/78
SEP/79
MAY/81
JAN/83
SEP/84
MAY/86
JAN/88
SEP/89
MAY/91
JAN/93
SEP/94
MAY/96
JAN/98
SEP/99
MAY/01
Electric
Telco
Pipes
Utility


Single and Two Factor Beta Estimates
New TSX Utility Subindex
0.8
0.6
0.4
0.2
0
-0.2
-0.4
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Beta2
Beta1

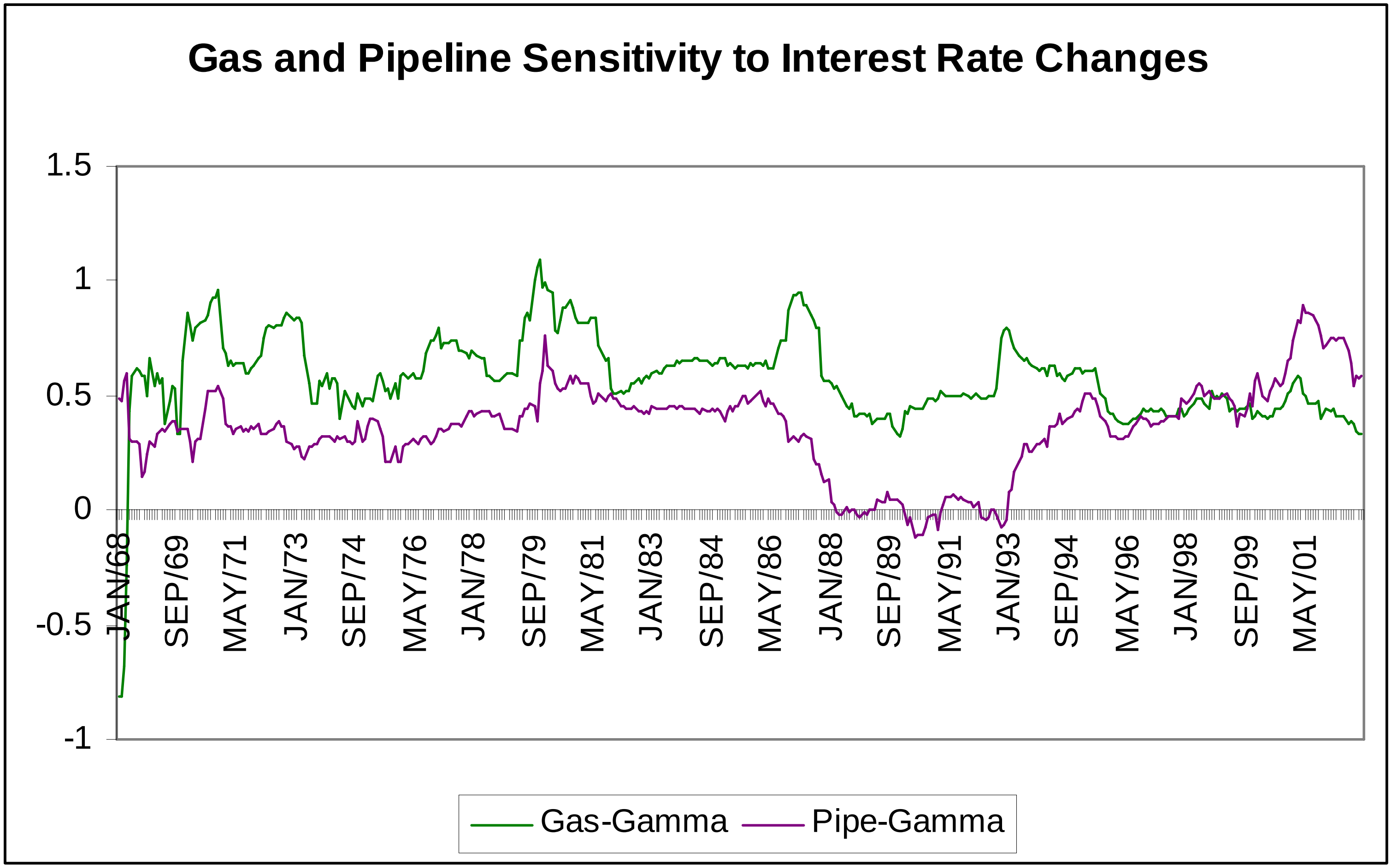

SUB INDEX BETAS
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Energy
Materials
Industrials
ConsDisc
ConsStap
Health
Fin
IT
Telco
Utilities


One and Two Factor Beta Estimates
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
JAN/68
SEP/69
MAY/71
JAN/73
SEP/74
MAY/76
JAN/78
SEP/79
MAY/81
JAN/83
SEP/84
MAY/86
JAN/88
SEP/89
MAY/91
JAN/93
SEP/94
MAY/96
JAN/98
SEP/99
MAY/01
Gas-One
Pipe-One
Gas-Two
Pipe-Two

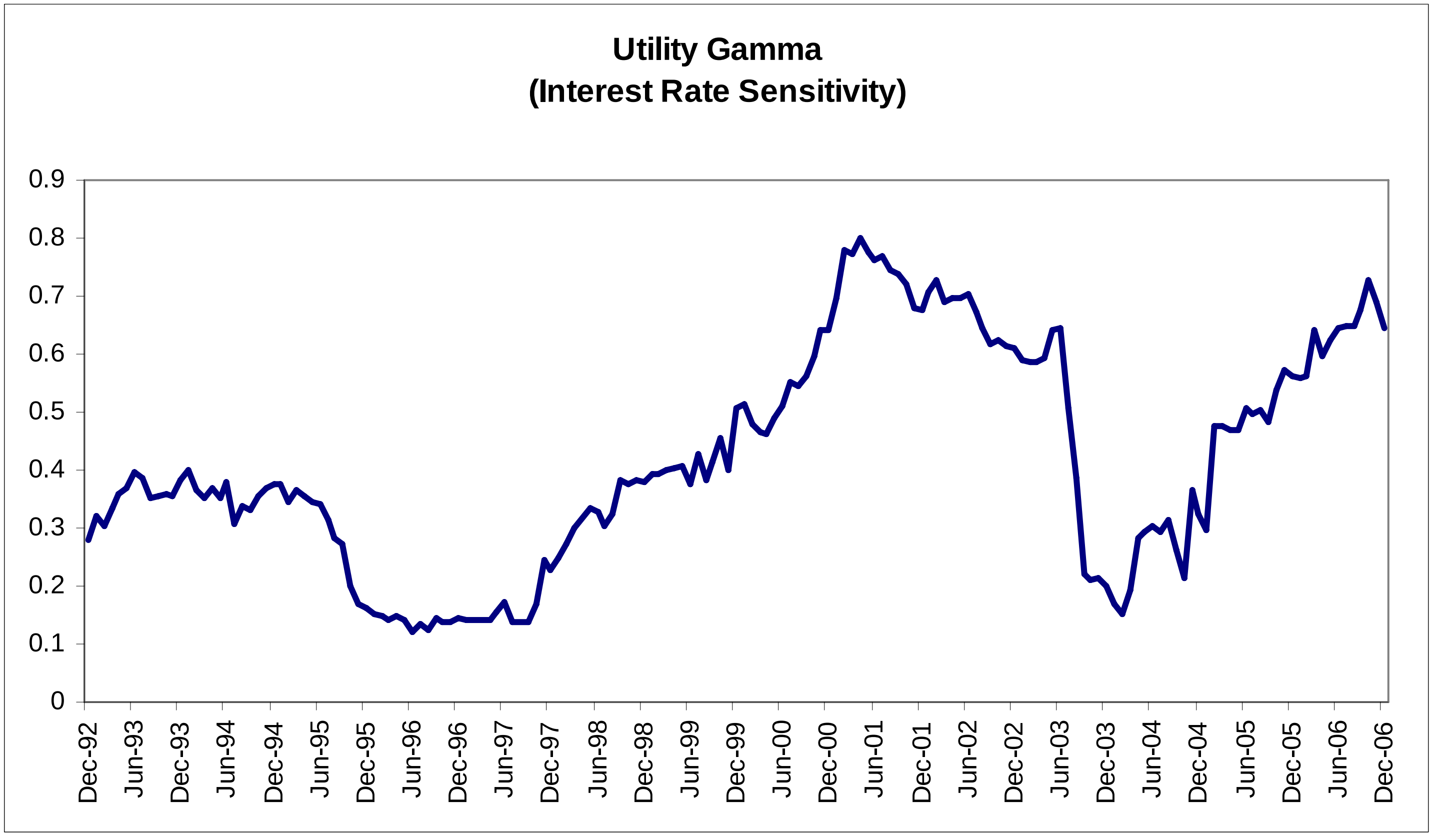


REAL BOND YIELD
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
11/20/1991
11/20/1992
11/20/1993
11/20/1994
11/20/1995
11/20/1996
11/20/1997
11/20/1998
11/20/1999
11/20/2000
11/20/2001
11/20/2002
11/20/2003
11/20/2004
11/20/2005
11/20/2006
11/20/2007

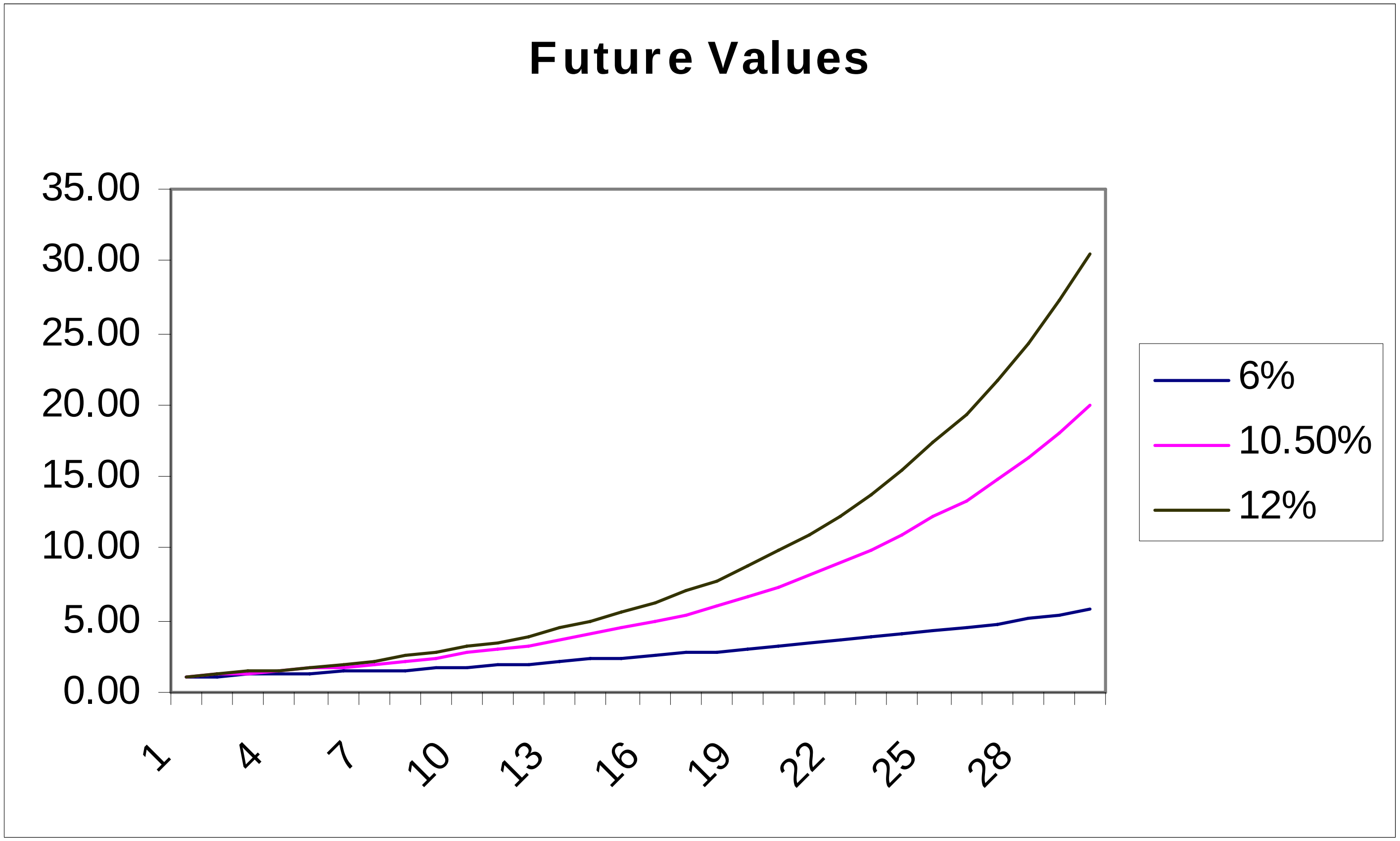
SCHEDULE 22


Gas and Pipeline Sensitivity to Interest Rate Changes
1.5
1
0.5
0
-0.5
-1
JAN/68
SEP/69
MAY/71
JAN/73
SEP/74
MAY/76
JAN/78
SEP/79
MAY/81
JAN/83
SEP/84
MAY/86
JAN/88
SEP/89
MAY/91
JAN/93
SEP/94
MAY/96
JAN/98
SEP/99
MAY/01
Gas-Gamma
Pipe-Gamma

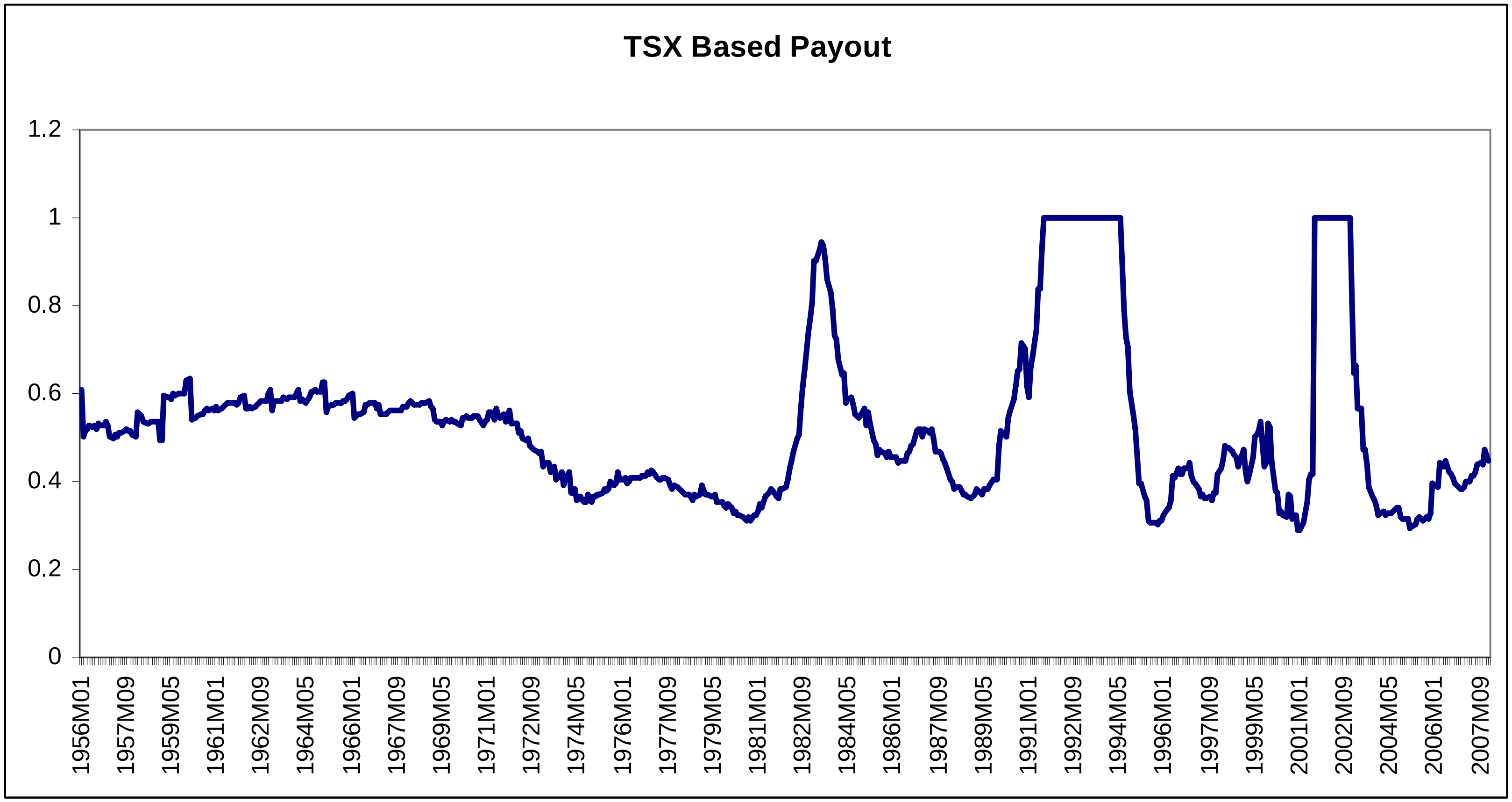
SCHEDULE 24


Utility Gamma
(Interest Rate Sensitivity)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Dec-92
Jun-93
Dec-93
Jun-94
Dec-94
Jun-95
Dec-95
Jun-96
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Jun-99
Dec-99
Jun-00
Dec-00
Jun-01
Dec-01
Jun-02
Dec-02
Jun-03
Dec-03
Jun-04
Dec-04
Jun-05
Dec-05
Jun-06
Dec-06

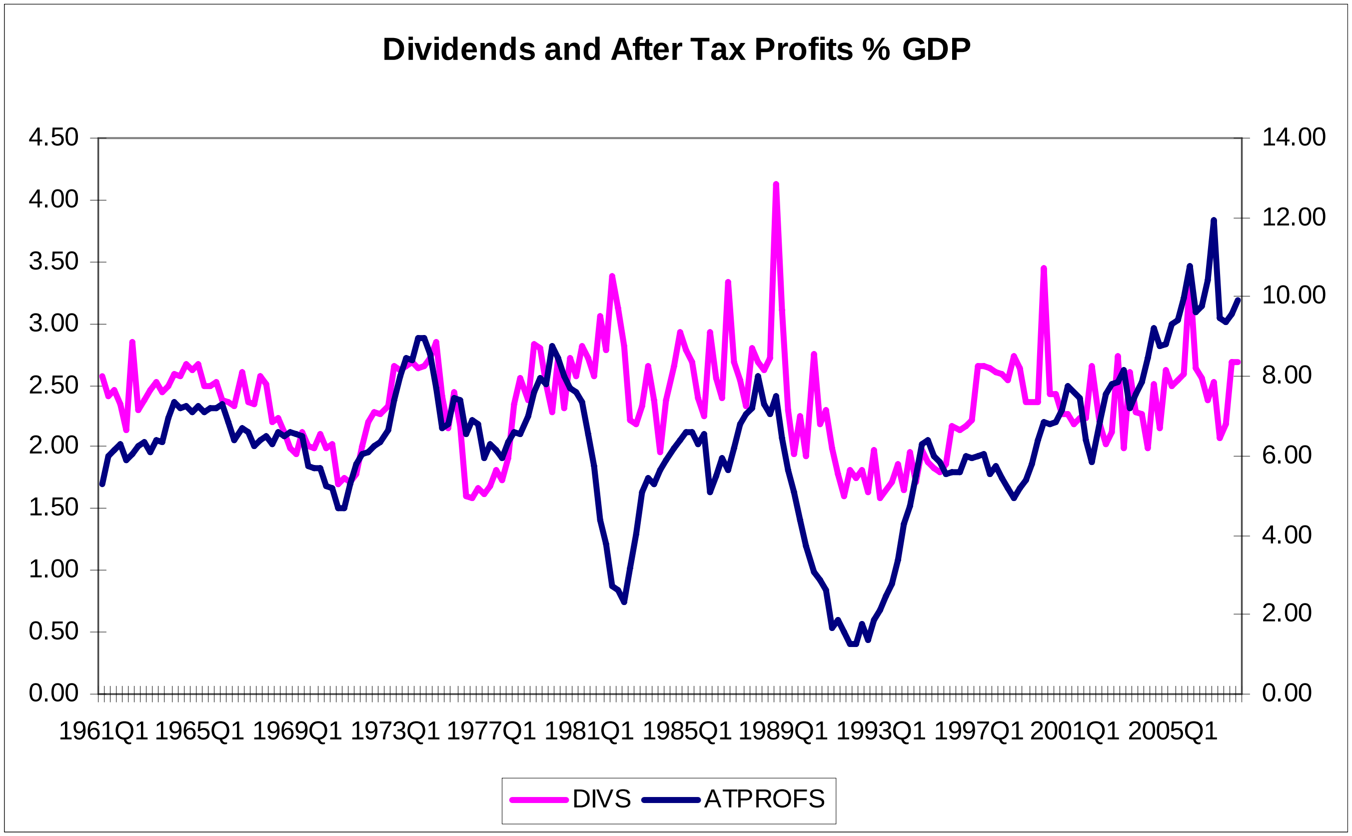
SCHEDULE 25


Future Values
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1
4
7
10
13
16
19
22
25
28
6%
10.50%
12%

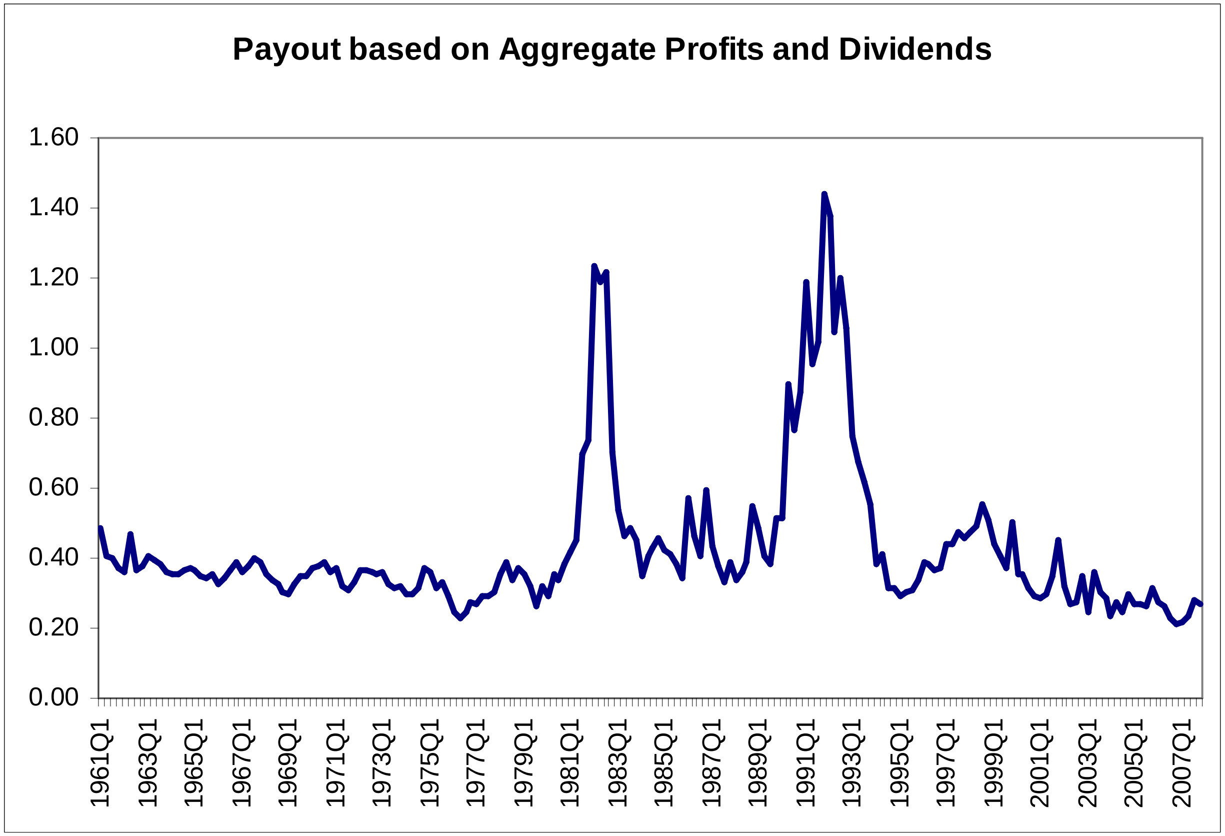
SCHEDULE 26


TSX Based Payout
1.2
1
0.8
0.6
0.4
0.2
0
1956M01
1957M09
1959M05
1961M01
1962M09
1964M05
1966M01
1967M09
1969M05
1971M01
1972M09
1974M05
1976M01
1977M09
1979M05
1981M01
1982M09
1984M05
1986M01
1987M09
1989M05
1991M01
1992M09
1994M05
1996M01
1997M09
1999M05
2001M01
2002M09
2004M05
2006M01
2007M09

SCHEDULE 27



Dividends and After Tax Profits % GDP
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1961Q1 1965Q1 1969Q1 1973Q1 1977Q1 1981Q1 1985Q1 1989Q1 1993Q1 1997Q1 2001Q1 2005Q1
DIVS
ATPROFS


Payout based on Aggregate Profits and Dividends
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1961Q1
1963Q1
1965Q1
1967Q1
1969Q1
1971Q1
1973Q1
1975Q1
1977Q1
1979Q1
1981Q1
1983Q1
1985Q1
1987Q1
1989Q1
1991Q1
1993Q1
1995Q1
1997Q1
1999Q1
2001Q1
2003Q1
2005Q1
2007Q1

US EQUITY MARKET RISK PREMIUM

(USING THE DCF MODEL AND ANALYSTS' GROWTH FORECASTS)

	Claus and Thomas Equity Market Risk Premia[a]			
	US	Canada	France	UK
1989	3.57	3.08	3.64	3.17
1990	3.54	1.51	3.04	2.57
1991	3.01	0.75	2.94	2.47
1992	3.09	0.42	2.26	2.77
1993	3.65	1.69	2.31	3.29
1994	4.06	1.65	1.7	2.87
1995	3.97	2.71	2.06	3.02
1996	3.45	2.69	2.38	3.34
1997	3.23	2.28	2.28	2.53
1998	2.51	2.68	2.53	2.09
C&T Average	**3.4**	**2.23**	**2.6**	**2.81**

a. J. Claus and J. Thomas, "Equity premia as low as 3.0%? Evidence from analysts' earnings forecasts for domestic and international stock markets," *Journal of Finance*, October 2001.

Market Risk Premium Studies

	Country	Holding Period	Arith/Geom.	Historic/Prospective	Market Risk Premium
Dimson, Marsh and Staunton[a]	Canada	1900-2000	Arithmetic	Historic	6.00%
	U.S.	1900-2000	Arithmetic	Historic	7.00%
Claus and Thomas[b]	U.S.	1985-1998	n/a	Prospective	3.40%
	Canada	1985-1998	n/a	Prospective	2.43%
Fama and French[c]	U.S.	1951-2000	n/a	Historic	2.55-4.32%
Ibbotson and Chen[d]	U.S.	1926-2000	Arithmetic	Prospective	5.90%
Arnott and Bernstein[e]	U.S.	1802-2001	n/a	Prospective	2.40%
Graham and Harvey[f]	U.S.	2001-2011	n/a	Prospective	3.60-4.70%
Richard Guay[g]	Canada	n/a	n/a	Prospective	3.00%
Easton and Sommers[h]	U.S.	1992-2004	n/a	Historic	4.43%
Mean					**4.22%**
Booth	Canada	1924-2007	Arithmetic	Historic/Prospective	5.00%

a. E. Dimson, P. Marsh and M. Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press, 2002.

b. J. Claus and J. Thomas, "Equity Risk Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stocks", *Journal of Finance*, October 2001.

c. E. Fama and K. French, "The Equity Risk Premium", *Journal of Finance*, April 2002.

d. R. Ibbotson and P. Cheng, "Stock Market Returns in the Long Run: Participating in the Real Economy", Yale International Center for Finance Working Paper No. 00-44, March 2002.

e. R.D. Arnott and P.L. Bernstein, What Risk Premium is Normal?", *Financial Analyst Journal*, March/April 2002.

f. J.R. Graham and C.R. Harvey, "Expectations of Equity Risk Premia, Volatility and Asymmetry from a Corporate Finance Perspective", Fuqua School of Business Working Paper, Duke University, November 2001.

g. R Guay "The Equity Premium and Risk management in a Global Portfolio," Presentation to the Risk Management Conference, Summer 2003.

h. P.Easton and G. Sommers, "Effect of analyst's optimism on estimates of the Expected Rate of Return Implied by Earnings Forecasts, Journal of Accounting Research, 45-5, Dec 2007.

Spread Between S&P/TSX Composite Total Return Index
and
Selected Bond Returns
January 1950 through December 2006

Table 5
Spread Over 91 Day T-Bills

Date	Geometric Mean	Arithmetic Mean	Std. Dev
8812	5.070%	6.293%	18.042%
8912	5.172%	6.371%	17.816%
9012	4.280%	5.530%	18.397%
9112	4.229%	5.449%	18.179%
9212	3.926%	5.133%	18.080%
9312	4.403%	5.627%	18.167%
9412	4.185%	5.394%	18.027%
9512	4.248%	5.432%	17.827%
9612	4.630%	5.816%	17.827%
9712	4.787%	5.948%	17.660%
9812	4.546%	5.699%	17.562%
9912	4.960%	6.123%	17.639%
0012	4.904%	6.046%	17.470%
0112	4.423%	5.598%	17.598%
0212	3.970%	5.174%	17.699%
0312	4.376%	5.575%	17.777%
0412	4.519%	5.696%	17.634%
0512	4.812%	5.981%	17.603%
0612	4.960%	6.112%	17.473%

Table 6
Spread Over
Medium Term Government Bonds
(7 1/2 year average term)

Date	Geometric Mean	Arithmetic Mean	Std. Dev
8812	5.094%	5.543%	19.826%
8912	5.164%	5.613%	19.568%
9012	4.399%	4.908%	19.824%
9112	4.083%	4.557%	19.703%
9212	3.696%	4.165%	19.626%
9312	3.895%	4.395%	19.449%
9412	3.984%	4.458%	19.226%
9512	3.747%	4.190%	19.091%
9612	3.971%	4.436%	18.951%
9712	4.008%	4.467%	18.746%
9812	3.680%	4.138%	18.684%
9912	4.267%	4.749%	18.977%
0012	4.101%	4.572%	18.825%
0112	3.609%	4.117%	18.916%
0212	3.075%	3.616%	19.075%
0312	3.386%	3.943%	19.040%
0412	3.475%	4.024%	18.869%
0512	3.727%	4.285%	18.793%
0612	3.904%	4.455%	18.666%

Table 7
Spread Over
Long Term Government Bonds
(17 year average term)

Date	Geometric Mean	Arithmetic Mean	Std. Dev
8812	5.696%	6.575%	20.334%
8912	5.679%	6.533%	20.073%
9012	4.992%	5.912%	20.215%
9112	4.600%	5.461%	20.180%
9212	4.142%	4.993%	20.173%
9312	4.241%	5.088%	19.947%
9412	4.378%	5.190%	19.731%
9512	4.052%	4.809%	19.680%
9612	4.234%	4.995%	19.507%
9712	4.097%	4.833%	19.331%
9812	3.681%	4.413%	19.354%
9912	4.362%	5.094%	19.751%
0012	4.157%	4.872%	19.617%
0112	3.704%	4.460%	19.650%
0212	3.156%	3.948%	19.814%
0312	3.473%	4.271%	19.769%
0412	3.466%	4.249%	19.586%
0512	3.557%	4.335%	19.417%
0612	3.736%	4.502%	19.285%

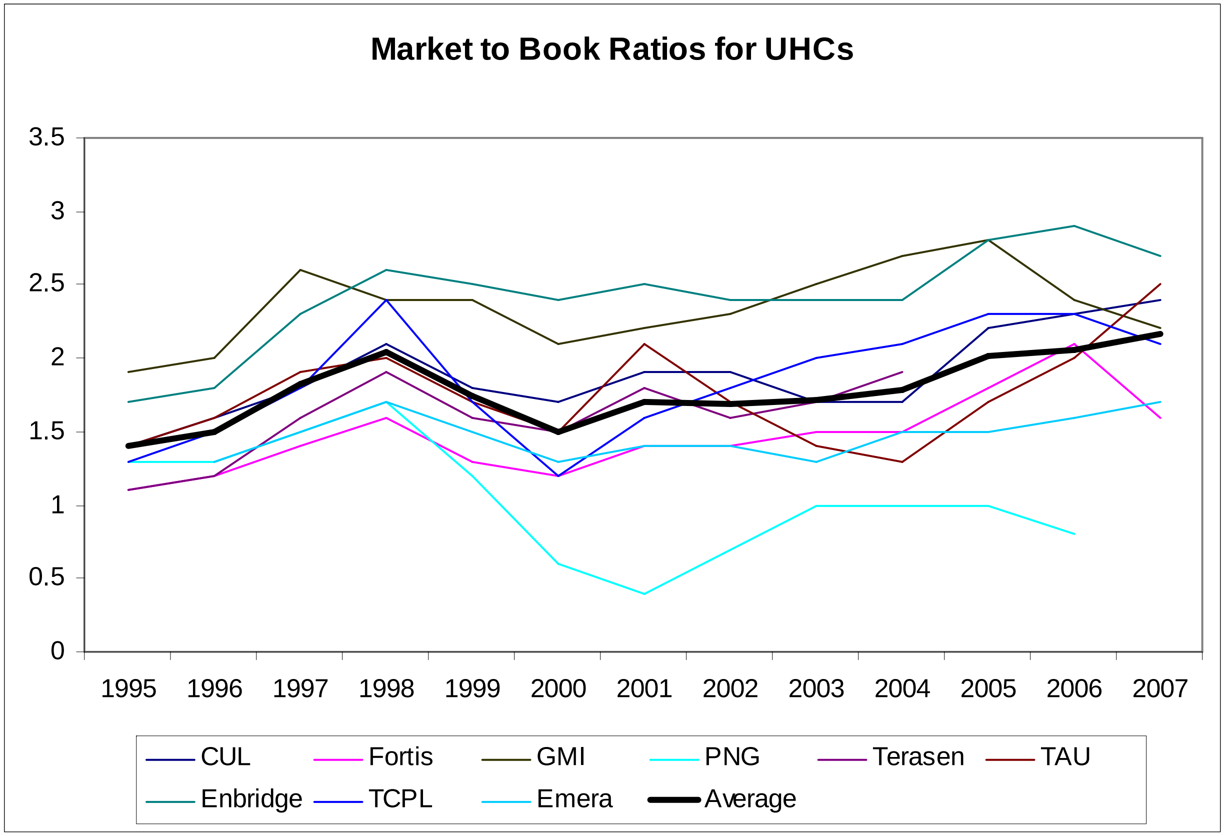
SCHEDULE 32

RETURN ON EQUITY AND MARKET TO BOOK RATIO

	TELCO ROE	TELCO M/B*	PREF YIELD	SPREAD
1970	9.63	0.97	7.42	2.21
1971	11.00	1.07	6.98	4.02
1972	11.83	1.12	7.00	4.83
1973	11.46	1.01	7.26	4.20
1974	9.94	0.86	8.90	1.04
1975	11.80	0.84	9.48	2.32
1976	12.84	0.93	9.28	3.56
1977	13.37	1.06	8.39	4.98
1978	13.43	1.17	8.34	5.09
1979	14.09	1.19	8.64	5.45
1980	13.68	1.05	9.89	3.79
1981	14.06	0.92	12.02	2.04
1982	15.08	0.91	13.78	1.30
1983	15.58	1.16	10.16	5.42
1984	14.82	1.24	9.89	4.93
1985	14.11	1.39	9.26	4.85
1986	13.16	1.41	8.92	4.24
1987	13.03	1.31	8.51	4.52
1988	12.90	1.27	8.37	4.60
1989	12.79	1.32	8.46	4.33
1990	12.68	1.26	9.20	3.48
1991	12.72	1.34	8.54	4.18
1992	12.41	1.35	8.20	4.21
1993	11.98	1.41	7.73	4.25
1994	11.49	1.50	7.96	3.53
1995	10.25	1.33	7.76	2.49
1996	11.22	1.47	7.51	3.71

* Average high low price divided by average book value per share.

SCHEDULE 32



Market to Book Ratios for UHCs
3.5
3
2.5
2
1.5
1
0.5
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
CUL
Fortis
GMI
PNG
Terasen
TAU
Enbridge
TCPL
Emera
Average

MACQUARIE

Macquarie Research Equities

Canadian Pipelines/Utilities Equity Issuance In 2007

Date	Company	Shares	Price	Total Value
January 3, 2008	Fortis Inc.	5,170,000	$29.00	$149,930,000
January 16, 2008	Enbridge Inc.	15,000,000	$38.75	$581,250,000
February 6, 2008	TransCanada Corp.	45,390,500	$38.00	$1,724,839,000
February 26, 2008	Fortis Inc.	44,275,000	$26.00	$1,151,150,000
			Total	$3,607,169,000

Note: represents issuances by large pipelines, power or utility corps under coverage.

APPENDIX A

Joseph L. Rotman School of Management
University of Toronto

Rotman

Professor Laurence Booth
CIT Chair in Structured Finance

HOME ADDRESS
Suite 802, 900 Yonge Street,
Toronto, Ontario, M4W 3P5.
E-Mail Booth@rotman.utoronto.ca
(416) 978-6311

OFFICE ADDRESS
University of Toronto
105 St George Street,
Toronto, Ontario M5S 3E6
(416) 971-3048 (Fax)

TEACHING AND RESEARCH INTERESTS. Main interest is teaching domestic and international corporate finance. Research interests centre on the cost of capital, empirical corporate finance and capital market theory.

ACADEMIC BACKGROUND:

D.B.A.,	Indiana University, (finance major).
M.B.A.,	Indiana University, (finance major).
M.A.,	Indiana University, (Economics).
B. Sc.(Econ),	London School of Economics.

AWARDS & HONOURS

MBA Second Year Instructor of the Year Award, 1996, 1998 (joint) & 2000
Best paper in corporate finance, 1999 SFA meetings
ASAC Distinguished Professor Address 1990,
Director Financial Management Association 1988-90,
English Speaking Union Fellow,
Fulbright,
Elected to Beta Gamma Sigma,
First class honours B.Sc.(Econ)
CBV (Chartered Business Valuator),
National Post Leader in Management Education Award 2003

ACADEMIC EMPLOYMENT: CIT Chair in Structured Finance (1999-), Professor of Finance, Rotman School of Management, University of Toronto (1987-Present), Visiting Professor Nankai University (China) 1989, the Czech Management Centre (1998), visiting scholar London School of Economics (1985).

TEACHING Graduate (MBA) courses on The Economics of Enterprise, the

EXPERIENCE: Economic Environment of Business, Business Finance, Corporate Financing, International Financial Management, Mergers & Acquisitions, Financial Management, Capital Markets & Corporate Financing (EMBA), Financial Theory of the Firm (Ph.D), Capital Markets Workshop (Ph.D). Undergraduate courses (B.Comm) in International Business and Business Finance. Executive courses (2-5 days) on Money and Foreign Exchange Markets, Business Valuation, Financial Strategy, Equity Markets, Capital Market Innovations, Mergers & Acquisitions and Finance for Non-Financial Managers.

JOURNAL ARTICLES

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"On the Nature of Foreign Exchange Exposure" Journal of Multinational Financial Management" (Spring 1996),

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TESTIMONY

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Other civil cases include: prudent investments in a money market fund; the use of inverse floaters; the valuation of a brick company; the purchase of a private company by a Crown corporation; the liability of an investment dealer in a deficient private offering memorandum; the role of the Crown in managing moneys placed "in trust," the motivation for differential investment decisions, the materiality of press releases and the role of event clauses in contracting.

Ph.D SUPERVISOR:

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Greg Lypny, An Experimental Study of Managerial Pay and Firm Hedging Decisions, 1989,

Frank Skinner, Credit Quality Adjustments and Corporate Bond Yields, 1990,

Rui Pan, Probability Analysis of Option Strategies, 1994,

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Guy Bellemare, Capital Market Segmentation: US -Canada, 1996,

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SERVICE:

Executive Committee member 1980-2, 1989-90, 1993-4, 2001-3
Finance Area Co-ordinator 1987-91, 1994-2008
External Advisory Board, Health Administration Faculty, 1985-92.
Editorial Board Activities:
- Journal of Economics & Business 1982-87.
- Finance Section Editor, Canadian Journal of Administrative Sciences 1993-2005.
- Journal of Multinational Financial Management 1989-.
- Journal of International Business Studies 1992-2002
- Associate Editor, Multinational Finance Journal, 1995-
- Journal of Applied Finance 2003-2007

Director at large Multinational Finance Journal 1998-
Co-Chair 1991 Northern Finance Association meetings.
Chair 1998 Northern Finance Association meetings

Programme Committee member FMA meetings, October 1993.
Programme Committee member SFA meetings November 2002.
Programme Committee member, MFS meetings 2002-5
Programme Committee Member, Global Finance Conference, 2006.
Programme Committee Member, European Financial Management 2006.
Frequent media commentator.

April, 2008.

APPENDIX B

APPENDIX B

THE FAIR RATE OF RETURN CONCEPT AND COMPARABLE EARNINGS

Corporate ROEs as an opportunity cost

The owners of a firm invest money to buy real and financial assets; their personal equity investment in the firm is then recorded as "stockholder's equity" on the firm's balance sheet. In order to undertake an investment the owners must expect to earn a rate of return at least equal to their minimum required rate of return, which is the cost of equity capital or fair rate of return.[1] Otherwise they will not undertake the investment. Hence, there is a link between what the firm earns and what the investor requires. However even if we are able to create a sample of firms that are identical in risk to the firm under examination, so that the required returns are similar, there is ***no*** reason for the ***earned*** ROE of the sample (commonly referred to as the "comparable earnings" ROE) to be similar to either that of the firm under examination or its investors' required rate of return.

The basic problems with the earned rate of return are as follows:

- It is an accounting rate of return
- It is an average not a marginal rate of return
- It is earned on historic accounting book equity that does not reflect what can be earned on investments today,
- It is based on non-inflation adjusted numbers
- It varies with the firms selected in the "comparable earnings" sample

When investors make investments they are concerned with the cash outflow in making the investment and the cash inflow when the investment pays off. This is recognised in corporate investment decisions where firms estimate the stream of future cash flows generated from the investment and the cash outflow. They then use discounted cash flow techniques to evaluate the investment. The net present value criterion discounts the expected cash flow at the cost of capital

[1] These terms are used synonymously.

to see whether the value of the project exceeds its cost, or alternatively the net present value is positive. The internal rate of return (***IRR***) criterion finds the discount rate that sets the expected stream of cash flows equal to the cost of the project. The ***IRR*** is frequently called the economic rate of return and it is this rate that is compared to the cost of capital. If the IRR is at least equal to the cost of capital, then the project enhances shareholder value and should be accepted.

Unfortunately the accounting ROE shown in a firm's financial statements, and commonly used in comparable earnings testimony, is only loosely related to the economic rate of return or ***IRR***. For example, the economic rate of return uses tax accounting for depreciation (CCA) since accelerated depreciation reduces the tax paid in the early life of the project and enhances cash flow. The accounting ROE in contrast uses generally accepted accounting principles (GAAP), where the firm may use straight line or any other acceptable method for reporting depreciation. The flexibility allowed in GAAP means that any prudent analyst looks to the cash flow statement (sources and uses of funds) to find out the quality of a firm's earnings. If there is a significant difference between cash flow and accounting earnings it is one signal that the firm may be using creative accounting so that the accounting ROE is not to be trusted. The large number of accounting scandals in the US, from WorldCom to Enron and HealthSouth, indicate that in practise there have been large differences between accounting ROEs and the true economic rates of return.

However, even if the accountants measured economic rates of return, what we would observe is the average and not the marginal ROE. Why this matters is that normally the set of available investment opportunities is downward sloping, that is, a firm may have some projects that might earn say 20%, some more at 18%, 15% etc all the way down to its cost of capital say 10%. As a result its ***average*** ROE will always be higher than its cost of equity capital, since this is the minimum rate of return, that is, the firm should not accept projects with ROEs less than the cost of equity capital.

This difference between average and marginal ROEs and the cost of capital is most severe if the firm is able to earn monopoly profits, since in this case its ROE will increase. In Schedule 1 is an example where the firm invests at I^*, since all of this money is invested at a rate that exceeds the cost of capital. However, the average ROE that we would observe even if the accounting fairly represented the firm’s economic earnings is simply the average of all these investments and by definition significantly exceeds the fair rate of return.

What happens when a firm has significant market power is that the investor notices the high ROEs and since they exceed the minimum fair return they are happy with the firm’s performance and bid up the stock price. As a result the stock price sells for more than the book value of the funds actually invested and the market to book ratio exceeds 1.0. In a competitive market economy this discrepancy does no harm, since the excess rate of return acts as the market signal to attract other firms into the industry. The result is an increase in output in the industry and a reallocation of resources in the direction signalled by consumers. However, for our purposes, it means that even if we adjust for the accounting problems, actual ROEs are constantly diverging from the investor's fair rate of return. This divergence is particularly acute in two situations: where there are monopoly profits and when there are swings in the economy.

When no entry into the industry can occur, a firm may continue to earn rates of return considerably in excess of any notion of a fair rate of return. For example, suppose that a firm has a legal barrier to entry. In this case, the firm can continue to earn excess rates of return indefinitely and the earned book rate of return will be consistently higher than the investor's fair rate of return. This would be the situation for many consumer products firms, where a major asset, such as a brand name or distribution system, is not reflected in the financial statements. In this case, the firm's equity is understated, because the costs of developing the asset, namely advertising and R&D, is expensed rather than capitalised. As a result, the economic rates of return are much lower than the over-stated accounting ROEs.[2]

What this means is that the accounting ROE is not an opportunity cost. Other firms or investors can not invest to earn those rates of return, since a significant asset such as the brand name or technology is missing. ***If a strong firm with assets not reported on the balance sheet, such as brand names or R&D, is earning say 15%, other firms can not simply invest in that industry***

[2] Note that if the value of R&D and brand names were included as assets then stockholder’s equity and accounting ROEs would obviously decline.

and earn the 15% without first generating a brand name or technology whose cost is not factored into that 15% ROE. Further a portfolio investor can't earn that 15% ROE either. If a firm is earning 15% and has a market to book ratio of 2 then they would only earn 7.5% on the market value of the investment, since they have to buy the assets at their market value for twice book value. In both cases the accounting ROE is not an opportunity cost and does not reflect the investor's fair rate of return.

The market to book problem also arises when there is significant inflation as North American GAAP is based on historic cost accounting and what appears in the financial statements are the historic costs, not the replacement or current value costs. Although inflation hasn't been a significant problem for many years, even 3% inflation can create distortions. Consider, for example, a situation where the investor wants a 5% real rate of return and inflation is expected to be 4.76%, so the nominal required nominal rate of return is 10%.[3] Further suppose this return is expected to continue for ever on a $100 investment.

What this means is that this year's cash flow of $5 is expected to increase to $5.24 next year, and then to $5.49 the following year. We can not judge the fair rate of return from this accounting ROE since it increases over time from 5%, to 5.24%, to 5.49% etc. First of all ***what we observe is the real rate of return*** and second ***it increases over time due to the increasing earnings on a constant non-inflation adjusted book value***. What we could do in this case is increase the value of the investment for inflation from 100 to $104.76 after the first year and then $109.75 after the second. The firm is then expected to earn a real return of 5% on this inflation adjusted book value, so that .05 * $104.76 also gives $5.24.

The above example is not just a theoretical exercise it also illustrates how the real return bond issued by the Government of Canada works. The principal or par value is increased with the consumer price index and the investor then receives a fixed real rate of return on this inflation adjusted principal value. In the above example it is the constant 5% applied to the inflation adjusted book value that determines how much interest the government pays out on the inflation indexed bond. Why this is important is that non-regulated firms operating under inflation have

[3] The nominal rate is one plus the real rate times one plus the expected inflation rate.

the characteristics of the real return bond. If these firms are inflation neutral then their profits go up with inflation, as does the market value of their investment, so they continue to earn the same real rate of return. Historic cost accounting does not normally recognise this increase in the market value of the assets, so the earned returns are in excess of the real rate of return due to the understatement of the book value. In the example if the investment value is not increased, the accounting return would be 5.24%, not the actual real return of 5%.

What the example illustrates is that if non-regulated firms are inflation neutral then their reported returns are real returns. However, to the extent that their investments are not revalued and continue to be reported at historic costs, then the reported returns exceed the real return. In this case we would again observe market to book ratios in excess of 1.0. In this case it is because the assets are valued at historic, instead of current dollar values. In the example after the first year the market value would be $104.76 divided by the constant book value of $100 or 1.0476. This market to book ratio would then increase over time as the book value becomes more and more irrelevant. However, note again that investors cannot buy the assets at these historic costs and as a result their fair return is overstated. In a similar way investors in the inflation linked bond can not buy them at historic cost, instead they have to buy them at current market prices, which reflect the realised inflation history.

The above inflation adjustment problems are moderated by the fact that most investments are not perpetuities and GAAP does offer opportunities to revalue assets to market values. For example, whenever a firm is acquired, purchase accounting requires that the value of the assets be written up to reflect the amount paid. However, in general there is no reason for the actual returns under even moderate inflation to reflect either real or nominal economic returns. Further, it is important to note that utilities are regulated like bonds. The rate base is fixed, just like a typical nominal bond, and the investor is then allowed the current nominal return on that investment. This means that earned returns from utilities can not easily be compared with the earned returns from a sample of even competitive low risk firms: it is an apples and oranges comparison of nominal returns with some hodge podge of nominal and real accounting ROEs.

The final problem is that the swings in the economy affect the assessment of the accounting rates of return. At the peak of the cycle, excess spending by consumers and businesses push up prices and firms generate large profits. Conversely, in recessions the lack of demand causes sharp price discounting, reduced margins and lowered, if not negative, rates of return. The peaks and troughs of the business cycle can be offset by averaging over the full business cycle, but this just leads to the problem that only rarely is the economy stable enough that the past business cycle can be used as a predictor of the future business cycle. However, the variability in accounting ROEs opens up enormous selection errors in choosing firms.

To illustrate the selectivity in creating a sample of corporate ROEs it is important to know the average ROE of the universe of companies. For example, there are currently 255 firms in the TSE300 or what is now termed the TSX Composite index. This is the major gauge of the Canadian equity market, so it is reasonable to ask what ROE have they earned? The Financial Post data base provides ROE data for these firms and the basic data is as follows:

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Average	**4.24**	**5.35**	**4.47**	**0.26**	**3.72**	**7.66**	**9.71**	**11.24**	**13.08**	**12.25**
Median	**7.80**	**9.52**	**11.03**	**9.53**	**6.95**	**9.92**	**10.71**	**11.98**	**12.63**	**13.68**
Maximum	**71.72**	**102.49**	**69.07**	**61.19**	**72.94**	**77.68**	**185.91**	**239.47**	**138.04**	**104.28**
Minimum	**-138.99**	**-293.65**	**-177.32**	**-231.88**	**-127.41**	**-224.02**	**-61.54**	**-108.68**	**-96.35**	**-126.14**
Standard deviaition	**22.58**	**30.76**	**31.31**	**34.22**	**21.68**	**23.23**	**20.03**	**26.01**	**21.21**	**21.50**
Profits % GDP	**9.41**	**11.27**	**12.63**	**11.47**	**11.73**	**11.91**	**13.10**	**13.77**	**13.75**	**13.74**
Correlation profits/GDP with average ROE		**0.76**								
Correlation profits/GDP with median ROE		**0.84**								

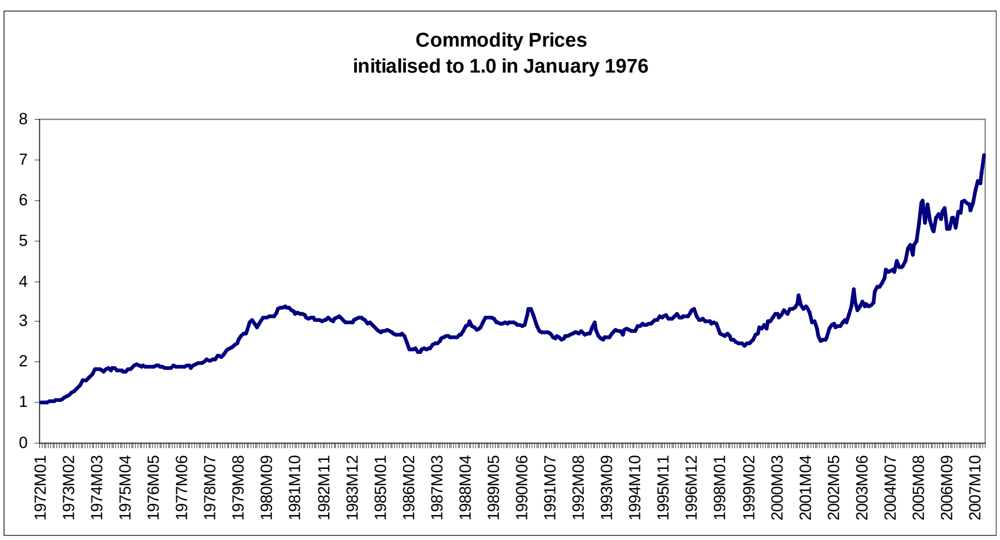
For example in 1998 the average ROE was 4.24% which by 2007 had increased to 12.25%. However, the average is distorted by outliers, this can bee seen by looking at the maximums and minimums. In 1998 the maximum ROE was 71.72%, but the minimum was -138.99%, so the minimum was much lower than the maximum. This is not always the case, but it often happens that when a firm has a bad year, it decides to take a “big bath” and write off as much as it can, since subsequently its financial statements looks better. To offset the effect of these outliers we often look at the median, which is simply the middle number, so in 1998 the middle or typical firm earned 7.80%. To see whether the average is better than the median we can see which is more highly correlated with the aggregate amount of profits in GDP. For this ten year period the average ROE of the TSX Composite had a 0.76 correlation with aggregate profits, and a 0.84 correlation with the Statistics Canada aggregate ROE in Schedule 1.In contrast the median has a correlation of 0.84 with aggregate profits and 0.89 with the Statistics Canada aggregate ROE indicating that it is a slightly better measure of typical profitability.

To see how representative these results are I also looked at the ROEs for the firms in the TSX60 index. This is the index of the largest most liquid stocks in Canada and is the automatic set of available investments for most large Canadian mutual funds. For them the data is as follows:

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Average	**5.12**	**8.97**	**7.53**	**3.47**	**5.49**	**13.32**	**13.90**	**18.23**	**19.32**	**19.93**
Median	**8.70**	**9.76**	**12.74**	**11.30**	**9.63**	**12.80**	**15.13**	**16.07**	**16.32**	**18.16**
Maximum	**71.72**	**69.23**	**34.68**	**37.18**	**38.95**	**52.91**	**57.03**	**239.47**	**138.04**	**104.28**
Minimum	**-90.43**	**-42.02**	**-177.32**	**-147.47**	**-88.99**	**-9.14**	**-5.45**	**-107.94**	**-79.66**	**-49.34**
Standard deviaition	**22.52**	**14.95**	**28.95**	**30.92**	**20.62**	**11.86**	**10.22**	**35.61**	**24.21**	**19.61**
Profits % GDP	**9.41**	**10.41**	**11.41**	**12.41**	**13.41**	**14.41**	**15.41**	**16.41**	**17.41**	**18.41**
Correlation profits/GDP with average ROE		**0.88**								
Correlation profits/GDP with median ROE		**0.92**								

Noticeably the average and median ROEs are slightly higher and the extremes, while still large slightly less extreme. As is to be expected since these firms represent a bigger component of corporate Canada the ROEs are more highly correlated with aggregate profits than is the TSE300 data in aggregate.

So what does this data tell us? First let's look at the most salient feature of the Canadian economy which is the recent run up in commodity prices, graphed below.



s a resource based economy we can clearly see the rapid run up in commodity prices starting in 2003/4. The effect of this is evident in the median ROEs. Prior to 2004 the average of the median ROEs for the TSE300 was 9.12% and for the TSX60 10.82%, which reflected a premium over the long Canada bond yield of 3.49-5.19%. Since then the average of the median ROE for 2004-7 is 12.25%-16.42% for the TSE300 and the TSX60 respectively. While the strong commodity prices have propelled the value for the CDN$ up and allowed interest rates to fall, so that the premium over the long Canada bond yield has increased to 7.72%-11.89%.

The behaviour of the median and average ROE for these firms confirms that they are not market opportunity costs and can not be used as is to infer the fair rate of return. A further problem is that they are not adjusted for risk or the existence of monopoly or market power. I can illustrate the former simply by looking at what happens to the average ROE of a sample of these firms as we include more risky firms as measured by the standard deviation of their ROE. I can do this by first calculating the average and median ROE for each firm over the ten year period and then calculating the standard deviation or the volatility of this annual ROE. I can then sort them by this volatility and form a sample of the firms by progressively adding more risky firms. I do this and show the firms in Schedule 3 and graph the results in Schedule 2.

For example, the lowest risk firm in eh TSX Composite was OPTI Canada with an annual ROE standard deviation of 0.32% and average and median ROE of -0.27% and -0.21%, so this is the first observation. I then add the second riskiest firm which is Eastern Platinum which has an average and median ROE of -1.03% and -1.44% respectively. The average of these two firms average and median ROEs is then -0.65% and -0.82% where we have increased the risk by adding Eastern Platinum with an ROE standard deviation of 0.89%, so this is the second observation. I can then graph the result of adding successively more risky firms to the samples average and median ROE. We would expect that by adding risk these ROEs would increase yet this is not the case as Schedule 2 shows.

What happens is that the average of both the median and average ROEs does increase at first, but then it drops precipitously, before flattening out and eventually dropping again. Overall there is no firm relationship between the average profitability and risk for the firms in the TSE

Composite and what relationship there is appears to be one of falling average ROEs as riskier firms are added. The reason for this is simply that the risk measure is the standard deviation of the realised return, which generally increases with losses as gains and losses are not symmetric as I showed earlier. What this means is that to get a sample of firms with an average ROE greater than 10% means removing a large number of firms.

Some of the firms followed by FP are very small with limited history, so one might restrict the sample to the TSX60 firms. In Schedule 3 is the same graph of average ROE against “risk” and the general pattern is the same that there is no increase in ROEs to reflect increasing risk. In this case the average ROE drops marginally as some large income trusts are added and then increases as the some very profitable firms are added which are mainly banks, after which it decreases until it levels off at about 13%. All the firms are shown in Schedule 4 with their average and median ROEs.

Reasonable screens can be devised to remove some of the poorly performing firms. One inappropriate way is to rank firms based on the coefficient of variation. This is simply

$$COV = \frac{STDEV}{AveROE}$$

Ranking by COV automatically chooses firms with both a low standard deviation in their ROE, thereby cutting out firms with significant losses, as well as having high average ROEs. In particular firms with negative ROEs can be automatically excluded. If we do this we eliminate Kinross Gold, Yamana Gold, Nortel Networks, NOVA Chemical and Lundin Mining all of which have negative ROEs and thus lower the average sample ROE. If we then look at the sample ROEs in Schedule 4 we might set a screen that eliminates mining companies, since they have cyclical earnings or sue other screens based on seemingly plausible reasons that have the effect of increasing the average ROE above the overall ten year average of about 7.2% to some target “reasonable” level.

The Fair ROE Standard

It is for the above reasons that most economists ignore accounting rates of return and go directly to the capital markets for an assessment of what constitutes a fair rate of return. From economic theory, the objective of rate of return regulation is that the owners of the firm should not earn excess rates of return from the exercise of monopoly power, nor be penalised by the act of regulation. This economic proposition has been reinforced by legal precedent. In Northwestern Utilities vs. City of Edmonton (1929), it was stated that a utility's rates should be set to take into account "changed conditions in the money market."

A fair rate of return was further confirmed in BC Electric (1960) when Mr. Justice Lamont's definition of a fair rate of return, put forward in Northwestern utilities, ie.,

> "that the company will be allowed as large a return on the capital invested in the enterprise as it would receive if it were investing the same amount in other securities possessing an attractiveness, stability and certainty equal to that of the company's enterprise."

was adopted. This definition is what economists refer to as an opportunity cost. Only if the owners of a firm earn their opportunity cost will the returns accruing to them be fair, i.e., will the return neither reward the owners with excessive profits, nor reward the ratepayers by charging them prices below the cost of providing the service. Hence, the opportunity cost is from economic theory, as well as the Northwestern Utilities decision, a fair rate of return.

Of note is that Mr. Justice Lamont's definition includes three critical components:

(1) The fair return should be on the "capital invested in its enterprise (which will be net to the company)"

This means that the return should be applied to the capital actually “invested” in the company, which is normally interpreted as the “book value” of the assets since this is what has actually been “invested.” The reason for this is that the market value changes as a result of the regulatory decision and has little connection with the actual capital that has been invested. As a result, Mr.

Justice Lamont's definition is normally interpreted as the original historic cost rate base. Only this represents the actual money invested in the regulated utility.

(2) "other securities"

Mr. Justice Lamont specifically states that the alternative investment should be other securities, and <u>not</u> the book value investment of other companies. This was a natural outgrowth of the *Northwestern Utilities Limited* decision that was concerned with the authority of the Board to change the allowed rate of return to reflect "changed conditions in the money market." In 1929 the term "money market" had a broader interpretation than its current use; "capital market" would be closer to today's terminology.

The motivation for the definition was clearly the desire to change the allowed rate of return to reflect the changes in "market opportunities." This is equivalent to the standard economic definition of a <u>market</u> opportunity cost. The return should be equivalent to what the stockholders could get if they took their utility investment (at book value) and invested it elsewhere. Clearly this utility investment can only be invested at market prices, since the utility investor cannot invest elsewhere at book value! Hence, the opportunity cost has to be measured with respect to market rates of return. In particular, there is no basis for allowing a utility investor a return equivalent to the accounting rate of return earned elsewhere.

(3) "attractiveness, stability and certainty"

These words clearly articulate what a financial economist would call a risk-adjusted rate of return. Even in 1929 it was obvious that investors required higher rates of return on risky investments, than on relatively less risky ones.

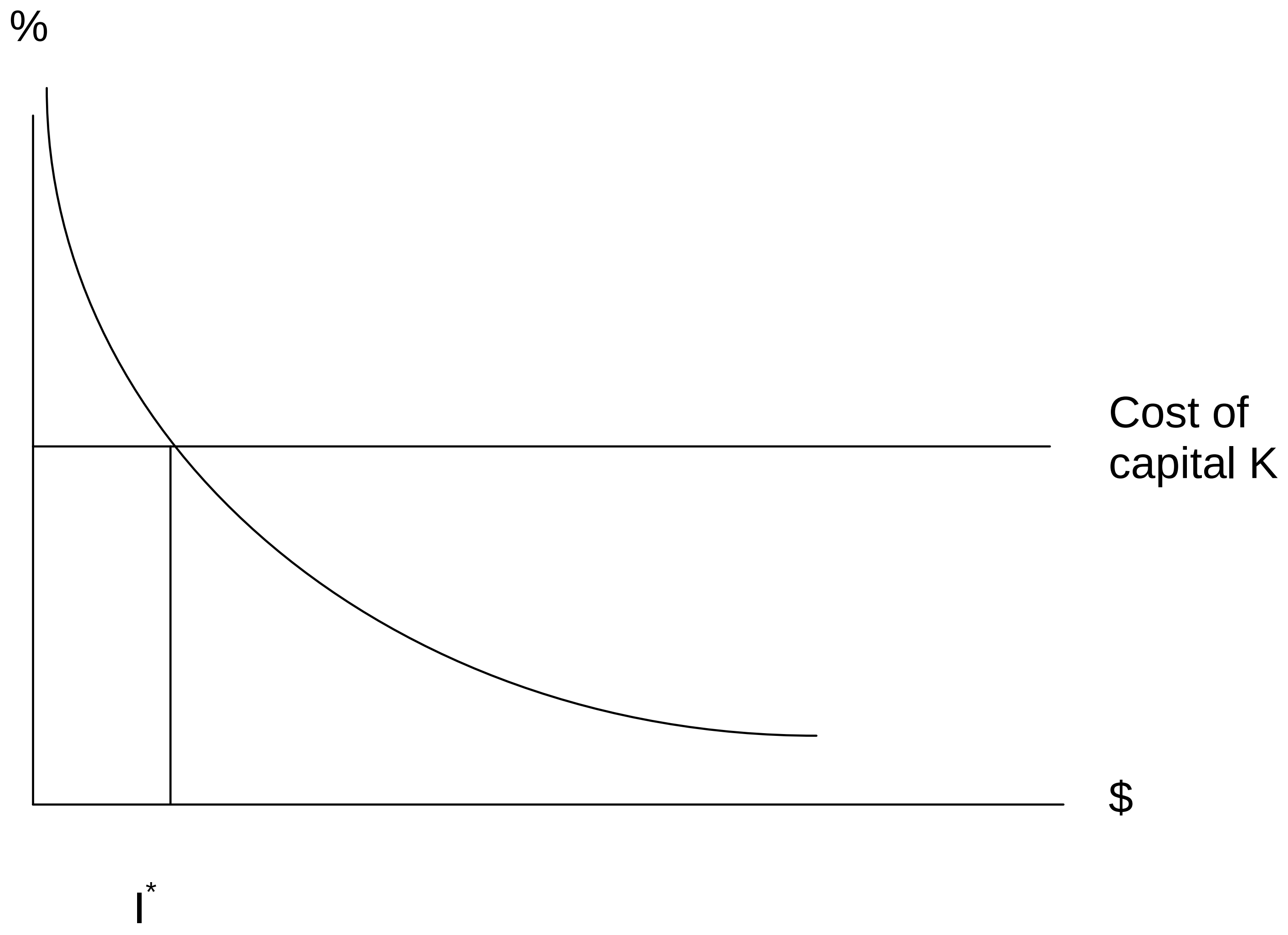
Further in *Federal Power Commission et al v. Hope Natural Gas Co.* [320U.S.591, 1944], the United States Supreme Court decided that a fair return

> "should be sufficient to assure confidence in the financial integrity of the enterprise so as to maintain its credit and to attract capital."

Financial integrity is critical for a utility. Since the equity holders have made a “sunk” investment, it is possible for subsequent regulated decisions to deprive the stockholders of a reasonable return and thus make it very difficult to access the market for new capital. Financial integrity is thus equivalent to the ability to attract capital and fair treatment to investors. The investor's "market opportunity cost" accomplishes these additional objectives, since by definition the opportunity cost is the rate that the investor can earn elsewhere. Thus it is a rate that attracts capital and if the company can attract capital on reasonable terms it can maintain its financial integrity. The upshot of these remarks is that Mr. Justice Lamont’s definition of a fair rate of return is essentially a ***market based investor opportunity cost.***

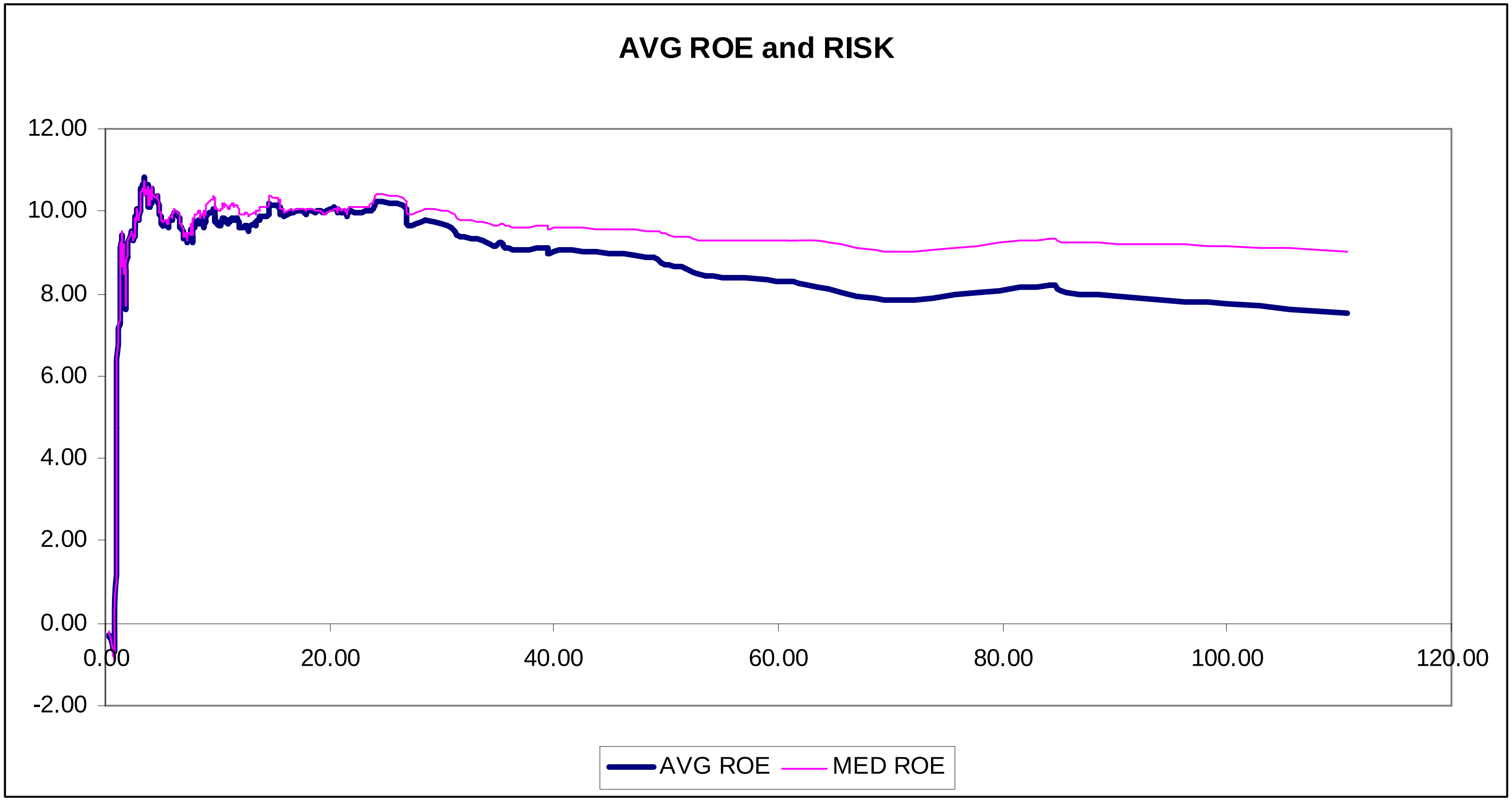
By basing regulation on the investor's opportunity cost of capital, as defined by Mr. Justice Lamont, not only is the economic objective of regulation attained, but so too is the need for the return to be fair. The obvious need to maintain the credit and financial integrity of the firm is also preserved, since the firm is offering a competitive rate of return and attracting capital. This is why most economists would base a regulated firm's fair level of profits on the external investor's opportunity cost and <u>not</u> an accounting rate of return that is not immediately tied to conditions in the "money market". The opportunity cost principle embodies all of the fairness, capital attraction and financial integrity issues of concern for equitable regulation.

Average vs Marginal ROE



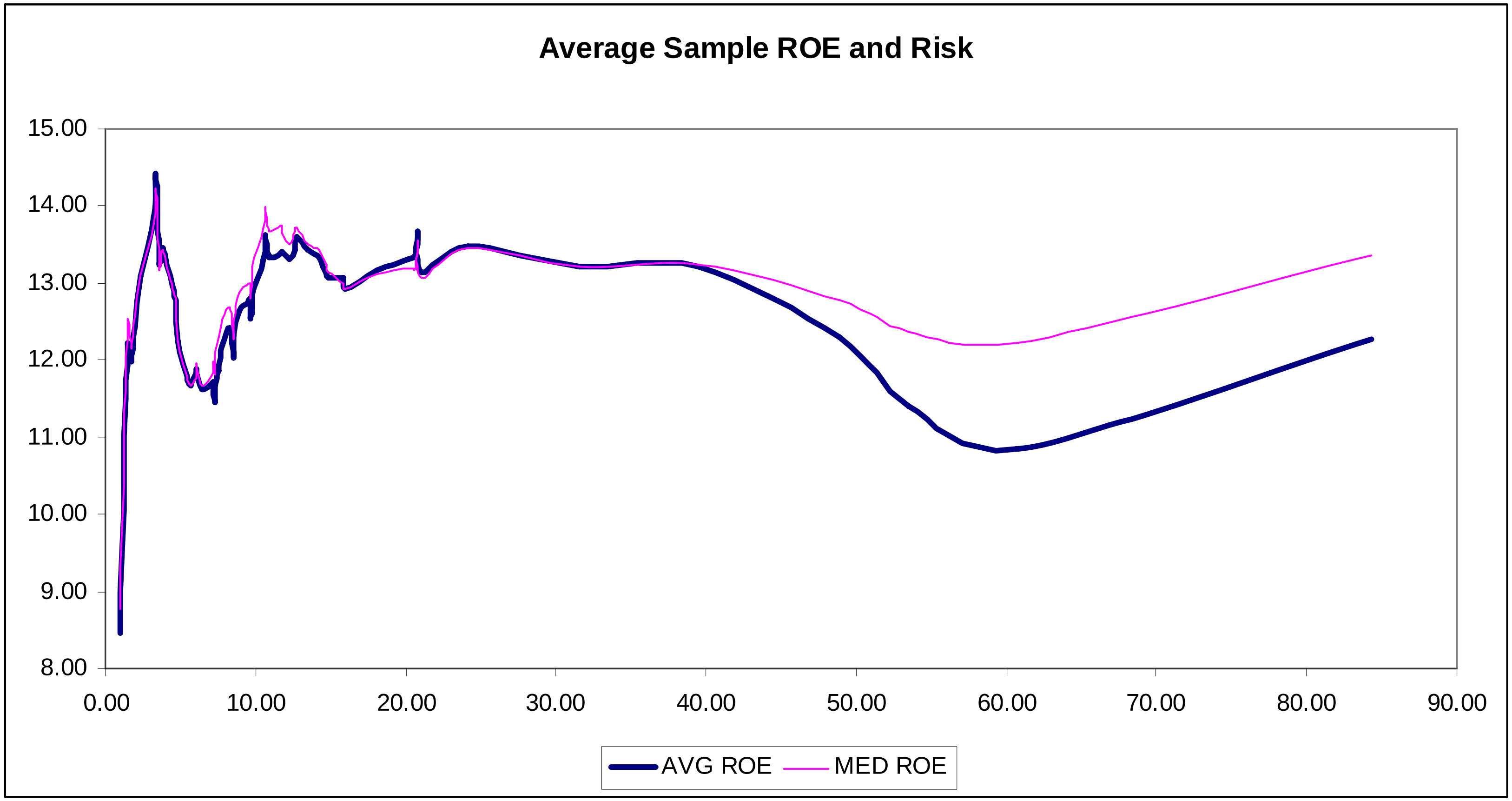
Schedule 2

TSE300 (Composite) Firms



Schedule 3

Average and Median ROEs for TSX60 Firms as the Volatility of their ROEs increase



Schedule 4

Annual ROEs for the TSX60 1998-2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	STDEV	Med	AVG
The Thomson Corporation	8.77	6.36	8.2	8.67	7.21	9.49	9.08	9.36	9.04	...	1.05	8.77	8.46
Canadian Tire Corporation, Limited	13.04	11.2	10.56	11.53	11.87	12.84	13.61	13.86	13.39	14.21	1.24	12.94	12.61
Manulife Financial Corporation	12.82	14.03	15.73	14.95	16.17	17.43	15.93	14.09	16.32	17.54	1.52	15.83	15.50
Magna International Inc.	11.63	11.03	13.45	12.34	10.66	10.99	13.38	10.64	7.7	...	1.74	11.03	11.31
Enbridge Inc.	13.25	13.35	15.65	14.9	10.11	17.31	16.43	13.9	14.26	14.53	1.99	14.40	14.37
Bank of Montreal	15.21	14.08	17.94	13.99	13.37	16.28	19.63	18.65	18.99	14.62	2.34	15.75	16.28
Royal Bank of Canada	18.3	15.72	19.36	16.47	15.96	16.89	15.88	18.61	23.35	24.86	3.21	17.60	18.54
The Bank of Nova Scotia	15.29	15.46	17.45	17.15	12.85	17.62	20.3	21.11	21.89	23.41	3.34	17.54	18.25
TransCanada Corporation	7.04	7.42	8.44	10.89	11.93	12.8	15.49	17.56	14.1	13.99	3.52	12.37	11.97
Yellow Pages Income Fund	...		...	...	...	0	3.61	5.69	7.98	9.08	3.63	5.69	5.27
National Bank of Canada	12.14	14.66	15.22	16.47	8.22	16.3	18.59	20.66	19.8	12.06	3.85	15.76	15.41
TransAlta Corporation	16.41	4.88	8.14	7.23	2.31	8.67	5.97	7.45	1.81	13.07	4.48	7.34	7.59
Sun Life Financial Inc.	0	2.84	10	12.23	9.14	9.06	11.84	12.6	13.58	14.02	4.65	10.92	9.53
MDS Inc.	11.14	13.71	11.65	6.01	8.09	5.04	4.65	2.87	2.12	-2.15	4.89	5.53	6.31
Uranium One Inc.	...	...	...	...	...	...	...	0	7.95	...	5.62	3.98	3.98
Canadian National Railway Company	2.83	12.11	13.58	11.86	8.7	11.2	18.76	18.75	21.88	21.58	6.09	12.85	14.13
Canadian Pacific Railway Limited	0	2.1	15.89	12.25	15.21	11.29	10.79	12.98	17.23	18.35	6.12	12.62	11.61
Enerplus Resources Fund	2.19	6.95	14.33	16.82	7.84	14.7	13.56	19.25	20.85	...	6.13	14.33	12.94
Cameco Corporation	2.43	3.72	-4.71	3.1	2.51	10.06	12.73	9.62	14.72	15.17	6.49	6.67	6.94
Loblaw Companies Limited	12.78	13.68	15.69	16.82	18.93	19.08	19.08	13.2	-3.87	6.01	7.19	14.69	13.14
Shoppers Drug Mart Corporation	...	0	2.45	1.96	13.76	14.96	15.77	16.04	16.53	16.96	7.19	14.96	10.94
TELUS Corporation	0	8.14	8.61	-2.25	-3.58	4.95	8.28	10.08	16.27	18.16	7.27	8.21	6.87
Petro-Canada	2.42	5.81	20.59	18.73	17.98	24.73	21.35	18.58	15.94	...	7.35	18.58	16.24
George Weston Limited	32.33	14.02	17.42	18.47	18.27	19.45	14.72	16.65	1.34	12.66	7.61	17.04	16.53
Penn West Energy Trust	9.78	15.18	29.87	24.9	13.16	29.85	15.4	28.29	18.09	...	7.78	18.09	20.50
Canadian Natural Resources Limited	4.76	12.63	30.62	19.71	13.04	25.62	20.91	13.5	...	...	8.25	16.61	17.60
Agnico-Eagle Mines Limited	-6.42	-10.44	-3.83	-4.44	3.5	-1.38	9.46	6.57	16.92	8.42	8.53	1.06	1.84
EnCana Corporation	5.68	12.24	29.36	32.23	13.71	21.34	17.28	18.66	30.18	20.35	8.54	19.51	20.10
Suncor Energy Inc.	12.88	9.72	15.21	13.79	23.54	27.76	23.34	22.58	39.4	27.54	8.92	22.96	21.58
The Toronto-Dominion Bank	14.9	31.96	8.89	11.3	-1.36	8.55	18.41	15.62	26.12	19.79	9.46	15.26	15.42
SNC-Lavalin Group Inc.	14.33	10.75	6.67	6.6	38.95	13.78	15.13	17.23	16.11	...	9.60	14.33	15.51
Barrick Gold Corporation	8.7	8.55	-21.35	6.1	4.15	2.63	-1.91	8.74	13.4	7.54	9.71	6.82	3.66
Canadian Imperial Bank of Commerce	10.5	10.02	20.75	16.39	5.22	19.15	19.3	-2.23	27.15	29.63	9.81	17.77	15.59
Canadian Oil Sands Trust	...	...	0	20.53	30.65	20.19	21.53	27.61	22.76	...	9.83	21.53	20.47
Imperial Oil Limited	12.94	13.51	32.42	28.43	25.1	30.61	33.92	40.14	43.36	...	10.50	30.61	28.94
Gildan Activewear Inc.	42.67	24.95	32.34	0.41	28.37	24.78	20.81	23	22.46	21.77	10.61	23.89	24.16
Shaw Communications Inc.	0.51	1.33	3.84	-6.6	-10.87	-3.33	2.03	5.69	23.73	20.43	10.91	1.68	3.68
Talisman Energy Inc.	-11.76	5.6	24.26	19.31	11.45	20.82	13.36	29.56	22.28	13.7	11.66	16.51	14.86
Brookfield Asset Management Inc.	10.06	9.8	8.41	6.35	1.42	12.12	19.25	40.7	22.91	...	11.74	10.06	14.56
Agrium Inc.	16.98	7.53	8.95	-7.08	-1.46	-4.04	27.43	24.54	2.74	20.39	12.25	8.24	9.60
Nexen Inc.	-8.42	3.87	34.68	24.44	19.24	24.51	29.52	20.36	13.91	21.2	12.58	20.78	18.33
BCE Inc.	44.93	38.14	4.99	14.79	13.6	15.31	12.34	14.52	14.72	28.95	12.75	14.76	20.23
Research In Motion Limited	6.15	5.07	-1.02	-3.2	-18.8	4.28	11.53	19.19	28.18	...	13.46	5.07	5.71
Potash Corporation of Saskatchewan In	11.15	-18.66	9.96	5.91	2.57	-6.21	13.7	24.03	25.72	25.08	14.29	10.56	9.33
Rogers Communications Inc.	0	0	13.58	-32.34	17.65	8.19	-2.16	-1.39	16.1	14.44	14.78	4.10	3.41
Goldcorp Inc.	-2.11	9.51	-14.11	37.18	25.87	23.04	9.46	16.09	5.29	2.95	14.84	9.49	11.32
Teck Cominco Limited	-3.75	3.13	5.14	-0.99	1.18	5.93	19.89	33.21	42.84	23.28	15.91	5.54	12.99
Bombardier Inc.	18.27	21.61	28.1	10.25	-21.49	-9.14	-5.45	5.46	9.63	...	15.93	9.63	6.36
Husky Energy Inc.	0	69.23	21.85	15.5	15.96	23.29	16.27	28.62	31.81	30.22	18.04	22.57	25.28
Inmet Mining Corporation	-6.37	15.35	3.36	7.5	1.57	52.91	17.8	26.53	49.1	33.88	20.16	16.58	20.16
Biovail Corporation	71.72	25.69	12.74	7.56	15.43	-3.19	4.02	7.28	16.07	15.04	20.69	13.89	17.24
Tim Hortons Inc.	...	...	...	...	...	...	0	36.02	49.08	26.68	20.77	31.35	27.95
Kinross Gold Corporation	-48.33	-42.02	-32.64	-13.36	-10.22	0.29	-4.07	-18.28	13.03	10.59	21.03	-11.79	-14.50
ACE Aviation Holdings Inc.	...	...	...	...	...	...	0	37.64	29.73	58.32	24.17	33.69	31.42
NOVA Chemicals Corporation	1.2	14.09	15.23	-10.24	-8.06	-0.07	15.82	-7.67	-79.66	42.14	31.63	0.57	-1.72
First Quantum Minerals Ltd.	-35.68	-0.42	26.15	-52.9	-7.59	6.5	23.27	65.13	66.49	41.28	39.46	14.89	13.22
Yamana Gold Inc.	-90.43	-14.14	-24.16	-124.35	-88.99	2.28	2.76	-1.73	-6.91	...	48.90	-14.14	-38.41
Nortel Networks Corporation	-7.22	-1.72	-14.54	-147.47	-73.33	3.94	-2.43	-107.94	2.94	-49.34	53.48	-10.88	-39.71
Lundin Mining Corporation	-36.21	-18.69	-177.32	4.09	-13.48	10.17	5.67	14.94	12.88	...	60.70	4.09	-21.99
Fording Canadian Coal Trust	...	...	...	...	0	47.47	57.03	239.47	138.04	104.28	84.25	80.66	97.72

APPENDIX C

APPENDIX C

DISCOUNTED CASH FLOW ESTIMATES FOR US UTILITIES

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 then 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 to get:

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

where 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,

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

which 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 Professor Emeritus of the University of Toronto Myron Gordon.

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)*. Note that while *K* is the return that investor's require, r is the actual return on equity (*ROE*) the firm is expected to earn.

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

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

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 <u>lower</u> 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 per share, <u>provided</u> 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 <u>same</u> 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, so the DCF estimate is particularly appropriate for use in determining the fair rate of return for a regulated utility. However, for non-regulated firms, 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.

In Schedule 3 is data for US utilities from the Standard and Poors Analyst's handbook.[2] The firms are those included in Schedule 5 and include the standard Electric and Gas utilities, plus recent additions in terms of multi-utilities, since 2000, and independent power producers and traders, since 2006. All of these activities used to be largely performed by integrated utilities,

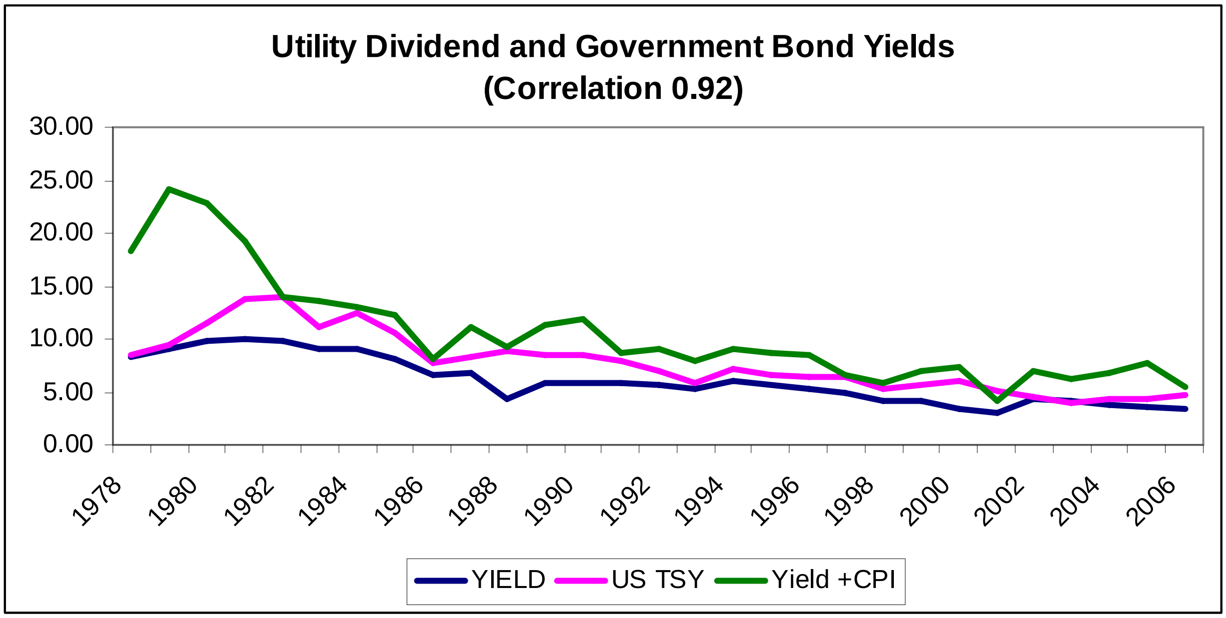
2 Equivalent data is not available for Canadian utilities

but the latter groups reflect the impact of deregulation, so for this reason Schedule 4 includes the data for traditional electric and gas utilities separately. Consequently they more accurately reflect the impact of regulated operations.

This basic data includes dividends, earnings, book value per share, average market values and the return on equity. From this it is possible to calculate several pieces of useful information. First, is the average payout of dividends, which is in the fourth column and its inverse, the retention rate. Clearly, utilities as low risk and low growth investments have relatively high payouts: in only one of the 28 years is the payout less than 50% and the average payout is 73%. This is biased high by the very large payout in 2002 when some utilities suffered serious problems. However, the median is still very high at 71%. Note that the payout tends to increase during recessions, such as those of the early 1990s and 2000s when earnings were depressed and dividends not cut proportionately. This indicates that US utilities are much more sensitive to the business cycle than Canadian utilities, which are only indirectly affected through changes in the long Canada bond yield.

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 following graph is of the yield on the ten year US government bond against the dividend yield of the overall S&P utilities index both with and without the CPI inflation rate. The dividend yield is positively related to the yield on US government bonds; in fact the correlation is 0.91. This indicates that income investors react in a similar way to utility stocks as to government bonds.

However, the average dividend yield on the utility stocks is 6.05%, whereas that on the US government bonds is 7.73%. The problem is that this difference ignores the fact that utilities are riskier than government bonds, while the latter offer no growth potential, since the nominal bond promises a fixed series of interest payments. To partially offset the lack of growth I also include the dividend yield grossed up by the average inflation rate for the year. This can be viewed as either comparing the dividend yield to the real yield on the US bond or as simply assuming that utility stocks are good hedges against inflation. In this case the grossed up dividend yield averages 10.52% for a utility risk premium of 2.79%. However, utility stocks do not necessarily increase with inflation since the bulk of their expenses are fixed in nominal terms.

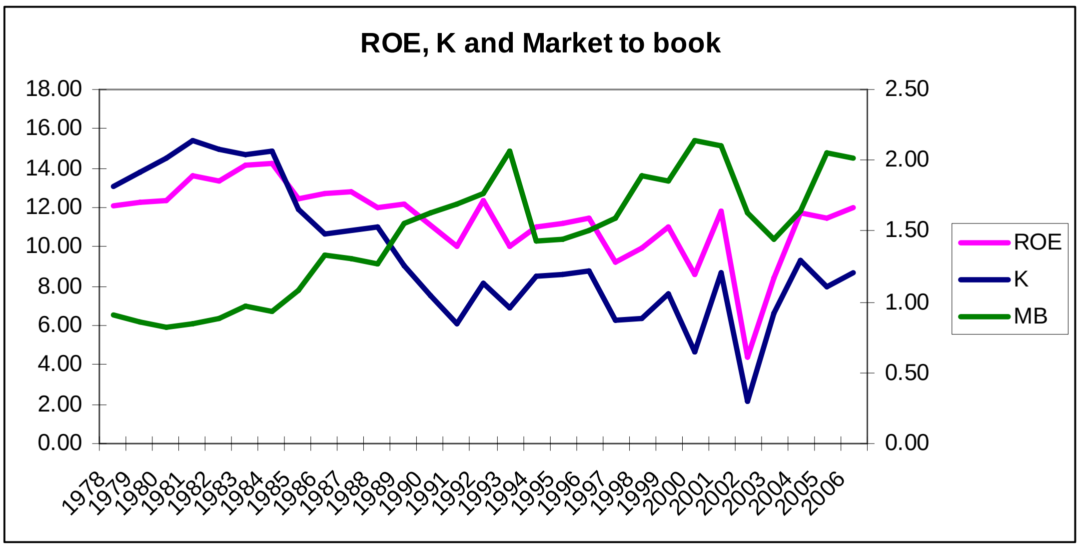


An alternative is to estimate utility growth rate by assuming that each year the utility is expected to earn its current ROE in the future so that its earnings will grow by the retention rate times this ROE. For example, in 1978 the retention rate was 36.87% and the ROE 12.09% implying future earnings growth of 4.46%. This is the *g (B*ROE)* in column 7. For 1978 the dividend yield for the S&P Utilities was 8.24% (column 8), so that the sum of the expected dividend yield plus this growth rate was 13.06%, which is the estimate of the required rate of return in column 10. In 1978 the average long US Treasury yield was 8.41% (10+ years) implying that the utility risk premium was 4.65%.

Column 11 gives the market to book ratio for these utilities, which in 1978 was 0.91, implying that at that time the utilities were not expected to earn their fair rate of return. During this period utilities were under significant pressure as inflation was rampant and most of these utilities were on historic test years. This implied significant regulatory lag that exposed utilities to inflation risk. Consequently this estimate is consistent with a market to book ratio marginally below 1.0

and an ROE less than the investor's required rate of return. Subsequently, two factors have largely removed this risk: the decline in inflation and the adoption of forward test years. It is not obvious that utility risk premiums were adjusted downwards as a result of the adoption of a forward test year[3] or the removal of this risk. However, we would expect to see a reduction in their risk premium as a result of the removal of these risks.

One way of testing this is to look at how the stock market reacted to the actual ROE and my estimate of the required rate of return, the standard way of doing this is to look at the market to book ratio, which is the average market price divided by the book value per share. This data is graphed in the following figure



Note that as just discussed in this earlier period utilities were under pressure, as can be seen from the fact that their actual ROEs were below my estimate of their fair ROE. This is confirmed by the fact that their market to book ratios were below 1.0. As my estimate of the required return (*K*) drops in the mid 1980s it falls below the actual ROE and the market to book ratio increases. This is consistent with basic financial theory and common sense, that when an investor receives more than they require they want more and bid up the stock price accordingly. Between 1978-

3 By applying the ROE to an average of the current and future shareholder's equity, the firm will over-earn unless the ROE applied to an historic test year is adjusted downward.

1984 the actual ROE averaged 13.14%, whereas my estimate of the required rate of return averaged 14.45%. The "under-earning" by these US utilities is apparent in an average market to book ratio of 0.89. In contrast, since 1985 these utilities have averaged an ROE of 10.81%, that is, a decrease of 2.33%, however, my estimate of the required rate of return fell even more by 6.42% to 8.03% so the market to book ratio increased substantially to an average of 1.65. In this case regulatory lag worked in favour of the utilities, since the ROE did not fall in line with the required or fair rate of return.[4]

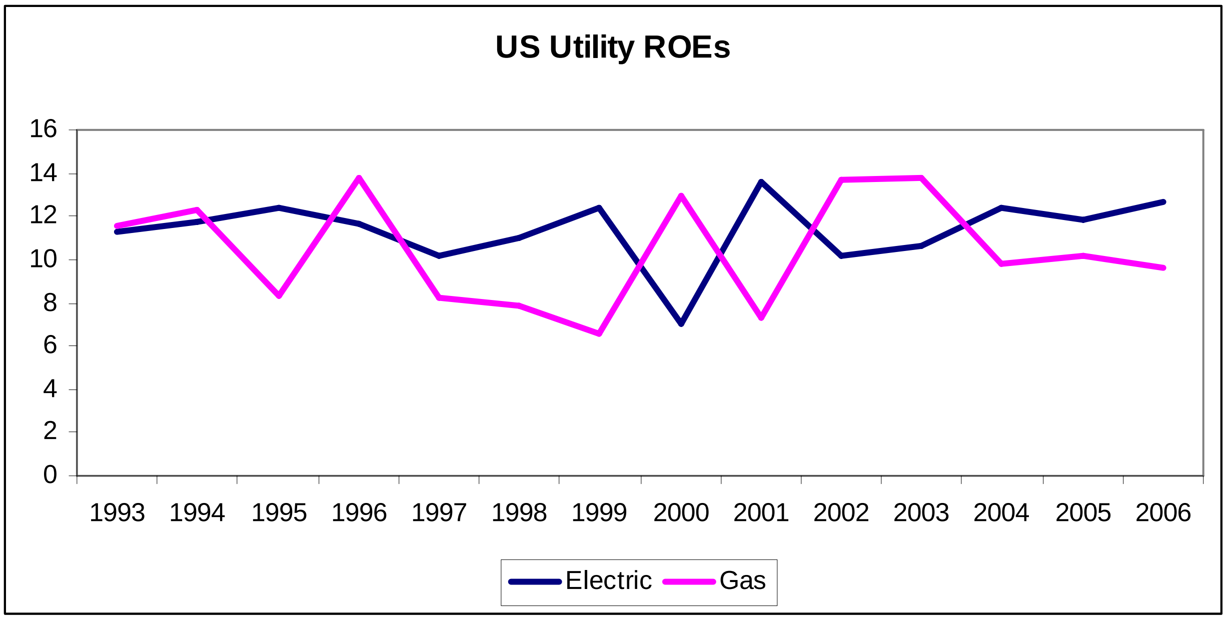
Over this whole period the average utility risk premium is 1.84% and the median 2.05%. However, the *br* growth rate is sensitive to the actual earnings which affect the retention rate and may not capture the full amount of growth expectations. To check for this the last two columns estimate the utility risk premium with two alternative growth expectations. URP2 assumes that the expected ROE is the long Treasury yield plus 5.0%, which avoids the problem of fluctuating earned returns. URP3 also assumes that the retention rate is a constant 28.8%, which is the median rate over the whole time period. In this way we avoid the problem of declining retention rates as earnings have been squeezed. These assumptions tend to be conservative. URP3 assumes a higher ROE than was often earned, while assuming a constant retention rate allows both the higher dividend yield from a higher payout, without penalising growth expectations. Both of these assumptions would tend to increase the estimate of the average utility risk premium. The average URP2 is 2.08% with a median value of 2.61% and the average URP3 is 2.23% with a median value of 2.26%.

One problem with the data in Schedule 3 is that it includes all firms classified as utilities by S&P, including some that had serious financial problems as a result of energy trading. In Schedule 4 is the same data for a smaller sample of Electric and Gas utilities since 1993. The data is obviously similar since Schedule 3 includes all the firms in Schedule 4. However, note that the retention rate is lower with a median value of 24% versus 29% for all the utilities in Schedule 3, and when the same time period 1993-2006 is used the retention rate for all utilities increases to 32%. As a result, the retention based growth rate would be lower for these gas and

4 It also reduced the incentive for utilities to request a rate hearing.

electric utilities than for all utilities. Using the same approach as before the risk premium for the electric utilities is 1.91%-2.58% based on the median values whereas it is 0.03-0.93% for the gas utilities. These estimates may be marginally low as for the last few years the retention rates for the electric utilities have increased, possibly due to their significant investment programs.[5]

The reason for the low estimate for the gas utilities is their highly variable ROE possibly reflecting the weather impact on demand and the more limited number of firms. The following graphs the average ROE for the electric and gas utilities over this period.



Both the ROEs of the gas and the electric utilities are relatively stable, but the standard deviation of the electrics' ROE is 1.58% versus 2.58% for the gas utilities, so I discount the results for the gas utilities as being less reliable.

From the data in Schedules 3 and 4, I derive the following conclusions:

- Risk premiums of the order of 2.05%-2.61% for a typical US utility over ten year US government bond yields for the period 1978-2006 seems reasonable.
- For the more stable US electric utilities the risk premium for the period 1993-2006 is

5 Market to books have also increased, possibly for this same reason.

similar at 1.91-2.58%.

- Overall a US risk premium over ten year government bond yields seems to be in the 2.0-2.6% range. To this would be added a small flotation cost allowance for financial flexibility of the order of 0.50%.
- This range of risk premiums would be higher than that needed for Canadian utilities, all else constant, since the risk premium in Canada is estimated over the 30 year Canada bond yield, which is normally higher than the ten year yield by 10-60 basis points. The Canadian utilities also seem to have more regulatory protection.

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%

S&P US Utility Data

	EPS	DPS	PAYOUT	RETAIN	ROE	g (B*ROE)	YIELD	US TSY	K	MB	URP	URP2	URP3
1978	6.7	4.23	63.13	36.87	12.09	4.46	8.24	8.41	13.06	0.91	4.65	5.18	4.01
1979	6.99	4.53	64.81	35.19	12.23	4.31	9.06	9.44	13.76	0.86	4.31	5.16	4.16
1980	7.25	4.8	66.21	33.79	12.38	4.18	9.87	11.46	14.47	0.82	3.01	4.52	3.62
1981	8.22	5.24	63.75	36.25	13.57	4.92	10.01	13.84	15.42	0.84	1.58	3.68	2.15
1982	8.42	5.52	65.56	34.44	13.38	4.61	9.86	13.91	14.92	0.88	1.01	3.10	1.94
1983	9.28	5.9	63.58	36.42	14.13	5.15	9.04	11.11	14.65	0.97	3.55	4.33	3.00
1984	10.11	6.33	62.61	37.39	14.19	5.31	9.08	12.44	14.87	0.93	2.43	3.76	2.13
1985	9.47	6.74	71.17	28.83	12.40	3.58	8.03	10.62	11.89	1.08	1.26	2.27	2.27
1986	10.08	7.03	69.74	30.26	12.73	3.85	6.56	7.68	10.67	1.33	2.99	2.97	2.78
1987	10.42	7.42	71.21	28.79	12.77	3.68	6.88	8.38	10.80	1.31	2.42	2.61	2.61
1988	10.07	4.65	46.18	53.82	12.00	6.46	4.31	8.85	11.05	1.27	2.20	3.24	-0.37
1989	10.41	7.88	75.70	24.30	12.15	2.95	5.89	8.50	9.02	1.55	0.52	0.87	1.51
1990	9.63	8.27	85.88	14.12	11.11	1.57	5.86	8.55	7.52	1.62	-1.03	-0.67	1.44
1991	8.65	8.43	97.46	2.54	10.03	0.26	5.84	7.86	6.11	1.69	-1.75	-1.67	1.91
1992	10.48	8.49	81.01	18.99	12.33	2.34	5.71	7.01	8.18	1.76	1.17	1.11	2.36
1993	7.63	6.49	85.06	14.94	9.99	1.49	5.34	5.87	6.92	2.07	1.04	1.18	2.77
1994	8.23	6.5	78.98	21.02	11.02	2.32	6.05	7.08	8.51	1.43	1.43	1.66	2.67
1995	8.58	6.48	75.52	24.48	11.17	2.73	5.74	6.58	8.63	1.44	2.05	2.16	2.69
1996	9.18	6.54	71.24	28.76	11.48	3.30	5.31	6.44	8.79	1.51	2.35	2.34	2.35
1997	7.55	6.48	85.83	14.17	9.19	1.30	4.94	6.35	6.30	1.59	-0.05	0.27	2.02
1998	8.19	6.39	78.02	21.98	9.95	2.19	4.12	5.26	6.39	1.90	1.13	1.20	1.93
1999	9.03	6.23	68.99	31.01	11.00	3.41	4.09	5.64	7.64	1.85	2.01	1.89	1.65
2000	7.12	6.14	86.24	13.76	8.60	1.18	3.45	6.03	4.67	2.14	-1.36	-1.01	0.71
2001	9.79	5.21	53.22	46.78	11.84	5.54	3.01	5.02	8.72	2.10	3.70	2.82	0.97
2002	3.36	4.97	147.92	-47.92	4.40	-2.11	4.33	4.61	2.13	1.62	-2.48	-5.08	2.61
2003	5.97	4.27	71.52	28.48	8.44	2.40	4.16	4.02	6.67	1.45	2.65	2.82	2.86
2004	8.75	4.8	54.86	45.14	11.77	5.31	3.76	4.27	9.27	1.64	5.00	3.83	2.26
2005	8.8	5.5	62.50	37.50	11.48	4.30	3.56	4.29	8.01	2.05	3.72	2.87	2.04
2006	10.15	5.81	57.24	42.76	12.02	5.14	3.41	4.79	8.73	2.02	3.94	2.95	1.54
Average			**73.28**	**26.72**	**11.37**	**3.31**	**6.05**	**7.73**	**9.58**	**1.47**	**1.84**	**2.08**	**2.23**
Median			**71.17**	**28.83**	**11.84**	**3.58**	**5.74**	**7.08**	**8.73**	**1.51**	**2.05**	**2.61**	**2.26**

URP assumes actual br growth, URP2 assumes that the expected ROE is the Treasury yield plus 5.0% and URP3 also assumes retention at the median retention rate. Source data is from Standard & Poors Analyst's Handbook 2007 and 2000 editions.

SCHEDULE 4

S&P Gas and Electric Utility Data

ELECTRIC	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	5.87	6.99	1.59	1.11	1.07	2.63
1994	8.45	7.05	83.43	16.57	11.71	1.94	6.55	7.08	8.62	1.37	1.54	1.61	2.58
1995	9.23	6.97	75.51	24.49	12.36	3.03	6.23	6.58	9.45	1.39	2.87	2.66	2.62
1996	9.07	6.96	76.74	23.26	11.64	2.71	5.86	6.44	8.73	1.43	2.29	2.24	2.35
1997	7.63	6.64	87.02	12.98	10.16	1.32	5.49	6.35	6.88	1.49	0.53	0.69	2.03
1998	8.52	6.5	76.20	23.80	11.05	2.63	4.45	5.26	7.19	1.82	1.93	1.73	1.77
1999	9.31	6.24	67.02	32.98	12.36	4.08	4.60	5.64	8.87	1.69	3.23	2.64	1.65
2000	6.06	6.36	104.95	-4.95	7.04	-0.35	4.40	6.03	4.04	1.80	-1.99	-2.20	1.15
2001	10.58	5.42	51.23	48.77	13.63	6.65	3.41	5.02	10.28	1.88	5.26	3.44	0.89
2002	7.31	5.93	81.12	18.88	10.18	1.92	4.82	4.61	6.83	1.63	2.22	2.11	2.64
2003	8.44	5.29	62.68	37.32	10.61	3.96	4.31	4.02	8.44	1.51	4.43	3.81	2.57
2004	11.12	5.77	51.89	48.11	12.37	5.95	3.74	4.27	9.91	1.68	5.64	4.09	1.79
2005	10.22	6.85	67.03	32.97	11.86	3.91	3.69	4.29	7.75	2.04	3.46	2.58	1.73
2006	12.35	6.99	56.60	43.40	12.68	5.50	3.37	4.79	9.06	2.13	4.27	2.97	1.02
average			**73.63**	**26.37**	**11.35**	**3.17**				**1.68**	**2.63**	**2.10**	**1.96**
Median			**75.86**	**24.14**	**11.68**	**2.87**				**1.66**	**2.58**	**2.41**	**1.91**
GAS													
1993	6.11	3.43	56.14	43.86	11.55	5.07	3.15	5.87	8.37	1.93	2.50	2.19	0.03
1994	7.21	3.82	52.98	47.02	12.29	5.78	3.57	7.08	9.56	1.78	2.48	2.38	-0.43
1995	5.25	4.02	76.57	23.43	8.28	1.94	3.45	6.58	5.45	1.75	-1.13	-0.33	-0.18
1996	9.75	4.36	44.72	55.28	13.75	7.60	2.78	6.44	10.59	2.14	4.15	2.84	-0.77
1997	6.25	5.01	80.16	19.84	8.19	1.62	2.74	6.35	4.41	2.15	-1.94	-1.30	-0.74
1998	5.89	5.36	91.00	9.00	7.85	0.71	2.69	5.26	3.41	2.32	-1.85	-1.63	0.02
1999	7.4	9.34	126.22	-26.22	6.57	-1.72	3.84	5.64	2.05	1.99	-3.59	-4.70	0.92
2000	18.7	8.43	45.08	54.92	12.96	7.12	2.61	6.03	9.91	2.18	3.88	2.80	-0.63
2001	9.87	8.16	82.67	17.33	7.33	1.27	2.47	5.02	3.77	2.38	-1.25	-0.77	-0.02
2002	13.45	8.58	63.79	36.21	13.69	4.96	4.01	4.61	9.17	2.15	4.56	3.02	1.86
2003	14.77	7.23	48.95	51.05	13.82	7.06	4.24	4.02	11.59	1.57	7.58	5.02	2.54
2004	13.37	9.92	74.20	25.80	9.84	2.54	4.99	4.27	7.66	1.43	3.38	3.23	3.12
2005	10.42	19.06	182.92	-82.92	10.14	-8.41	9.05	4.29	-0.12	2.03	-4.41	-3.64	7.26
2006	8.26	8.89	107.63	-7.63	9.59	-0.73	3.94	4.79	3.18	2.62	-1.61	-1.63	1.65
average			**80.93**	**19.07**	**10.42**	**2.49**				**2.03**	**0.91**	**0.54**	**1.04**
Median			**75.38**	**24.62**	**9.99**	**2.24**				**2.09**	**0.68**	**0.93**	**0.03**

Standard and Poors Utility Index (5510)

Utilities (5510)
- **Electric Utilities (551010)**
  - **Electric Utilities (55101010)**
    - Allegheny Energy (AYE)
    - American Electric Power (AEP)
    - Edison Int'l (EIX)
    - Entergy Corp. (ETR)
    - Exelon Corp. (EXC)
    - FirstEnergy Corp. (FE)
    - FPL Group (FPL)
    - Pinnacle West Capital (PNW)
    - PPL Corp. (PPL)
    - Progress Energy, Inc. (PGN)
    - Southern Co. (SO)
- **Gas Utilities (551020)**
  - **Gas Utilities (55102010)**
    - NICOR Inc. (GAS)
    - Peoples Energy (PGL)
    - Questar Corp. (STR)
- **Multi-Utilities (551030)**
  - **Multi-Utilities (55103010)**
    - Ameren Corporation (AEE)
    - CenterPoint Energy (CNP)
    - CMS Energy (CMS)
    - Consolidated Edison (ED)
    - Dominion Resources (D)
    - DTE Energy Co. (DTE)
    - Duke Energy (DUK)
    - Keyspan Energy (KSE)
    - NiSource Inc. (NI)
    - PG&E Corp. (PCG)
    - Public Serv. Enterprise Inc. (PEG)
    - Sempra Energy (SRE)
    - TECO Energy (TE)
    - Xcel Energy Inc (XEL)
- **Water Utilities (551040)**
  - **Water Utilities (55104010)**
- **Independent Power Producers & Energy Traders (551050)**
  - **Independent Power Producers & Energy Traders (55105010)**
    - AES Corp. (AES)
    - Constellation Energy Group (CEG)
    - Dynegy Inc. (New) Class A (DYN)
    - TXU Corp. (TXU)

APPENDIX D

APPENDIX D

INTERNATIONALISATION AND ITS IMPACT ON THE MARKET RISK PREMIUM

I: The Trend in International Investment

We are much more aware of international investment opportunities now than say twenty years ago. The world used to be characterized by currency restrictions, investment controls and very limited international investing opportunities. Now most currencies are freely convertible, investment restrictions have been removed and there has been an increase in the coverage of international stocks among investment advisors. This latter coverage has been enhanced by international collaboration between investment banks and the growth of some major international investment banks.

These changes have been mirrored in Canada's international investment position. In Schedule 1 is a graph of the inbound and outbound investment in Canada by both direct foreign investment (FDI) and investment in stocks (portfolio investment). FDI consists of investment by corporations in foreign assets, whereas portfolio investment is investment by institutions and individuals in foreign securities. In both cases, the investment involves claims on foreign income, but only FDI involves control. For both series investment has been deflated by dividing through by nominal gross domestic product (GDP). The data is that tracked by Statistics Canada since 1990. Several conclusions are obvious:

- There has been increasing international investment both in and out of Canada since 1990;
- FDI is significantly more important than portfolio investment, normally of the order of 2-3X as large;
- The importance of foreign portfolio investment has increased proportionately more than FDI,
- All values for international investment both in and out of Canada have fallen off from the peaks in the early 2000s, except inbound FDI which witnessed a surge in 2006/7 as major companies like Stelco, Falconbridge, Inco, etc were purchased by foreign acquirers.

The data underlying schedule 1 clearly indicate that Canadians are investing more abroad. With the removal of the 30% restriction on foreign investment in tax advantaged pension plans (including RRSPS) this trend should increase despite the drop off from the highs of several years go. However, it is of interest to see where this investment has gone. Schedule 2 graphs the share of outward investment going to the US and elsewhere, whereas the graph in Schedule 3 tracks the inward share from the US. Again there are several conclusions:

- For outward investment in 1990 over 60% of FDI and 80% of Canadian portfolio investment was going to the US;
- The trend since then has been for the US to lose its share of outward Canadian investment;
- By 2007 the US share of Canadian outward portfolio investment was barely 50%, whereas the US FDI share had dropped significantly below 50%;
- For inward investment the picture is completely different; the US remains by far the dominant investor with 90% of portfolio investment in Canadian stocks and still almost 60% of inward FDI despite the prominent non-US acquirers in 2007.

The picture that emerges from looking at the composition of Canadian FDI and portfolio investment in stocks is that Canadian investors have diversified away quite dramatically from the reliance on the US that was typical in 1990. If an external risk return yardstick is relevant it is clear from the data that this is no longer the US. In contrast, Canada seems to have trouble attracting interest from non-US investors. However, what is clear is that the internationalisation of the world's capital markets is affecting Canadian investors and there is a more global perspective than prior to 2000.

II: The Impact of Internationalisation on the Required Rate of Return

If markets are increasingly becoming global, or international, the key question is: how is the risk return trade-off and the market risk premium affected? To understand this we have to understand that there are several effects at work.[1] First, prices are determined by a different set of investors,

1 1 R. Cohn and J. Pringle, "Imperfections in International Financial Markets: Implications for Risk and the Cost of Capital to Firms," *Journal of Finance,* March 1973, pp 59-66, is the classic reference.

it is no longer purely Canadian investors that are determining the prices of Canadian securities and vice versa for the US and elsewhere. Cohn and Pringle show that for normal utility functions describing investor behaviour, the price of risk will fall as markets become more integrated. Second, all stocks become less risky. This is because purely domestic factors get diversified away in an international portfolio and as a result, the total market risk is smaller.[2] This means, for example, that if a cabinet minister resigns in disgrace in the UK and the UK market is off 3%, an internationally diversified portfolio would be much less affected. This is a domestic risk that would be priced in a domestic portfolio, but not an internationally diversified portfolio. In the limit, as portfolios become internationally diversified, they become much less risky. Finally, the systematic component of risk should also fall as markets become more international. As a result, holding everything else constant, the market risk premium for an internationally diversified portfolio is much smaller than for the same securities held by their respective domestic investors alone.

Cohn and Pringle summarise the above three components with the statement (page 111)

> "These two effects both operate in the direction of reducing the required return E(Rt) and concomitantly raising the price of individual securities.

Further they conclude (page 116)

> "The relatively high ex post returns provided by internationally diversified portfolios of securities may well be related to market imperfections. If current restrictions on international capital flows, to say nothing of other market imperfections, were removed, returns on internationally diversified portfolios would be expected to decline relative to the risk-free rate of interest. More importantly, the equilibrium rate of exchange of risk and return should decline for most countries, non-diversifiable risk should decline for most projects, and the resulting reduction in the risk premium component of the cost of capital to firms should improve the efficiency of real capital allocation."

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[2] B. Solnick, "The Advantages of International Diversification", *Financial Analyst's Journal*, July-August 1974, showed that an internationally diversified portfolio was about half as risky as a simple US diversified portfolio.

As the quote from Cohn and Pringle indicates financial theory tells us that investors should diversify internationally. The reason for this is **not** that returns are necessarily higher, since the returns are themselves determined by investors buying the shares. Instead the motivation is that the risks are lower. The action of investors diversifying internationally will then push up share prices, causing higher short run returns, but once the new higher level of stock prices is determined equilibrium expected returns are then lower. This is the same phenomenon that occurs when market interest rates fall. In this case, the returns to higher coupon bonds go up, until their price increases, such that their expected returns are lower to reflect the lower market interest rates.

It is important to note that financial theory indicates that risk premiums ***decline*** as portfolios are internationally diversified: they do not increase. In particular, as Canadian and foreign investors diversify internationally, there is no reason to believe that the Canadian risk premium will increase. In fact, except for pathological cases, this is flatly contradicted by financial theory. Further, the above conclusions point out that the evidence on the realised US market risk premium is also biased high, since US investors will no longer have to bear a large part of the US market risk, since it is unique to the US. Consequently this risk will be diversified away in an internationally diversified portfolio causing US risk premiums to fall.[3] Because capital markets are becoming more diversified internationally, it follows that the market risk premium in the future will be lower than the historic estimates from any and all national markets.

An example may help the above intuition. The expected return on the market as a whole is determined by the capital market line:

$$E(R_m) = R_F + MPR\sigma^2$$

where the expected return on the market is equal to the risk free rate plus the market price of risk (*MPR*) times the variance of the market portfolio. In contrast to the pricing of securities, the relevant measure of risk for the market as a whole is the variance of its rate of return or its

[3] There is also an obvious "survivor bias" to U.S. equity returns, since the emergence of the U.S. as the dominant superpower was no means expected at the time that most U.S. data series start.

dispersion. The market risk premium is then just the

$$E(R_m) - R_F = MPR * \sigma^2$$

or the market price of risk times the variance or risk of the overall market. As Cohn and Pringle indicate the *MPR* should fall as markets become more global, but for convenience I will ignore this.

For the US we can infer the average pricing of risk from the fact that since 1926 (Appendix F) the realized market risk premium has been 6.43% and the standard deviation of the annual rates of return 19.96%. Hence, if these were the values that investors expected, the US market price of risk was

$$MPR_{US} = \frac{E(R_m) - R_F}{\sigma^2} = \frac{.0643}{.03984} = 1.61$$

If we use the same data for Canada we get

$$MPR_{CAN} = \frac{E(R_m) - R_F}{\sigma^2} = \frac{.0518}{.03371} = 1.54$$

The above estimates indicate that the realized market risk premium in Canada has been lower than we would expect simply from the lower risk of the Canadian market or conversely that the Canadian market price of risk has been lower. There are good reasons for this result due mainly to the known institutional features in Canada and the fact that the size of the US market risk premium is one of the most celebrated “puzzles” in financial economics. However, for convenience I will assume that the true market price of risk is 1.5 and that the actual estimates simply reflect estimation error.

If we assume that the Canadian and US markets are completely segmented and then suddenly open up and become integrated, we can solve for what might happen to the market risk premium.[4] We can then determine a new risk premium for Canada as follows:

$$WorldMRP * \beta_C$$

For the world market risk premium we can estimate the variance of the new combined US-Canada capital market:

$$\sigma^2 = \left(\frac{V_{US}}{V_C + V_{US}}\right)^2 0.1996^2 + \left(\frac{V_C}{V_C + V_{US}}\right)^2 0.1836^2 + 2 * \rho * \left(\frac{V_{US}}{V_C + V_{US}}\right)\left(\frac{V_C}{V_C + V_{US}}\right) 0.1996 * 0.1836$$

This is simply the variance of a portfolio of two securities with correlation ρ.

If we assume the correlation between the US and Canadian markets is 0.85 and the values of the US and Canadian markets are 10 to 1 based on approximate GDP and size differences, then the standard deviation of the new integrated market portfolio is 19.6%. If the new market price of risk stays at 1.5 then the new world market risk premium is 5.75%.

As might be expected by merging the US and Canadian markets, with a constant market price of risk the new market risk premium is in between the US 6.43% and the Canadian 5.18%, with the US market assumed to be ten times larger the new average is closer to the US than the Canadian value. However, what is not obvious is the impact of the correlation coefficient. If the markets are perfectly correlated, because for example the underlying real economies are already integrated and both stock markets respond to the same phenomena, even if segmented, then the market risk premium would be 5.9%. In contrast if the markets are totally uncorrelated then the new risk premium would be 4.98%. Clearly the less correlated the two markets then the lower the market risk premium of the new integrated market. But the market risk premium for the new market integrated will be in between that of the US and Canada.

4 Obviously this is a simplification since there have always been capital flows between the US and Canada

In Schedule 4 is a graph of the correlation coefficient estimated over the prior ten year market returns for the US and Canada.[5] This correlation is estimated both with and without foreign exchange risk. What is clear is that the US and Canadian markets used to be very highly correlated. A correlation coefficient of 0.90, as was common up until the early 1970s, indicates that the markets were highly correlated. It is for this reason that standard investment advice was to diversify in markets other than the US! After the oil price shocks of the early 1970s this high correlation between the US and Canadian equity markets started to break down and there has subsequently been a long downward trend in the correlation between the two markets, punctuated by periodic declines such as the huge decline in the late 1990s due largely to the internet bubble. Going forward it is difficult to see why the correlation coefficient would increase particularly as the Canadian market is becoming a "petrocurrency" again due to the recent increases in raw material prices. I will therefore use a value of 0.60. This would put the integrated market risk premium at 5.5%, lower than that in the US but higher than that in Canada.

For the Canadian market risk premium we need the Canadian beta with respect to this new integrated market risk premium. This can be calculated as

$$\beta = \left(\frac{V_C}{V_C + V_{US}}\right) + \left(\frac{V_{US}}{V_C + V_{US}}\right)\rho * \frac{\sigma_C}{\sigma_W}$$

Where the first value is the weight on the Canadian market, assumed to be (1/11), and the second that on the US, assumed to be (10/11).[6] The intuition of the new beta is simply that the first term indicates the exposure to the Canadian part of the new market index and the second is the exposure to the US part. Using the previous values for the risk of the Canadian and world markets the Canadian market beta is 0.59 and the Canadian market risk premium 0.59*5.5% or

5 The correlation is based on non foreign exchange adjusted returns, adding in exchange fluctuations would tend to lower the correlation coefficient.

6 This also assumes that these weights do not change, that is the values of the US and Canadian markets change in the same proportion.

3.26%, for a decrease of about 1.92% compared to what it was as a segmented market. Conversely the US beta with respect to the new integrated market is close to 1.0, since most of the new market is simply the US, but due to the decline in the integrated market risk premium the US market risk premium also declines.

The above example highlights the key theoretical result that market risk premiums normally decline when markets are integrated. How much the market risk premium is affected depends on the relative size and risk in the two markets and how correlated they are. In the extreme case where the Canadian and US markets are uncorrelated, then the Canadian market risk premium drops to less than 0.45%. The gains mainly flow to Canadian investors, since it is the smaller market and US investors do not benefit from the same diversification gains as Canadian investors. Conversely in the pathological case where the markets are perfectly correlated, the Canadian market risk premium increases to 5.5%. In this case, Canadian risk is now measured relative to a riskier market portfolio whereas US risk is measured relative to a less risky one. But of course the US and Canadian markets are not and have never been perfectly correlated, since the composition of the markets is different and there are different systemic political and economic factors at work.

When we add in the tendency for the market price of risk to also fall on the integration of markets, it is clear that financial theory indicates that the Canadian market risk premium falls as Canadians invest abroad and capital markets become globalised. Except in pathological cases ***it runs counter to financial theory to increase the Canadian market risk premium to account for the gains that Canadians realise by investing internationally.*** It is more appropriate to reduce both the Canadian and the U.S. market risk premium estimates to account for international diversification.

III Actual Market Integration

The prior discussion is a stylised discussion of what happens when capital markets become globalised and more integrated. However, I place no emphasis on this discussion except to point out the obvious fact that market risk premiums tend to fall as markets get more integrated and not increase, and that, all else constant, the historic results from both the US and Canada ***over estimate*** current risk premiums. This last point is even stronger than indicated from the prior discussion, since Canadians are diversifying into markets other than the US, where the correlation is even lower than with the US market. Consequently the effect of declining market risk premiums is stronger.

However, in my judgment markets will never become completely integrated just as they have never been completely segmented. We are already seeing the North American Free Trade Agreement becoming a political football in the US presidential elections and there is no guarantee that the US will continue to allow foreign investment and control of its industries to pass to non-residents.[7] If the US lurches towards protectionism it is likely to ripple through to other countries as well.

In my judgment the true description is that the Canadian market has been and will continue to be partially segmented from both the US and other capital markets. This is because Canadian stocks will always remain the cornerstone of any Canadian portfolio for several reasons:

i. First, most investment portfolios are for retirement purposes and will normally involve Canadian dollar living expenses. Consequently, foreign stocks are inherently riskier, since they involve additional foreign exchange risk. The recent increase in the value of the Canadian dollar, for example, has hurt investors investing in the US;

ii. Second, the direct purchase of foreign securities involves relying on foreign securities law, since the Ontario Securities Commission, for example, only regulates information flows to securities sold to residents of Ontario.

iii. Third, the purchase of foreign securities is generally more expensive, since transactions costs, brokerage fees etc, are generally higher since trades frequently go through a domestic and a foreign broker.

7 The investments by sovereign wealth funds into Citigroup and Merril Lynch have raised concerns of foreign influence over US financial institutions while the award of a refuelling contract to Airbus over Boeing has raised all sorts of protectionist cries in Congress.

iv. Fourth, evaluating foreign securities is inherently more complex since accounting standards differ across countries: one dollar earnings per share or a 10% return on equity can mean a variety of different things, depending on whether it is for a German, American or Canadian company.[8] As a result, it is very difficult to work out whether Manulife, for example, is more profitable than Metropolitan Life.[9]

v. Finally, there are a variety of legal and tax impediments to foreign investing and there is always the lingering fear that foreign investors will be treated differently than local investors in the event of serious financial troubles.

The above barriers are all getting smaller. The cross listing of securities, creation of ADRs (American Depository Receipts),and ETFs (exchange traded funds), multilateral jurisdictional disclosure (MJDS) in terms of issue procedures, the normalisation of international accounting standards, and the acceptance of foreign disclosure rules for domestic sale of securities have all served to weaken the barriers to international investment. However, other tax restrictions remain, and are unlikely to be reduced any time soon, since they are frequently enshrined in bilateral tax treaties that take years to negotiate. The result is that the Canadian market will always be partially segmented from world markets in general and the US market in particular. The result is what some financial economists call the "home bias" to investment portfolios: residents of all countries have a disproportionate amount of their wealth invested in their domestic market.

This means that Canadian investors look to foreign securities simply to fill the "holes" in their Canadian stock portfolios. As is well known, the TSE300 is now heavily weighted towards financials and resource stocks (and more recently technology stocks through Nortel), which reflects their importance in the Canadian economy, and is correspondingly under-weighted in other areas. Canadian investors therefore should seek out the stocks for which there are no good domestic substitutes. It may make more sense to buy a Merck than a US pipeline or utility stock. This is because we have several first tier Canadian utility and pipeline stocks, but we have relatively few quality pharmaceutical stocks. When we add in tax preferences, Canadian investors should be investing in the tax advantaged stocks of firms that represent economic

[8] For example in Manulife's initial public offering in the fall of 1999, its Canadian dollar earnings, according to Canadian generally accepted accounting principles (GAAP), were about 50% higher than its Canadian dollar earnings calculated according to US. GAAP.

[9] This difference in GAAP also explains why US return on equity data cannot be easily compared with that for Canadian companies, unless there is reconciliation for the differences in GAAP.

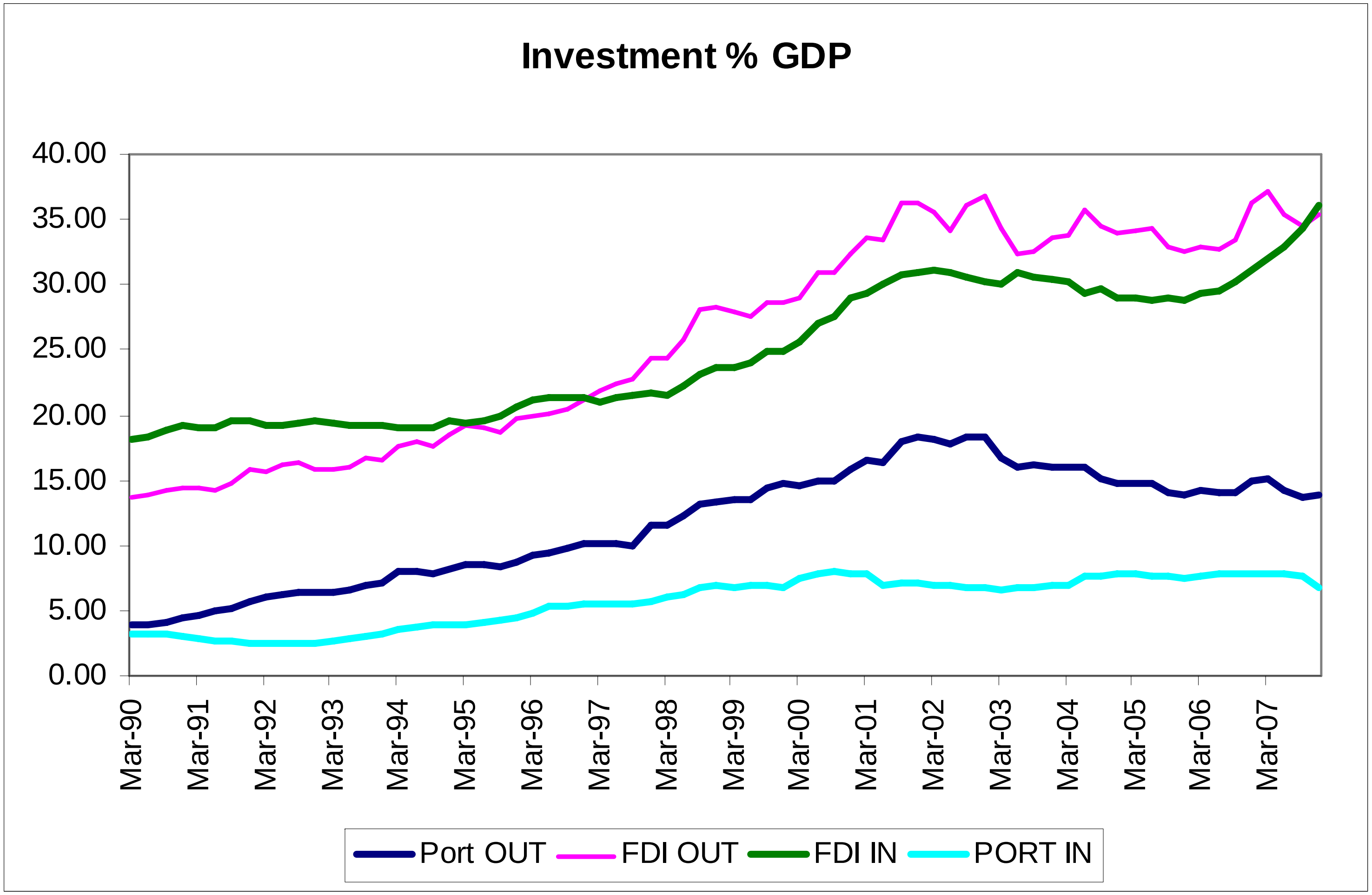
activity not available in Canada.[10]

The chief tax impediments are withholding taxes and the impact of the dividend tax credit system. As investment income flows across national boundaries there are usually taxes levied "at the border" in lieu of the income taxes that would have been paid if the foreign investor had been a resident. These withholding taxes differ according to the bilateral tax treaty and whether the income is dividends or interest. As a result, it makes sense for foreign investors to buy capital gains, rather than dividend oriented stocks. This conclusion is particularly relevant for Canadians, since the federal government allows a dividend tax credit for dividends paid by Canadian companies to partially compensate for the double taxation of equity income at both the corporate and individual level. Schedule 5 gives a table that indicates the different composition of the Canadian versus the world market portfolio as of March 2000 estimated by Morgan Stanley.

These effects have a direct impact on utilities. Why would a Canadian investor, for example, sell Canadian utilities to buy shares in a US utility, when they can buy shares in a Canadian one, be protected by the OSC's disclosure rules, make direct comparisons of its financial statements with other Canadian firms and receive a significant tax advantage as well? In my view the continued relaxation of international investment barriers will lead to the diversification of Canadian investment portfolios, but this will not lead to significant selling pressure on tax advantaged Canadian stocks, like utilities. As a result, I can see almost no impact of international diversification trends for the utility and pipeline sector's fair ROE except for the tendency for the overall market risk premium to decline.

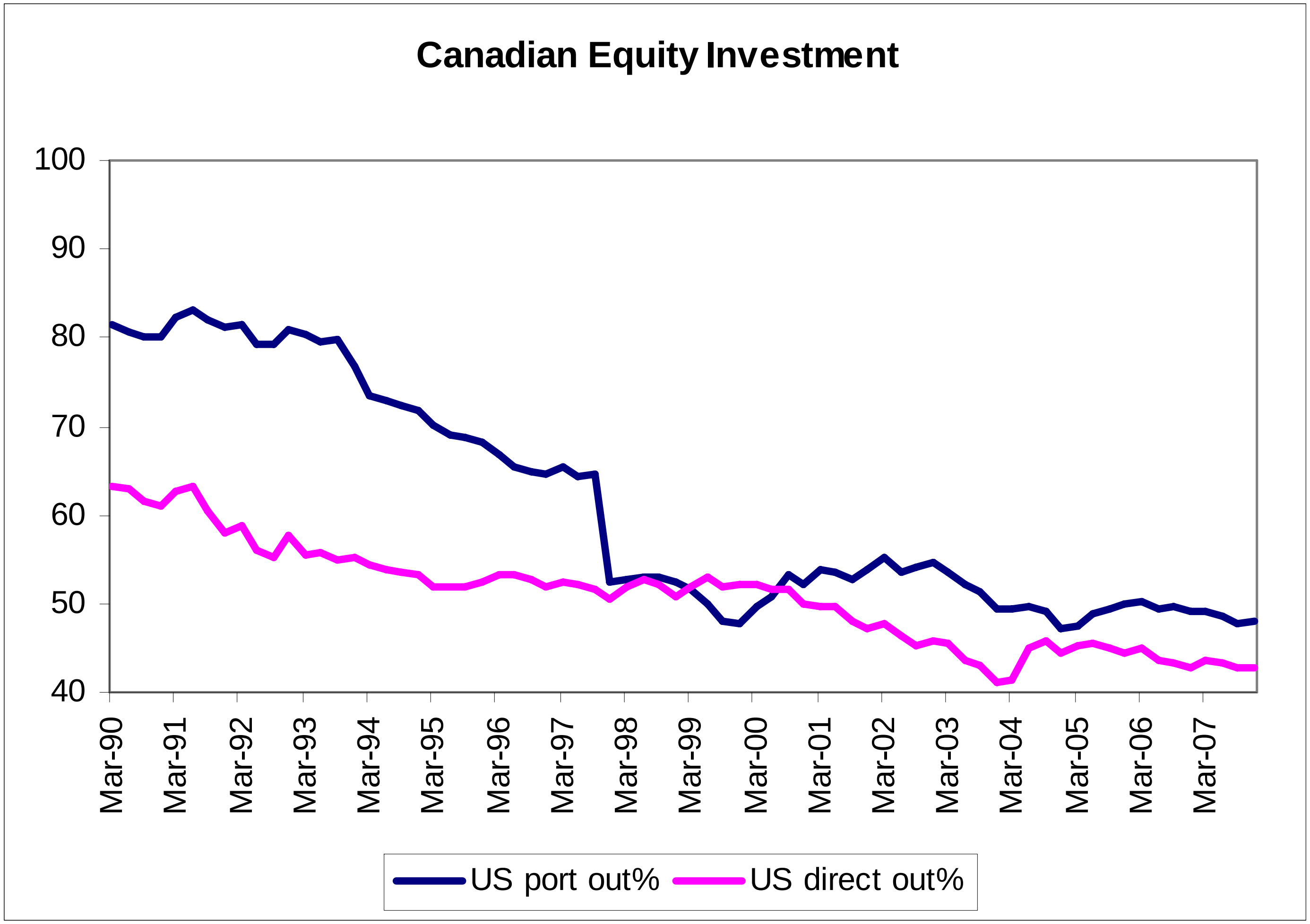
[10] Tax advantaged primarily means high dividend paying stocks. These arguments were first made by Laurence Booth, "The Dividend Tax Credit and Canadian Ownership Objectives" *Canadian Journal of Economics*, May 1987.

Schedule 1



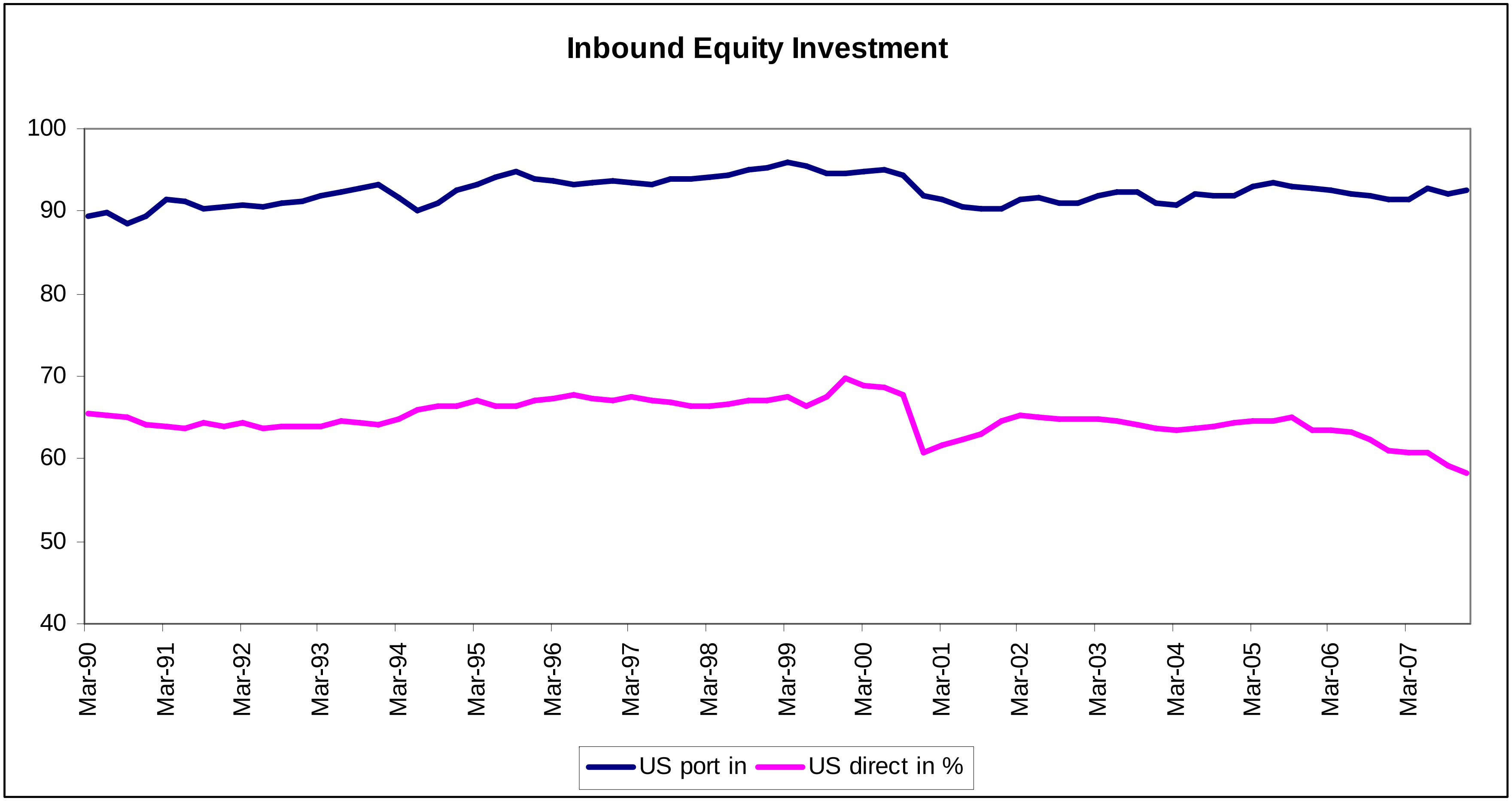
Investment % GDP
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Mar-90
Mar-91
Mar-92
Mar-93
Mar-94
Mar-95
Mar-96
Mar-97
Mar-98
Mar-99
Mar-00
Mar-01
Mar-02
Mar-03
Mar-04
Mar-05
Mar-06
Mar-07
Port OUT
FDI OUT
FDI IN
PORT IN

Schedule 2

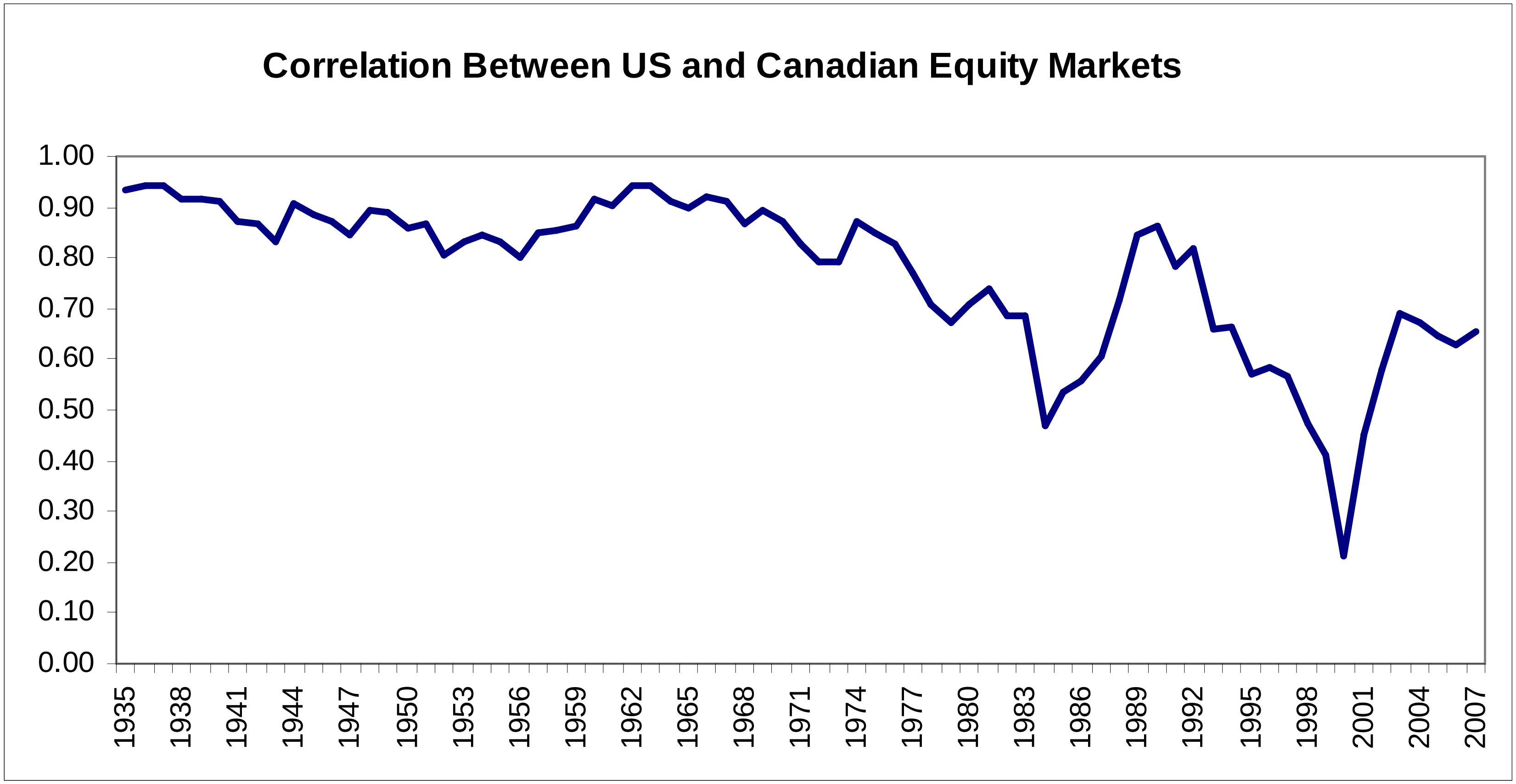


Canadian Equity Investment
100
90
80
70
60
50
40
Mar-90
Mar-91
Mar-92
Mar-93
Mar-94
Mar-95
Mar-96
Mar-97
Mar-98
Mar-99
Mar-00
Mar-01
Mar-02
Mar-03
Mar-04
Mar-05
Mar-06
Mar-07
US port out%
US direct out%

Schedule 3



Inbound Equity Investment
100
90
80
70
60
50
40
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
US port in
US direct in %


Correlation Between US and Canadian Equity Markets
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
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

Schedule 5

Table 1: Morgan Stanley Industry Composition (March 2000) (Percentage of total market value)

	Canada	U.S.A.	Europe	Far East	ACWI[1]
Energy	7.3	4.6	7.3	0.3	4.9
Materials	7.1	2.6	3.7	4.5	4.0
Capital Goods	3.7	8.0	4.9	8.7	6.8
Commercial Services	0.1	1.2	1.0	1.7	1.1
Transportation	1.8	0.7	1.4	3.3	1.3
Autos	0.6	1.4	1.9	9.5	2.7
Consumer Durables	0	0.8	1.9	10.1	2.5
Hotels & Restaurants	0	0.9	0.9	0.7	0.8
Media	10.4	5.0	3.4	1.2	4.1
Retail	0.4	6.1	1.7	2.0	3.8
Food & Drug: Retail	1.0	0.8	1.7	0	1.0
Food, Beverage & Tobacco	0.3	2.7	3.7	2.2	3.0
Household & Personal	0.1	1.6	0.8	1.0	1.2
Health Care	0.4	1.6	0.4	0.7	1.0
Pharmaceuticals	0	7.4	8.1	4.3	6.6
Banks	9.5	4.7	11.7	10.1	8.2
Diversified Financials	1.0	4.5	1.7	7.8	4.0
Insurance	0.3	2.8	6.8	0.7	3.7
Real Estate	0	0.2	0.6	3.1	0.8
Software	0.1	11.0	2.5	3.7	6.7
Tech Hardware	36.7	22.3	9.0	14.3	16.8
Telecommunications	17.3	6.5	19.4	7.7	11.6
Utilities	2.0	2.5	5.3	2.5	3.5

APPENDIX E

APPENDIX E

ESTIMATION OF THE MARKET RISK PREMIUM

Introduction

In this appendix I estimate the market risk premium by examining realised rates of return on different broad classes of securities over long periods of time.[1] The reason for doing this is that if the underlying relationship generating these returns has remained reasonably constant then these realised returns can be used as a forecast of the market's future requirements. The differences between these returns can then be used as an estimate of the market risk premium. In analysing the actual data, however, we first need to be aware of some methodological problems, since raw data by itself is of little use. The three methodological problems we will discuss are 1) estimation procedures, 2) the relevant time period and 3) the rationality of the estimates.

Estimation Procedures.

Suppose an investor puts $1,000 into an investment. If the investment doubles, i.e., a 100% return, to $2,000 and then halves, i.e., a -50% return, to $1,000, we can calculate two rates of return. The ***arithmetic*** rate of return would be 25% i.e., the average of +100% and -50%. The arithmetic rate of return is the average of the two per period rates of return. However, it would be difficult to convince an investor, who after two years only has the same $1,000 that he started with, that he has earned an average rate of return of 25%. Quite obviously, the investor is no better off at the end of the two periods than he was at the start! To counterbalance this potentially misleading statistic, most mutual funds advertise geometric or ***compound*** rates of return. This compound rate of return is often called the true rate of return. It is calculated as the nth root of the terminal value divided by the initial value, minus one. In our case, there are two periods, so that n=2 and the compound rate of return is

[1] This appendix covers similar material to that covered in Laurence Booth "Equities Over Bonds: But By How Much?" Canadian Investment Review, Spring 1995 and "Equity Risk Premiums in the US and Canada," *Canadian Investment Review* (Spring 2001). The latter paper is available for download from Professor Booth's web site http://www.rotman.utoronto.ca/~booth

calculated as $(1/1)^{1/2}$ which is 1, indicating a zero rate of return. This gives the common sense solution that if you started and finished with $1,000, then your rate of return is zero.

Both the arithmetic and compound rates of return are normally calculated when evaluating investments. If we need the best estimate of *next* period's rate of return, this is the arithmetic return. If we need the best estimate of the return over several periods, the arithmetic return becomes less useful and more emphasis is placed on the compound return. If we want the best estimate of the annual rate of return earned over a long period of time, this is the compound rate of return, since this indicates the long run expected change in wealth. Moreover, if we ignore intervening periods, then the arithmetic return over a very long period is the compound rate of return, that is, the difference between the arithmetic and compound returns is essentially the definition of the period over which the investment is held.

What causes the two rates of return to differ is the uncertainty in the per period arithmetic rates of return. If the arithmetic rate of return is constant, then both rates of return are identical. However, the more uncertain the arithmetic rate of return, the larger the discrepancy between the two estimates. For instantaneous rates of return the following equation approximately describes their relationship:

$$\textit{Compound rate of return} = \textit{Arithmetic return} - (\textit{var}/2)$$

In the previous example, there is a large amount of uncertainty, that is, high variance (var), so that the difference between the arithmetic return and the geometric return is very large. Moreover, as we estimate over a longer and longer period, the estimated compound rate of return earned on an investment approaches that of the compound return. In estimating the market risk premium, we believe that the correct time period for calculating arithmetic rates of return is a **one-**year holding period. The reason for this is primarily because most regulated firms are regulated on the basis of annual rates of return and rates are almost always expressed as annual percentages.

In addition to the arithmetic and compound rates of return we also estimate the arithmetic rate of return by means of an ordinary least squares regression model. This is a statistical technique that estimates the annual rate of return by minimising the deviations of the annual values around the estimate. Ordinary least squares (OLS) is the standard technique for estimating economic models and is commonly used for estimating other annual growth rates, such as the growth rate in dividend growth models.

(B) Time period

There is a problem in estimating the market risk premium over a short period of time, since the stage in the business cycle will bias the results. For example, if the period is restricted to end in a bull market, the recent realised returns will be high, raising the overall realised risk premium. This 'business cycle' problem is well known in comparable earnings tests, but it is also evident in realised risk premium tests. In particular, it makes the use of the compound rate of return estimated over short periods suspect. This timing problem is also evident in analysing bond returns, since bond returns vary inversely with interest rates. This means that estimating a bond return over a period when interest rates have been increasing tends to understate the bond investor's expected rate of return. This is because the realised rate of return will be lower than expected, because of the losses caused by increasing interest rates. This in turn will overstate any estimate of the market risk premium. Conversely, estimating bond returns over a period of declining interest rates will have the reverse effect, as capital gains will cause the realised rate of return to exceed that expected. It is important therefore, to capture a full interest rate cycle; otherwise realised rates of return may not be valid predictors of the market risk premium

In Schedule 1 are the results of a study of realised Canadian risk premiums over the longest time period for which there is data available. The data is taken from an annual "Report on Canadian Economic Statistics, 1924-2006," March 2007, compiled on behalf of the Canadian Institute of Actuaries extended to include 2007 data. Over the entire period 1924-2007 an investment in equities would have earned an average total rate of return of ***10.42%*** using the OLS estimate***, 10.29%*** using the geometric mean estimate, and **11.84%** using the arithmetic return estimate. The corresponding return estimates for the long Canada bond are **5.61%, *6.13%*** and **6.47%,** producing corresponding

market risk premium estimates of 4.*81*%, 4.16% and *5.37*%.

The standard deviations for the equity and Canada bond returns were 18.13% and 8.70% respectively, indicating the higher average risk of equities than bonds. Consequently, there is a larger difference between the arithmetic and geometric returns for equities than bonds. For example half the equity return variance (of 0.1813^2 or 3.29%) is 1.64%, which is approximately the 1.55% difference between the arithmetic (11.84%) and geometric (10.29%) returns. For bonds half the variance is 0.38%, which is again approximately the difference between the arithmetic and geometric bond returns.

From this data alone one would conclude that over annual investment horizons equities outperform Canada bonds by 4.81-5.37% on annual investment horizons, but that as the time period lengthens this out-performance drops to 4.16%, which is the approximate risk premium someone would have earned by buying in 1923 and selling at the end of 2007

To determine whether or not these realised risk premium estimates are **unbiased**, we can graph the yields on 91 day Treasury Bills, long Canadas and the CPI inflation rate. From the graph in Schedule 2 we can see that the yields on T. Bills and long Canadas were very stable from 1936, despite an extremely volatile inflation rate. During this period fixed income investors were not able to adjust their yields since interest rates were effectively controlled. Then about 1950, yields started to trend upwards with the rate of inflation, as well as becoming more volatile, as the bond market was decontrolled. Interest rates then peaked in the early 1980s before beginning a long period of declining rates that ended in the mid 1990s.

What the graph vividly shows is that the behaviour of interest rates has not been constant over the full period 1924-2007. For this reason, Schedule 1 also includes rate of return estimates for two sub-periods from 1924-1956 and for 1957-2007. For the earlier period the market risk premium estimate is 4.66%, 6.82% and 8.85% for the OLS, geometric and arithmetic returns respectively. For 1957-2007 the corresponding estimates are 1.84%, 2.42% and 3.12%, indicating a significant difference over the two periods. Also note that the standard deviation of the equity series declined from 21.25%

for the earlier period to 15.58% for the latter period, indicating the lesser risk involved in investing in common shares, which in turn reflects the maturing of the Canadian equity market. In contrast, the standard deviation of the long Canada bond returns increased from 5.20% to 10.10%, indicating the dramatic post war increase in volatility in the long-term bond market as the tools of Canadian monetary policy changed.

The graph of interest rates and the data in Schedule 1 indicate that the period prior to 1956 is different from that after 1956. Estimates will always be slightly different from one period to another simply because of estimation errors. However, the differences in the sub periods in Schedule 1 seem to be too large to be simply due to these types of problems. If instead they are due to underlying structural reasons, drawing inferences from the data prior to 1956 will lead to estimates that do not reflect current market conditions. There are several very good reasons why the relationship between equity and bond returns, and the market risk premium, has changed since the 1924-1956 period.

(1) Evolution of Canadian Monetary Policy

Prior to the early 1950's interest rates were controlled to stimulate the economy and did not vary very much, partly because the Canadian markets were very illiquid. It was not until the 1953-4 reforms introduced by the Bank of Canada, that an active secondary market in shorter-term Canada bonds even developed. Prior to that period the tools of Canadian monetary policy were primitive. It is quite obvious from the graph in Schedule 2 that the long Canada yield pattern changed in the early 1950's, as these changes in the Canadian markets were introduced. After being stable at around 3% from 1936-1955, long yields, in particular, started edging upwards.

Note also that since the reforms of 1953-4, the volatility of yields has increased. Part of the reason for this is that in the earlier period the realised rate of inflation was between 1.35% - 1.78%, whereas in the latter period it was 4.11% - 4.95%. Fixed income securities are more sensitive to inflation, since their coupons by definition are fixed. As a result their real return varies with the level of inflation. The volatility of inflation and the changed nature of monetary policy is most evident in the behaviour of Treasury bill yields. The yield on 91 day T. Bills became increasingly volatile after the

1953-4 reforms, reaching record highs of over 20% for a short period in 1981. This increase in Treasury Bill return volatility from 0.57% in the earlier period to 3.86% in the latter period mirrors that of long Canadas, where the variability increased from 5.20% to 10.10%. Essentially, between these two periods the risk of investing in long Canadas effectively doubled.

From 1950 until 1981 the trend in long Canada yields was upwards. This means that investors in long Canada bonds suffered losses as the prices of their existing bonds (with low interest rates) dropped in comparison to the newer bonds being issued at ever increasing yields. As a result, the returns from holding long Canada bonds **understated** what investors expected to earn, causing biased high estimates of the market risk premium. This overestimation peaked in 1981 as losses from holding long Canada bonds peaked. After that point, long Canada yields decreased causing huge capital gains. As a result, the investor's expected return for long Canada bonds is **overstated** by looking at realised returns, which causes a downward bias to the estimated market risk premium. Noticeably, the nominal returns on equities have been very similar between the two sub-periods despite significant changes in the fixed income market. Actual returns of 8.80%, 10.84% and 13.00% for the OLS, GM and AM estimates for the 1924-1956 period are not too dissimilar to the returns of 10.42%, 9.93% and 11.09% for 1957-2007.

(2) Canadian Equity Market Data.

If long Canada yields are affected by the reforms of 1953-4, the equity market data is also of doubtful validity prior to 1956, since before that time there is **no** consistent Canadian equity market data. The CIA data comes from splicing together the following series:

(1)	1924-1946	Urquhart & Buckley "Corporate Composites"
(2)	1946-1956	TSE Corporates
(3)	1956-1995	TSE300

The Urquhart and Buckley series does not include all Canadian companies or sectors and does not include dividend data. Dividend yields for 1926-1933, for example, are obtained by taking US dividend yields from the S&P Index and subtracting 0.17% based on a yield difference existing between 1956-1965! The only consistent data is that produced by the TSE, which has pushed its

TSE300 (now the TSX Composite) index back to 1956. Splicing these series together is the best that can be done in the circumstances, however it is not ideal and some skepticism of the quality of the data prior to 1956 is in order.

Additionally, for some time it has been government policy to Canadianise the ownership of Canadian industry. This policy has been muted of late as foreign ownership has been allowed to increase, but there has still been an increase in the number of Canadian firms for Canadians to invest in. This plus the natural maturing of the Canadian economy has resulted in a more diversified equity market, which has decreased the overall riskiness of the Canadian equity market since the 1930's. Note again that the equity returns have decreased in volatility from 21.25% to 15.58%. Also some sectors that are now very important to the Canadian economy, such as the oil and gas sector and the pipelines, barely existed prior to the late 1940's.

These changes have clearly affected the relative returns on debt and equity securities. They have also affected their relative riskiness. One way of looking at the relative riskiness of equity versus debt securities is to look at the variability of the equity return divided by that on long Canadas. This is shown in the graph in Schedule 3, where variability is measured as the standard deviation of returns over the prior ten-year period. In the earlier periods, equities were four or five times as risky as bonds, since from the earlier graph of interest rates we know that bond yields and thus bond prices were quite stable. However, this relationship changed during the period of interest rate volatility in the 1970s and 1980s when equities were only slightly more risky than the bond market. As a result the equity risk premium was squeezed. More recently as the yields on long Canada bonds have stabalised the risk in the bond market has declined and the riskiness of equities relative to bonds has increased. By the end of the period equity risk had increased to about double that of the bond market. For the ten-year period ending 2007, TSX Composite equities had a return variability 2.31X that of the bond market up significantly from the ten year period ending in 1995 when it was only 1.1X more risky. This change in the relative riskiness of equities versus bonds means that the estimates drawn from the entire period are unlikely to represent current market conditions.

(C) Rationality of the estimates

In the above estimates, the "market risk premium" is estimated as the difference between the estimated return on equities and that on long Canada bonds over a particular period. An alternative is to estimate it each year. This is what has been done in the graph in Schedule 4. Starting in 1924-1928 the realised market risk premium was estimated using each of the three techniques and then updated each year with the new data. The instability in the 1920s is evident: the estimates are very high, since the equity market performed so well, and then in the 1930s it declines precipitously as a result of the great stock market crash. However, it stabilises by the late 1950s, before beginning its long gradual decrease as a result of the structural changes referred to above. Note that since over eighty years of data are now available, the impact of any one-year is very small and the market risk premium is "stuck" around 5.0%. However, it is apparent that the realised market risk premium has been **declining** almost continuously since the mid 1960's. The main reason for this is that as more data becomes available the importance of the prewar period in the calculations gets smaller and smaller.

An alternative to the above approach is to work backwards. That is, start in the five-year period 2002-2007 and then go back in time. This is what is in the graph in Schedule 5. Note that whereas the previous graph always includes the period 1924-1928, this graph always includes the last five year period. In this case the last five years are 2002-2007, which included the recent very good equity markets. However, as we work back through time and add in progressively older data the influence of the recent bull market recedes. When we get back to the 1950's we finally get the market risk premium consistently above 4.0%.

Changes in the Market Risk Premium

In Schedule 6 is the earned risk premium (using arithmetic returns) for various holding periods. If we look at the last row we have the earned risk premium for various start dates finishing in 2007, this is essentially a subset of the date graphed in Schedule 5. Note for example, that the most recent ten-year period has an earned risk premium of 3.2%, as this period goes back successively by adding an extra ten years of data the earned risk premium drops to -1.96% and then increases until for the fifty year period 1957-2007 it reaches 3.71% and then finally gets to 5.62% for the 1947-2007 period.

The fact that estimates of the market risk premium do change over time indicates that some adjustments are in order. In my judgement the riskiness of the equity market is relatively stable. In fact, going back as far as 1871, there is substantial evidence that the real return on US equities has been constant at just under 9.0%.[2] However, there is ***no*** support for the assumption that either bond market risk or average bond market returns have been constant. As Schedule 1 shows, from 1924-1956, there was very little movement in nominal interest rates, as monetary policy was subordinate to fiscal policy. As a result, the standard deviation of annual bond market returns was only 5.20%. In contrast from 1956-2007, monetary policy became progressively more important and interest rates much more volatile. As a result, the standard deviation of the returns from holding the long Canada bond increased substantially. ***Effectively bond market risk doubled, while equity market risk was much the same***.

However, what is crucial for the investor is whether this risk is diversifiable. That is: is the bond market beta positive? In Appendix F I show that bond market betas in both the US and Canada have been very large, particularly during the period since 1991, when governments had severe financing problems and flooded the market with Canada bonds. This indicates that both the bond and equity markets have been partly moved by a common factor: interest rates. This is why adding long Canada bonds to an equity portfolio during the 1990's did not reduce portfolio risk to the extent that it did in the 1950's. It also explains why adding an “average” risk premium to a long Canada yield that had increased substantially due to this risk produced excessive estimates of the fair rate of return throughout the late 1980s and much of the 1990s.

Essentially, with a “risky” long Canada bond we are estimating the market risk premium as the expected return difference between two risky securities. If both the Canada bond (C) and an equity security (j) are priced by the Capital Asset Pricing Model, the required or “fair” return on

[2] See Laurence Booth, “Estimating the Equity Risk Premium and Equity Costs: New Ways of Looking at Old Data”, *Journal of Applied Corporate Finance*, Spring 1999.

each is as follows:

$$E(R_j) = R_F + MRP\beta_j$$
$$E(R_C) = R_F + MRP\beta_C$$

For both the return is expected to be equal to the risk free (R_F) rate plus the market risk premium (*MRP)* times the relevant beta coefficient. The "market" risk premium of the equity market relative to long Canada bonds is then simply

$$E(R_j) - E(R_C) = MRP(\beta_j - \beta_C)$$

What this means is that even if an individual security's risk is unchanged, its risk premium over the long Canada bond will get smaller as the long Canada bond itself gets riskier.

In Appendix F, I show how the beta on the long Canada bond was close to zero until the estimation period 1987-1991; since then it has been positive, peaking in 1995-6 at about 0.60. It was this increase in bond market risk that caused risk premiums to shrink throughout the 1990's. In fact it is quite clear that with a Canada bond beta of say 0.60, a low risk utility in the mid 1990s, with a similar beta, did not require a risk premium at all**.** This conclusion was reinforced by the observation that the Canada bond income (interest) is fully taxed, whereas the utility income would predominantly come as dividend income, which is preferred by every single taxable investor in Canada.

In Schedule 7 are the results of a regression analysis of the real Canada bond yield against various independent variables. The real Canada yield is defined as the nominal yield reported by the Canadian Institute of Actuaries minus the average CPI rate of inflation, calculated as the average of the current, past and forward year rates of inflation. The regression model explains a large amount of the variation in real Canada yields, and four variables are highly significant. The two "dummy" variables represent unique periods of intervention in the financial markets. Dum1 is for the years from 1940-1951, which were the "war" years, when interest rates were controlled. The coefficient indicates that government controls reduced real Canada yields by about 5.4% below what they would otherwise have been. This of course was the objective of the war-time controls. Similarly, Dum2 is for the years 1972-1980, which were the oil crisis years, when huge amounts of "petrodollars" were recycled from the suddenly rich OPEC countries back to western capital markets, where they essentially depressed real yields. The sign on Dum2 indicates that, but for this recycling, real yields would have been about 3.6% higher. These dummy variables are included because during these two periods real yields were depressed by special “international” factors.

The remaining two independent variables capture the risk and endemic problem of financing government expenditures. Risk is the standard deviation of the return on the long Canada bond over the preceding ten years. In earlier periods when monetary policy was not used, interest rates barely moved and the returns on long Canada bonds were very stable. As a result the risk of investing in them was very low. Through time the investment risk attached to long Canadas has increased. The coefficient on the bond risk variable indicates that for every 1% increase in volatility, real Canada yields increased by about 23 basis points. That is, the effective 5% increase in the standard deviation of bond market returns between the two periods 1924-1956 and 1957-2006 has been associated with about a 115 basis point increase in real Canada yields <u>between</u> these two periods. This is the extra risk premium required by investors to compensate for the higher risk attached to investing in long Canada bonds. Absent any increase in equity market risk, the result is a 115 basis point reduction in the market risk premium between the two periods.

The deficit variable is the total amount of government lending (from all levels of government) as a percentage of the gross domestic product. As governments increasingly ran deficits, this figure became a very large negative number, indicating increased government <u>borrowing</u>. For 1992, the number was about -9.1%, a record peacetime high, indicating that government net borrowing was 9.1% of GDP and was flooding the markets with Canada bonds. For 1997, this deficit turned into a surplus, which increased every year until 2000 when the surplus hit almost 3.0% of GDP. The coefficient in the model indicates that for every 1% increase in the aggregate government deficit, real Canada yields have increased by about 27 basis points. That is, increased government borrowing by competing for funds has driven up real interest rates. At the peak of the government's financing problems in 1992 a 9% deficit was adding almost 2.5% to the real Canada yield relative to what would be produced with a balanced budget. When these two effects are added together it is easy to see why there was very little "extra" risk for low risk equities over bonds in the early 1990s.

The effect of increased interest rate risk and government “over borrowing” are clearly two sides of the same coin. Their effect was to crowd the bond market with risky long Canada bonds that could only be sold at premium interest rates, frequently to non-residents. This driving up of Canada bond yields reduced the spread between Canada bond yields and equity required rates of return and the market risk premium. It is this deficit and risk phenomenon in the government bond market that created the narrowing market risk premium, and the large Canada bond betas in the mid 1990's.

In Schedule 8 is a graph of the real yield produced directly from the real return bond. Unfortunately this data is not available for earlier periods since these bonds did not exist. However, we can see directly the huge decline in the real yield over the last ten years as governments have got their budgets under control and uncertainty in the bond market has declined. In my judgment with a current small budget surplus and long Canada bond yields at the 4.0% level similar to where they were in the late 1950s we have an economic scenario unlike any period since that time. Accordingly I discount much of the experience since the late 1950s and place the market risk premium at **5.00%.**

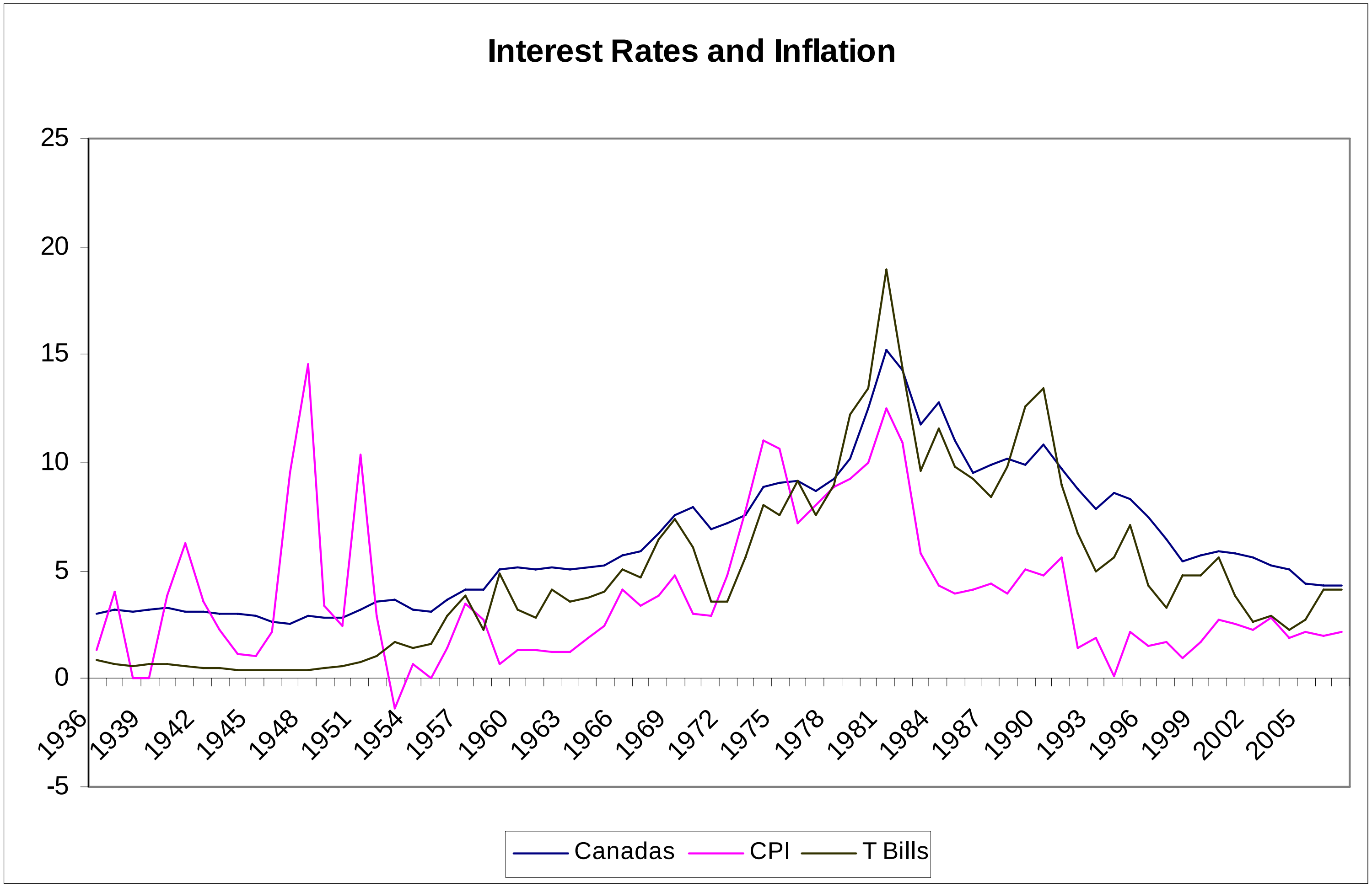
SCHEDULE 1

ESTIMATED ANNUAL RETURNS[1]

	OLS Estimate[2]	Arithmetic Mean	Geometric Mean	Standard Deviation
1924-2007				
CPI	3.83	3.09	3.01	3.95
Long Canadas	5.61	6.47	6.13	8.70
Equities	10.42	11.84	10.29	18.13
Treasury Bills	5.79	4.95	4.85	4.23
Excess Return over Bonds	4.81	5.37	4.16	
1924-1956				
CPI	1.78	1.35	1.45	4.55
Long Canadas	4.13	4.15	4.02	5.20
Equities	8.80	13.00	10.84	21.25
Treasury Bills	0.68	0.84	0.84	0.57
Excess Return over Bonds	4.66	8.85	6.82	
1957-2007				
CPI	4.95	4.15	4.11	3.07
Long Canada	8.58	7.97	7.52	10.10
Equities	10.42	11.09	9.93	15.58
Treasury Bills	7.97	6.78	6.71	3.86
Excess Return over bonds	1.84	3.12	2.42	

1. Using data from the Canadian Institute of Actuaries, "Report on Canadian Economic Statistics" March 2007.
2 OLS stands for the ordinary least squares regression estimate

SCHEDULE 2


Interest Rates and Inflation
25
20
15
10
5
0
-5
1936
1939
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
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1987
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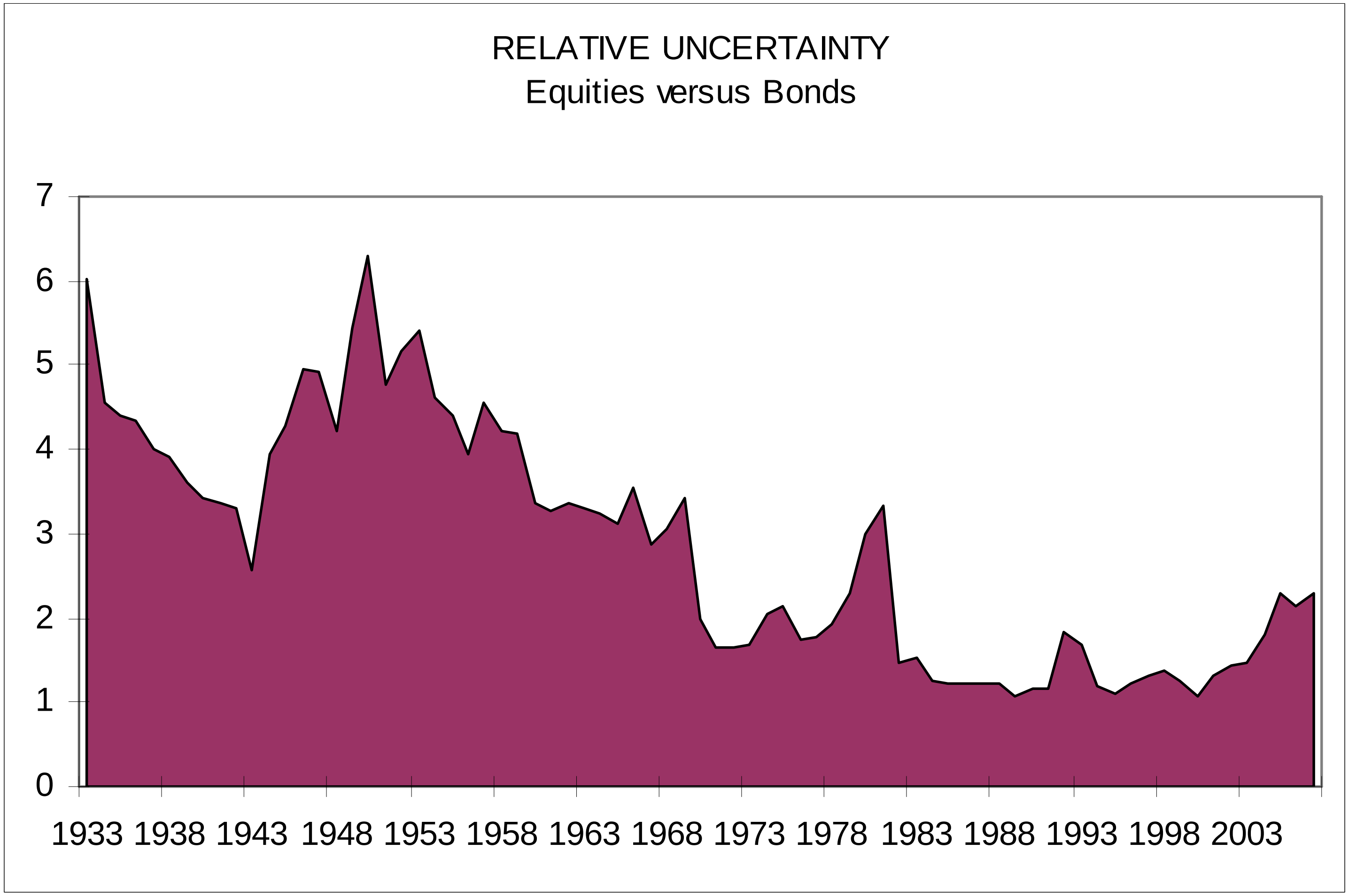
1996
1999
2002
2005
Canadas
CPI
T Bills


RELATIVE UNCERTAINTY
Equities versus Bonds
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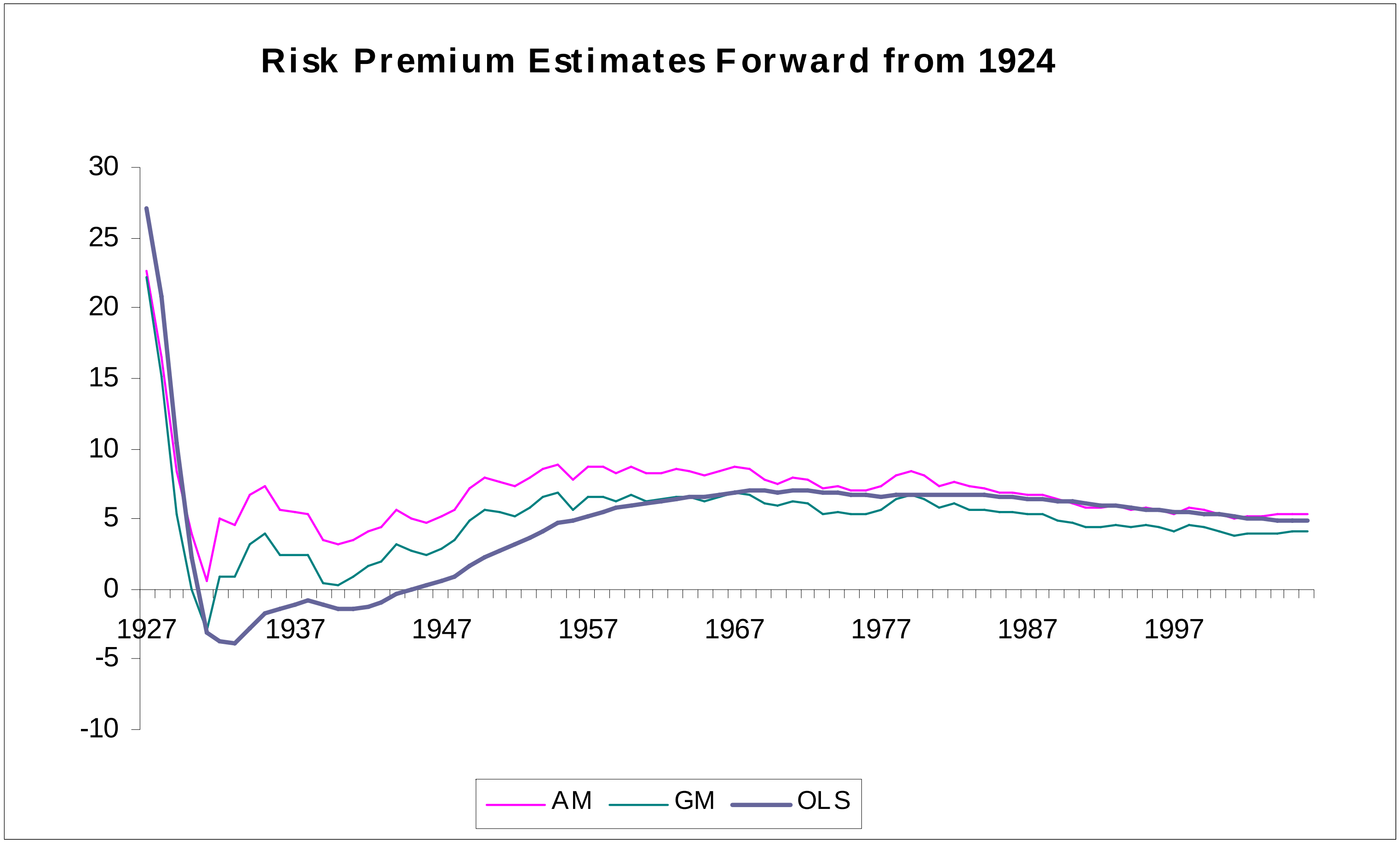
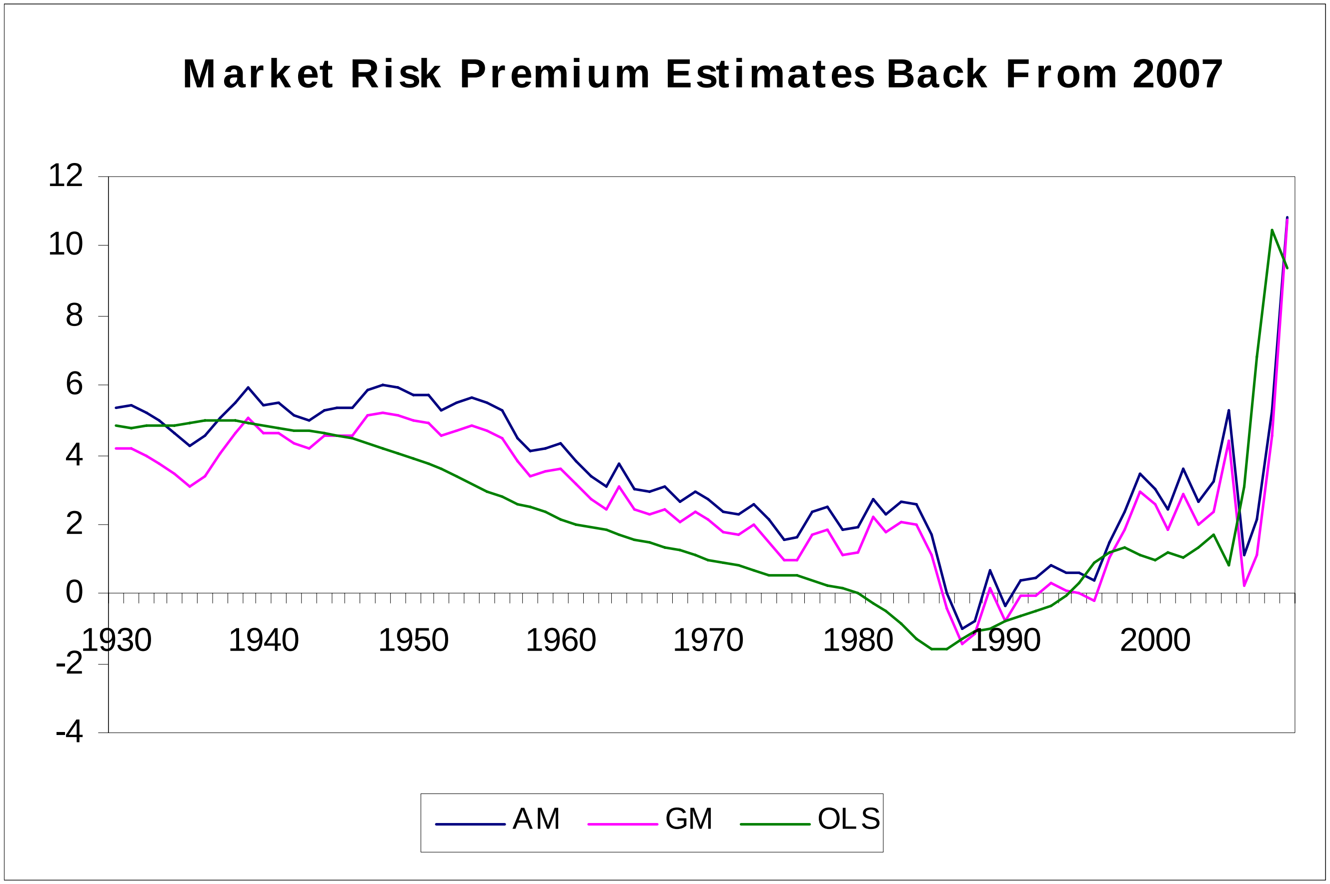
6
5
4
3
2
1
0
1933 1938 1943 1948 1953 1958 1963 1968 1973 1978 1983 1988 1993 1998 2003


Risk Premium Estimates Forward from 1924
30
25
20
15
10
5
0
-5
-10
1927
1937
1947
1957
1967
1977
1987
1997
AM
GM
OLS


Market Risk Premium Estimates Back From 2007
12
10
8
6
4
2
0
-2
-4
1930
1940
1950
1960
1970
1980
1990
2000
AM
GM
OLS

SCHEDULE 6

Earned Risk Premiums for Different Holding Periods

Start dates on the horizontal and ending dates on the vertical. For example, an investor would have earned a 3.84% arithmetic risk premium investing from 1957-1997.

	1927	1937	1947	1957	1967	1977	1989	1997
1937	-0.14							
1947	1.66	3.45						
1957	6.16	9.31	15.17					
1967	7.14	9.56	12.62	10.07				
1977	5.88	7.38	8.69	5.45	0.84			
1987	5.97	7.19	8.12	5.78	3.63	6.43		
1997	4.84	5.66	6.11	3.84	1.77	2.24	-1.96	
2007	4.63	5.31	5.62	3.71	2.13	2.56	0.62	3.20

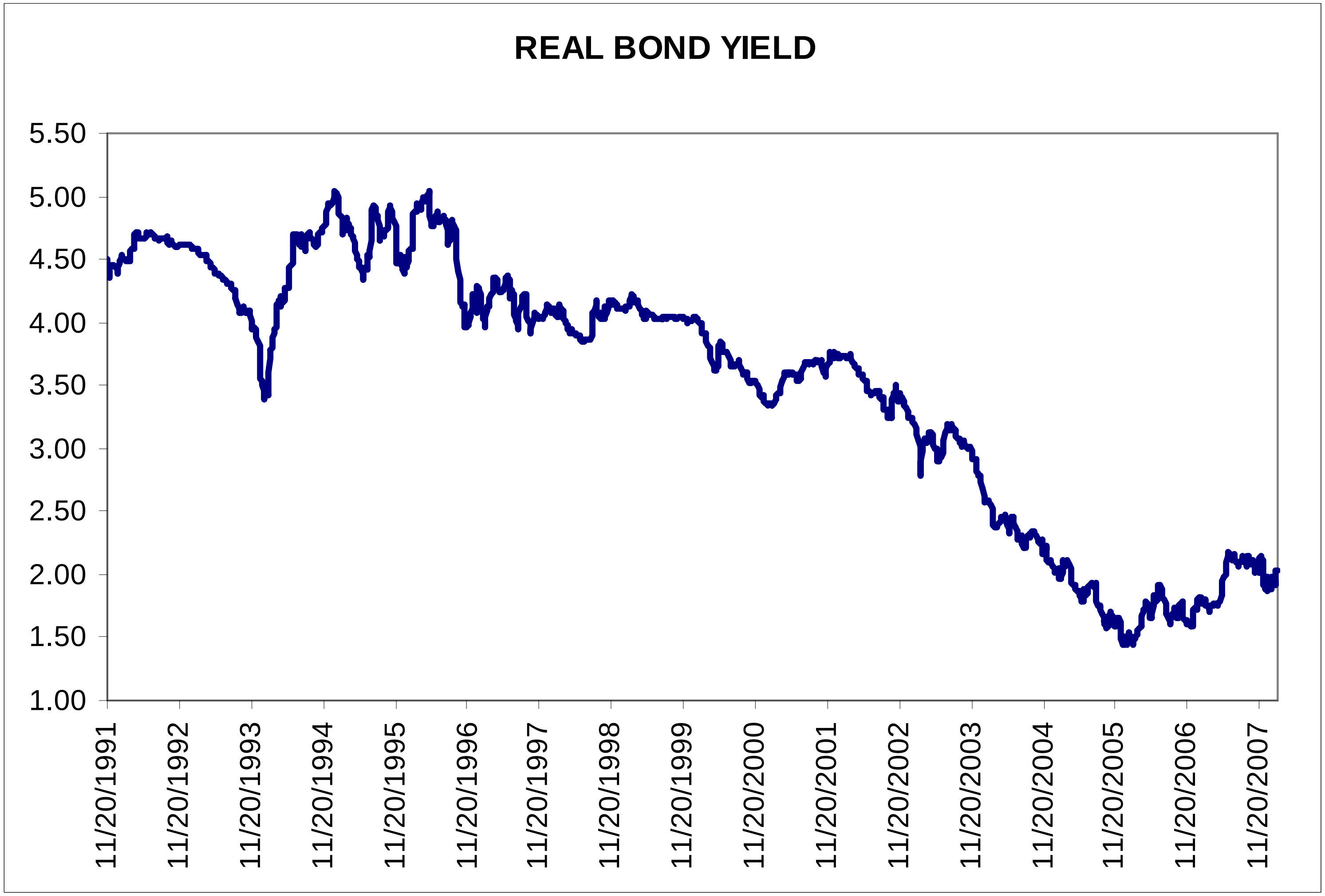
SCHEDULE 7

FACTORS INFLUENCING THE REAL CANADA YIELD

Dependent variable: Long Canada yield minus the average CPI inflation rate for the past, current and forward year.

Independent variables:

	Coefficient	T-Statistic
Constant:	1.394	
Risk: standard deviation of return on long bond index for prior ten years.	0.229	4.793
Deficit: aggregate government lending as a % of GDP.	-0.269	-8.650
Dum1: dummy variable for years 1940-51	-5.351	-12.624
Dum2: dummy variable for years 1972-80	-3.631	- 8.782
Adjusted R^2 of the regression Seventy years of data 1936-2007	86.2%	


REAL BOND YIELD
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
11/20/1991
11/20/1992
11/20/1993
11/20/1994
11/20/1995
11/20/1996
11/20/1997
11/20/1998
11/20/1999
11/20/2000
11/20/2001
11/20/2002
11/20/2003
11/20/2004
11/20/2005
11/20/2006
11/20/2007

APPENDIX F

APPENDIX F

US MARKET RISK PREMIUM ESTIMATES

The main source of data on the U.S. market risk premium comes from the seminal work of Ibbotson and Sinqufield, who calculated holding period return data from December 1925 for common equities, long term government bonds, treasury bills, and the consumer price index. For our purposes we will calculate the risk premium of equities over long bonds in the same way as in Appendix E. For comparison purposes, we will also present the equivalent Canadian estimates. These estimates differ from those in Appendix E, since the time periods differ slightly. Schedule 1 gives the estimates of the average realized excess return of equities over long bonds for the overall period 1926-2007.[1]

The central message from the data in Schedule 1 seems to be straightforward, US common equities have on average earned between 10.35-12.25% and long Treasuries 4.93-5.83% per year, depending on the estimation method. The excess return of common stocks over long term government bonds has been in the range 6.20-6.43% for annual holding periods (OLS & AM), declining to 4.89% as the holding period is lengthened (GM). For Canada, the results are almost identical to those in Appendix E, with the excess return of Canadian equities over long Canadas in the 4.80-5.18% range for annual holding periods declining to 3.95% as the holding period lengthens.

Note that based on annual holding periods the US realised equity risk premium is higher than the Canadian equivalent. Given the "higher" quality of the US data as well as the volatility of the estimates, many put greater faith in the US estimates, even for the Canadian market. This is also frequently justified by the doubt expressed at the “higher risk”[2] Canadian market having a lower

[1] US Data for 1926-1995 are the Ibbotson and Sinquefield data from the CRSP data files with 1996-2007 data updated from S&P and the 20 year bond yield maintained by the Federal Reserve Bank of St Louis (FRED).

[2] Note, however, that the standard deviation or variability of the S&P500 equity returns was 19.96% or 1.60% higher

realized market risk premium, as well as the increasing integration between the two capital markets, which “presumably” will move Canada closer to the US experience.

However, the difference between the US and Canadian arithmetic mean risk premiums for the overall period of 1.36% (6.43%-5.18%) is split between a difference in the average equity return of 0.61% and a difference in the average government bond return of 0.64%, that is approximately equally between the equity and bond markets. The difference between the equity market returns can partly be explained by the previous effects of Canadian government policy to deliberately segment the Canadian equity market from that in the US,[3] as well as by the historically lower risk of the Canadian market. The difference in the returns on Canadian and US government bonds in turn reflects the pivotal role of the US government bond market in the world capital market and the observation that the Canadian market has had to react to that in the US during an era of significant government financing problems.

The difference in the average realised returns between the US and Canada is consistent with known institutional differences, which are unlikely to completely disappear. The data does, however, emphasise that the realised risk premium is just the difference between the realised return on equities minus that on bonds. However, from Appendix E we know that a "break" occurred in the capital markets in the mid 1950's. Although the exact dates are somewhat arbitrary, there are good reasons for putting the split at 1956/7. First, changes in monetary policy freeing up interest rates to reflect market movements started around then; second, at least in Canada the availability of quality data begins in 1956 and finally the incidence of personal taxes on investment income became much more important in the post war period.

Schedule 2 gives the estimates for both the US and Canada for the two sub periods 1926-1957 and 1957-2006. For the earlier period the realised return on equities was around 9.0-13.0% in

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than that for the Canadian market. Over this whole period US equities were ***more*** risky than Canadian equities.

[3] The dividend tax credit only applies to dividends from Canadian corporations; foreign withholding taxes apply to foreign source income, while portfolio restrictions have existed in tax-preferred plans.

both the US and Canada with the lower estimate coming from the least squares regression estimate that takes into account the massive volatility in the equity market at the time of the "Great Crash." US equity returns were then largely the same in the latter period at 10.51-11.77% range. However, the substantial decrease in equity market risk from 25% to 16.50% has caused the arithmetic return in the US to decline, even though the compound return has increased. This is because from the discussion in Appendix E, the arithmetic return is approximately the compound return plus half the variance. So even with a similar compound return the arithmetic return has fallen since 1956 in the US.

Also it is not frequently recognised that the reason the US data starts in 1926, rather than 1924 in Canada, is simply that the original authors of the data wanted a complete business cycle prior to the great stock market crash of 1929. As a result, the start date for the data is inherently biased, both in terms of volatility and the average realised return estimates.[4] Note also that similar to Canada, the realised return on the long US treasury bond more than doubled from around 3.5% to around 7.00% while the standard deviation (variability) of the annual bond returns more than doubled, from 4.93% to 10.55%. Again changes in the bond market have had a direct impact on the risk premium of equities over bonds.

For Canada equity market returns were also essentially unchanged between the two periods. The arithmetic return declined from 12.55% to 11.09%; but unlike the US the compound rate of return declined marginally from 10.30 to 9.93%. Similar to the US, equity market, risk declined from 22% to 16%. In looking at equity market returns, the major differences are that in the earlier period the US equity markets was riskier than in Canada, whereas more recently this difference has narrowed; while Canadian equity returns have been lower probably due to the impact of government policy. Similar to the US, long Canada bond returns almost doubled from about 4.0% to 8.0%, as the variability in the long Canada bond return also almost doubled from 5.41% to 10.17%

[4] This is discussed in more detail in Laurence Booth, AEstimating the Equity Risk Premium and Equity Costs: New Ways of Looking at Old Data,@ Journal of Applied Corporate Finance, Spring 1999.

The data in Schedule 2 is very important. First, it highlights the fact that the main reason for the decline in the equity market risk premium is **not** to be found in the equity market. ***Equity market risk in both the U.S. and Canada has been marginally less since 1956 than it was in the earlier period.*** This is what we would expect given the greater diversification opportunities available in modern capital markets. Second, it points out that it is changes in the bond market that have caused the equity market risk premium to decline. In both the U.S. and Canada bond market risk has essentially doubled over these two long time periods. At the same time average bond market returns have also doubled. This has significantly reduced the market risk premium, when measured as the excess of the equity market return over the bond market return. Moreover it points to the fact that the same factors have been at work in the US as in Canada.

Another way of looking at the data is in Schedule 3, which looks at what has caused the decline in the market risk premium. In the U.S. the market risk premium has declined by 1.94-5.22%, whereas in Canada the decline has been 3.07-5.42%. It is clear that while equity market returns have remained quite similar between the two periods, for both the US and Canada average bond market returns have increased significantly. The upshot from this analysis is that even if the equity market had performed the same between these two periods the equity market risk premium would have fallen by about 4.0% due to the increase in bond market returns and risk. To understand this we can look at the risk faced by a bond market investor.

The graph in Schedule 4 gives the relative uncertainty of the equity market to the bond market for both the US and Canada. In both cases uncertainty is measured by the standard deviation of annual returns over the prior ten years. As is very clear, like Canada, the US equity market was much more volatile than the bond market until the mid1950s. Until then equity markets were about four times as volatile as the bond market and frequently more. After the mid 1950's, however, the increasing uncertainty in the bond market caused the differences in risk to become less pronounced. For the last twenty five years, since the early 1980s, the bond market has been almost as risky as the equity market. However, in both the US and Canada recent bond market stability has caused the relative riskiness of the equity market to increase marginally as the overall inflationary problems that existed until the early 1980s have receded.

The graph in Schedule 5 gives the beta for the US and Canadian bond markets. In both cases the betas are estimated using annual holding periods over the prior ten-year period, so that 1935 measures the bond beta from 1926-1935. Since interest rate risk has recently been much more pronounced we would expect that the long-term bond market would begin to show some of the same risk characteristics as the equity market, which it does. Note that until the 1970's bond market betas could be safely ignored, since interest rate risk had little impact on the equity market. This means that there should have been no or very a very small risk premium attached to investing in bonds. However, bond market betas started to dramatically increase in the mid 1980's, reaching a peak of about 0.57 for Canada and 0.70 for the US. These were the periods when government deficits and inflation dominate the capital market. Recently bond market betas[5] have declined significantly in both the US and Canada so that there is currently little evidence of significant systematic risk premiums in bond returns.

The decline in the bond beta is not the only way of measuring the risk in the long government bond. In Schedule 6 is the break-even inflation rate (BEIR). The BEIR is the difference between the yields on the nominal bond and the real return bond and thus is affected by inflationary expectations. If inflation turns out to be above this BEIR, then looking back it would have been better to have been in the real return bond and vice versa, there are risk differences between the two bonds, so we would expect this BEIR to be equal to the expected inflation rate plus this risk premium. The real return bond was introduced at the time that the Bank of Canada with the support of the Government of Canada moved to a 1-3% inflation target with a mid-point of 2.0%. What is clear from Schedule 6 is that the BEIR was well above the 2% inflation target until the late 1990s which is when in aggregate government in Canada started to move into a

[5] The bond market betas are based on a simple regression of the bond market return against the equity market return. Estimating the betas over five years of monthly data produces the same types of estimates, see J. Petit ACorporate Capital Costs, Journal of Applied Corporate Finance, Spring 1999 Figure 4.

surplus position. Since that time the BEIR has exceeded the 2.0% inflation target by about 20 basis points. This BEIR would support the bond beta estimates that the risk premium in the long Canada bond has declined significantly so we would expect the market risk premium to have increased.

In Schedule 7 is the Canadian equity market beta from the point of view of a US investor both with and without foreign exchange (FX) risk. This estimate of risk is that of a US investor adding Canadian securities to a diversified US portfolio. The estimate without foreign exchange risk assumes that the investor can somehow remove all the foreign exchange risk whereas that with FX risk converts both return series to a common currency and involves changes in the FX rate. Note that the Canadian equity market beta was generally around 0.80 until the late 1980's when it briefly increased to above 1.0, since then it has been declining. This has primarily been due to the different growth paths of the US market during the tech boom, the performance of the Canadian market around NAFTA inspired restructuring post 1989 and the recent effect of commodity prices on the TSX. What this data indicates is that if capital markets have become more integrated then the Canadian market would be seen as a lower risk market from the point of a US investor thereby justifying a ***lower*** risk premium than would be required of a US investor investing in the US, where the beta by definition is 1.0. With recent betas for the Canadian market of around 0.50 this would put the Canadian market risk premium from a US perspective at half that of the US market risk premium.

The conclusion from examining US equity market data is that US equity returns continue to marginally exceed those in Canada, with the recent excess probably reflecting Canadian tax preferences and the lower risk nature of many Canadian companies. In contrast, Canadian bond returns have exceeded those in the US as public sector borrowing has persistently forced Canadian governments into the capital market. In both countries, realised market risk premiums have declined significantly due to the large increase in bond market risk and bond returns.

However, the US equity market risk premium has behaved much the same as the Canadian one.

Due to the increasing bond market risk, relative to the declining equity market risk, realised equity risk premiums have shrunk dramatically. Even if equity market risk is assumed to be constant, the increasing bond market risk will have reduced the equity risk premium by about 4.0%. When the marginal reduction in equity market risk is considered it is easy to see why equities have earned less since 1956 than before.

Finally in Schedule 8 is the yield on the real return bond in both the US and Canada. This data is only available in the US since July 2004. However, it clearly shows that US real interest rates have recently been above those in Canada until the credit crisis hit the US in July 2007. Since that time the "flight to quality" in the US has pushed down government real bond yields to about eh same level as in Canada.

My conclusion from examining US data is that Canada and the US have marched to different drummers over this very long period, but in both cases the market risk premium since 1956 has declined due to increased returns in the bond market. What this means is that estimates of the market risk premium using long data periods from the US are as biased as they are from Canadian data unless adjustment is made for known risk factors. In my judgment recent estimates post 1956 from the US of 3.68-4.45% and from Canada of 1.84-3.13% are both biased low. In both cases they reflect bond market risk that has now largely dissipated, particularly in Canada. In my judgment a reasonable current estimate of the market risk premium is 5.0%. This is significantly higher than the evidence of realised risk premiums in the US and Canada since 1956, but reflects the diminished risk in the bond market as reflected in current yields. A 5.0% market risk premium on top of the current level of long Canada bond yields would place the equity market return at just over 9.0%, which is consistent with long run historic evidence.

Annual Rate of Return Estimates 1926-2007						
	U.S.			**CANADA**		
	S&P Equities	Long US Treasury	Excess Return	TSE Equities	Long Canadas	Excess Return
AM	12.25	5.83	6.43	11.64	6.47	5.18
GM	10.35	5.47	4.89	10.07	6.12	3.95
OLS	11.19	4.93	6.20	10.48	5.67	4.80
Volatility[1]	19.96	9.02		18.36	8.86	

1. Volatility is the standard deviation of the returns over the whole period.

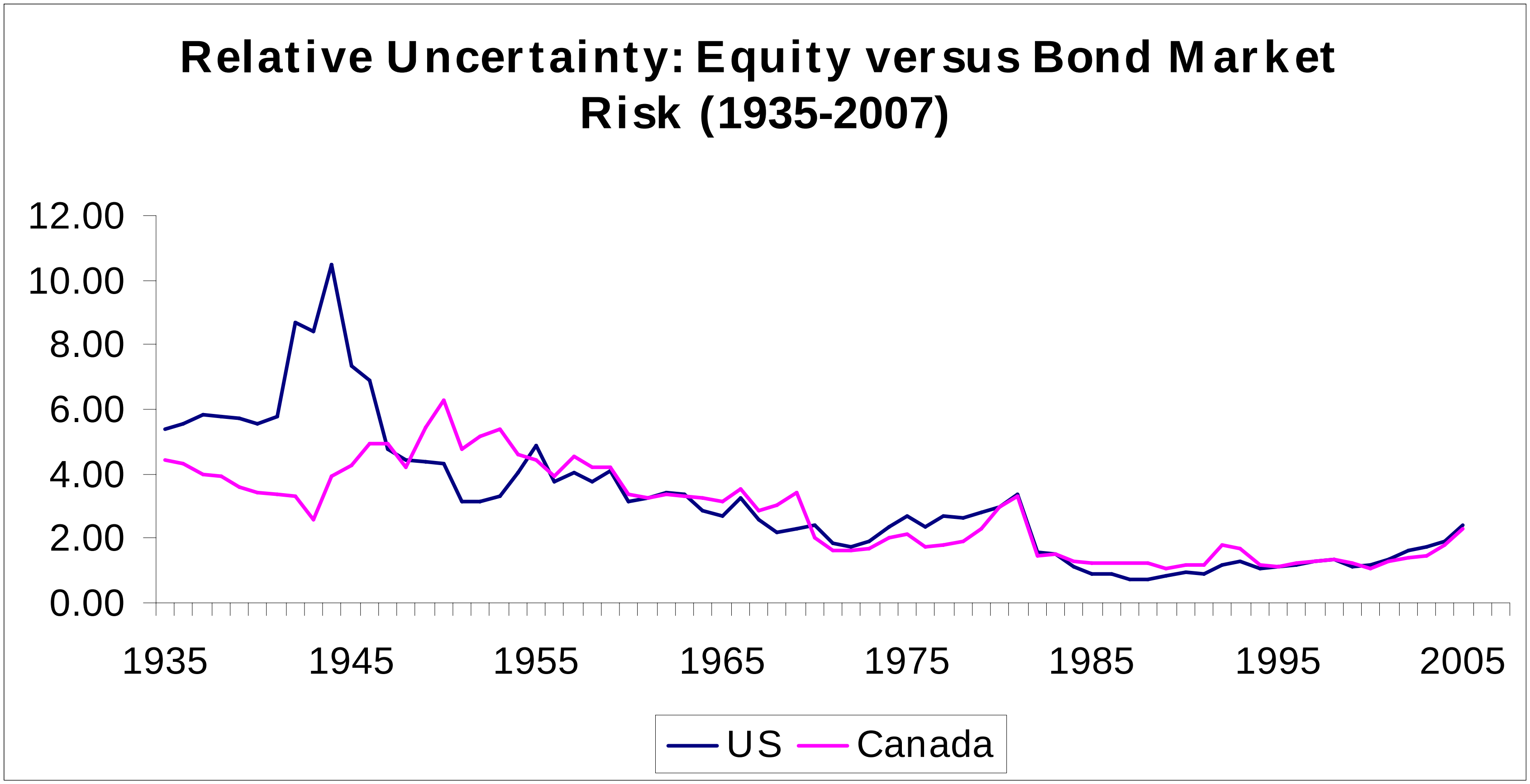
SCHEDULE 2

Equities Over Long Term Bonds in the U.S. & Canada						
	S&P500 Equities	U.S. Treasuries	Excess Return	TSE Equities	Long Canadas	Excess Return
1926-1956						
AM	13.05	3.38	**9.67**	12.55	4.00	**8.55**
GM	10.11	3.27	**6.84**	10.30	3.87	**6.42**
OLS	8.98	3.46	**5.52**	8.90	3.99	**4.91**
Volatility[1]	24.88	4.93		22.09	5.41	
1957-2007						
AM	11.77	7.32	**4.45**	11.09	7.96	**3.13**
GM	10.51	6.83	**3.68**	9.93	7.51	**2.42**
OLS	11.29	7.71	**3.58**	10.42	8.58	**1.84**
Volatility	16.54	10.55		15.89	10.17	

1. Volatility is the standard deviation of the returns over the whole period.

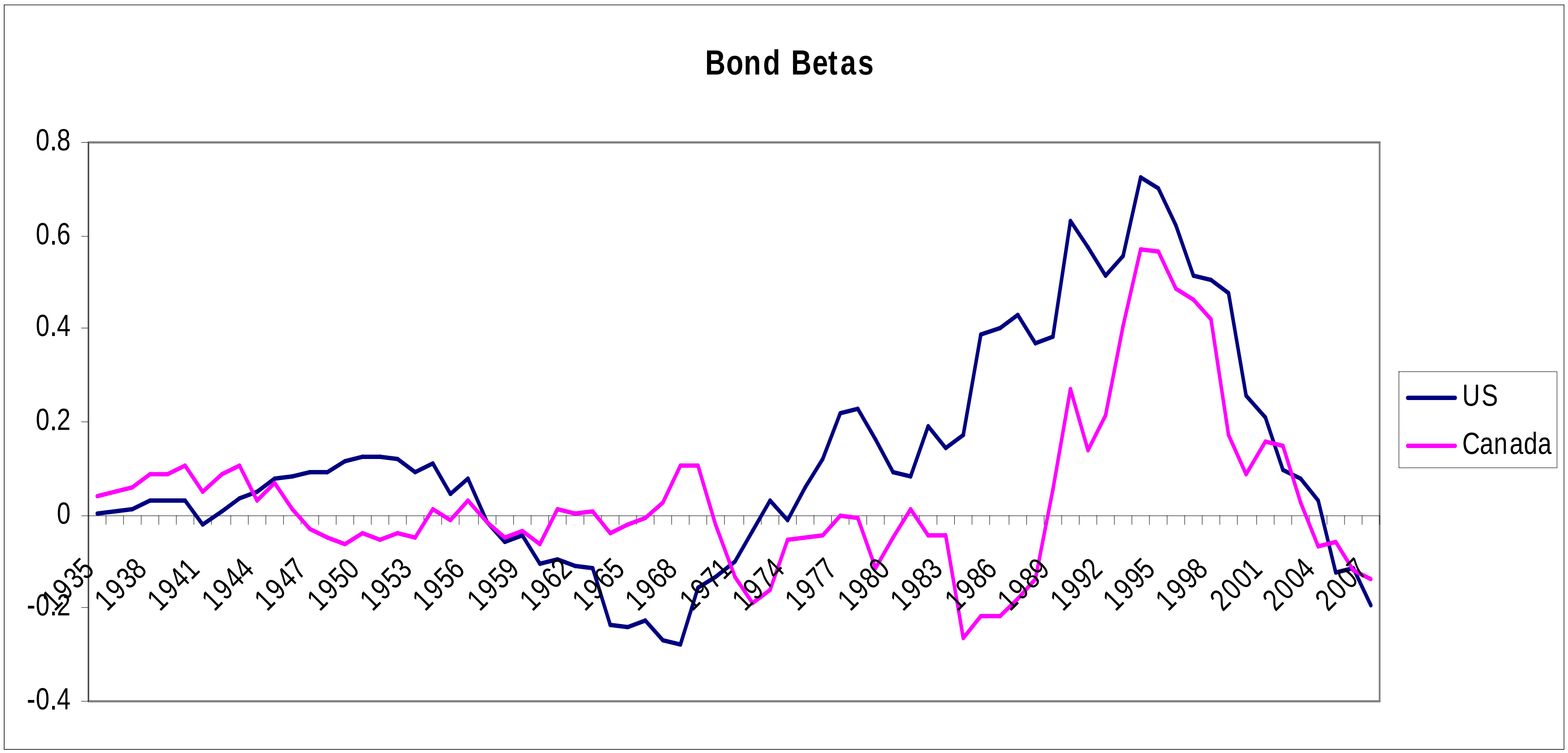
Factors Determining the Decline in the Market Risk Premium (Between 1926-56 & 1957-2007)						
	Decline in U.S. Risk Premium	Equity Returns	Bond Returns	Decline in Canadian Risk Premium	Equity Returns	Bond Returns
AM	**5.22**	1.28	3.96	**5.42**	1.46	3.96
GM	**3.16**	-0.40	3.56	**4.01**	0.37	3.65
OLS	**1.94**	-2.32	4.26	**3.07**	-1.52	4.59

A positive value for the equity or bond returns would indicate an increase in return which for equities means an increase in the market risk premium and for bonds a decrease. In both the US and Canada the decline in the ***realised*** risk premium has largely been due to much larger bond returns. The evidence in the equity market returns have been mixed due to differences across the estimation methods.



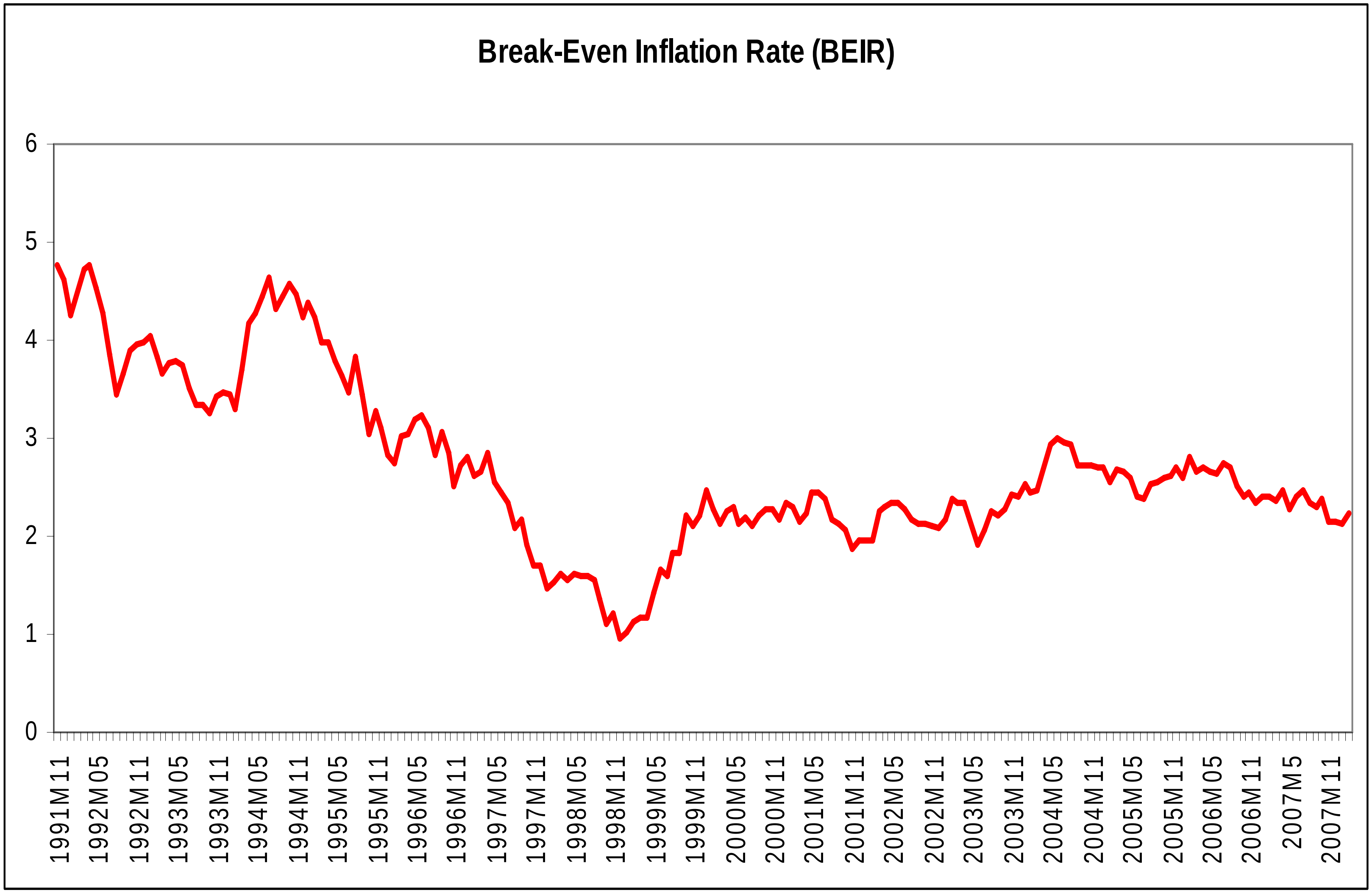
Based on the ratio of standard deviation of returns over the previous ten years

SCHEDULE 5



Based on the estimates from the returns over the previous ten years

SCHEDULE 6


Break-Even Inflation Rate (BEIR)
6
5
4
3
2
1
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1991M11
1992M05
1992M11
1993M05
1993M11
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1995M05
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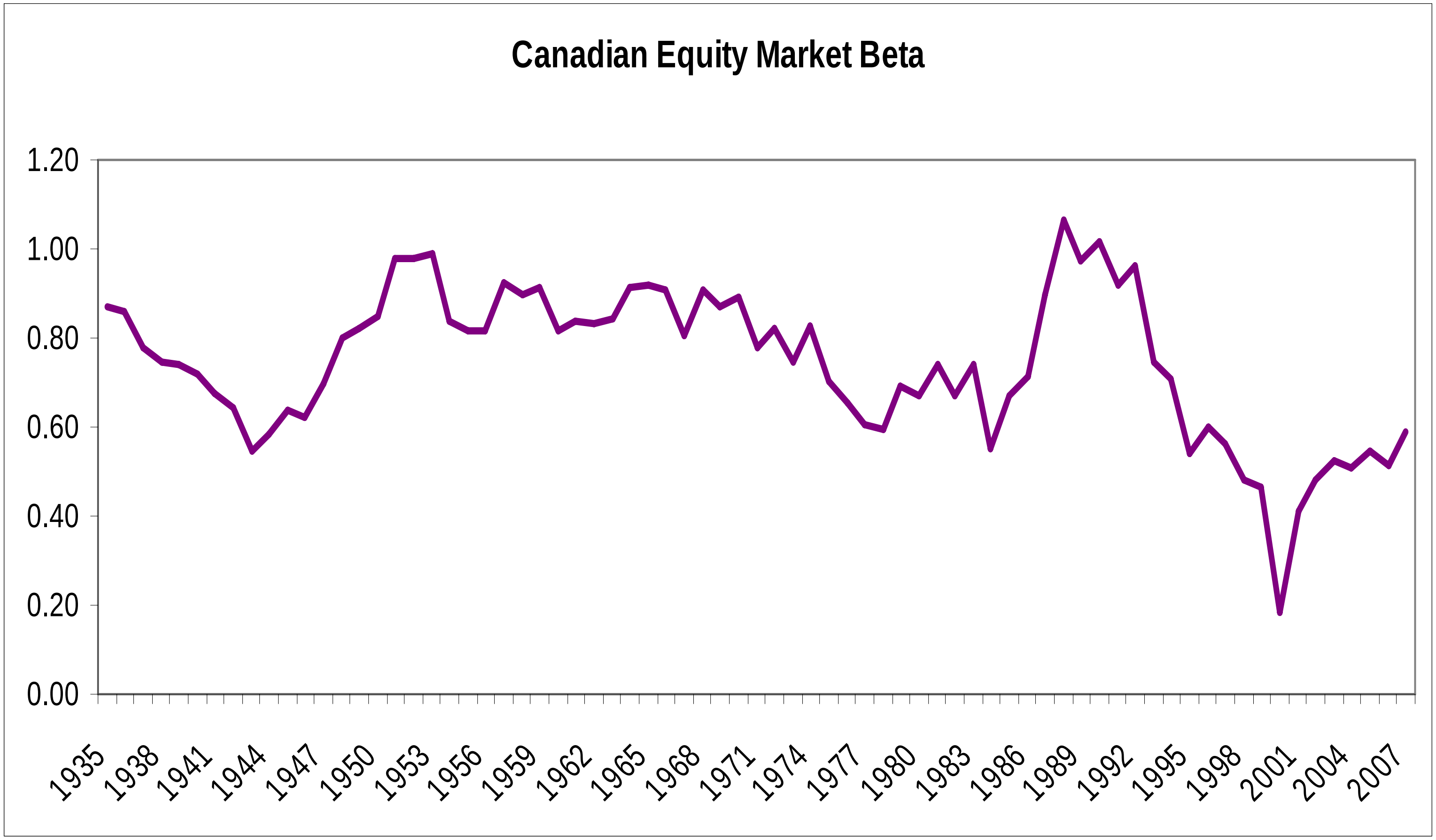
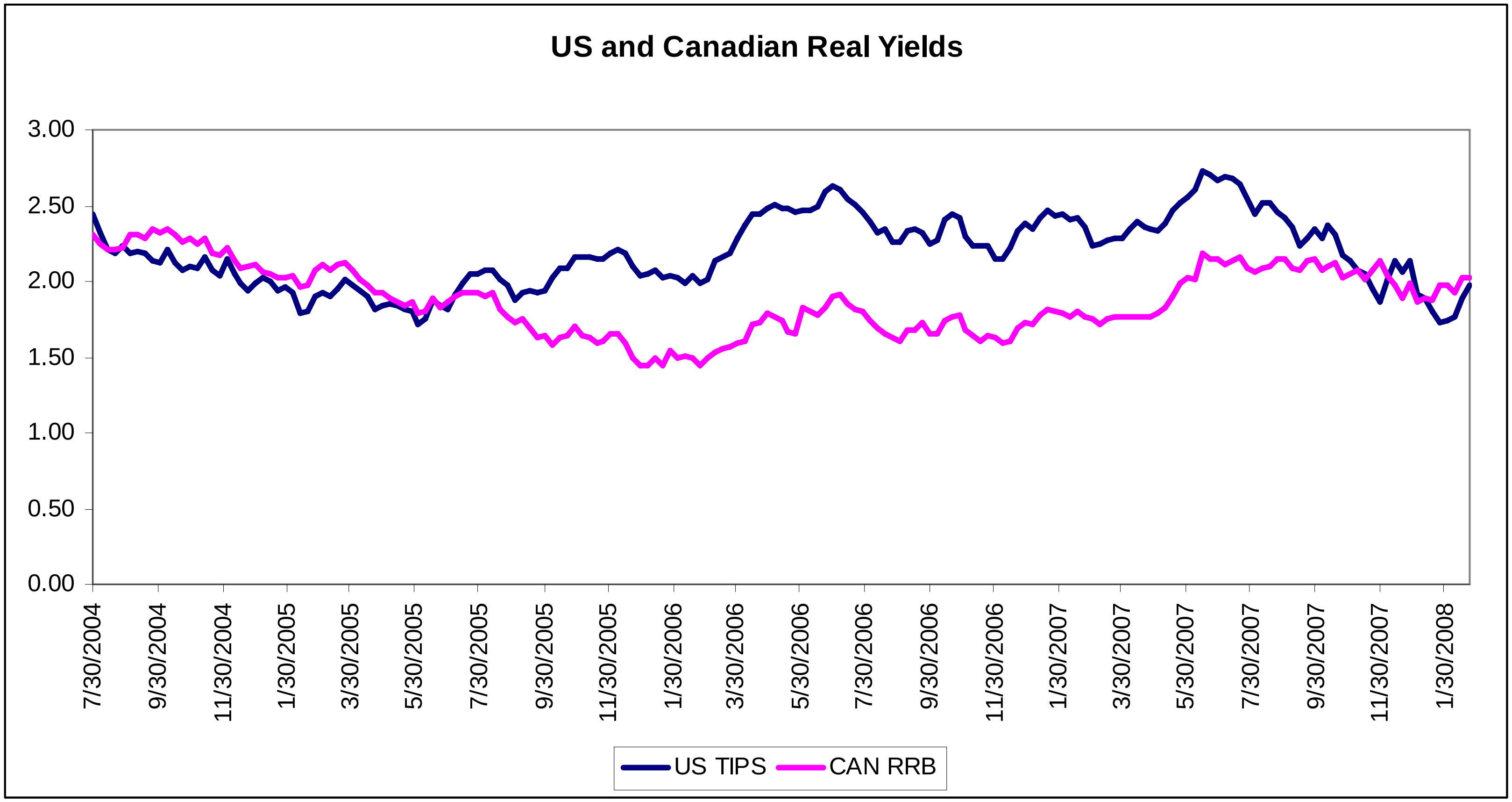
2007M5
2007M11

SCHEDULE 7



Based on the estimates from the returns over the previous ten years


US and Canadian Real Yields
3.00
2.50
2.00
1.50
1.00
0.50
0.00
7/30/2004
9/30/2004
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1/30/2005
3/30/2005
5/30/2005
7/30/2005
9/30/2005
11/30/2005
1/30/2006
3/30/2006
5/30/2006
7/30/2006
9/30/2006
11/30/2006
1/30/2007
3/30/2007
5/30/2007
7/30/2007
9/30/2007
11/30/2007
1/30/2008
US TIPS
CAN RRB

APPENDIX G

APPENDIX G

US Regulated Utilities

Introduction

Increasingly testimony is introduced into Canadian regulatory hearings using US regulated utilities as comparables. I have resisted this until now for several reasons: first the US and Canada remain two different countries and there are significant cultural, economic and financial differences; more importantly although the general justification for regulating utilities is similar, the implementation is often quite different. US utilities seem to be regulated on a complaint basis, so there seems to be considerable regulatory lag and they do not seem to be as tightly regulated in terms of their capital structures. They also make less use of deferral accounts. As a result, I see little value to introducing evidence for firms that have a different risk profile to Canadian utilities. However, since the underlying operations are similar and there is increasing uncontested evidence presented, I have started examining them.

In examining US utilities I have developed four groups: two are from testimony developed by US witnesses on behalf of their Canadian clients and the last two are from the S&P Analyst's Handbook. The first sample which is referred to as ***Vilbert*** is presented by Dr. Vilbert on behalf of TransQuebec and Maritimes Pipeline (TQM) before the National Energy Board, December 2007. This is a sample of natural gas local distribution companies (LDCs) and a description of the sample characteristics is contained in Schedule 1. The second, referred to as ***McShane,*** is presented by Ms. Kathleen McShane on behalf of Ontario Power Generation (EB2007-0905, November 2007) and represents a sample of Electric and Gas local distribution companies. The characteristics of this sample are in Schedule 2. The final two samples referred to as S&P Electric and S&P Gas and are from the S&P Analysts Handbook. A listing of these firms is in Schedule 3; note that the multi-utilities are not included.

The S & P Gas and Electric firms are the current firms contained in the S&P 500 index, which comprises 75% of the total market capitalization of the US equity markets. The key features for inclusions are as follows:

- Market cap of at least $5 billion,
- 50% public float so the firms are not closely held;
- At least four quarters of positive GAAP net income before extraordinary items and discontinued operations;
- Adequate liquidity, which means more than 30% f the market cap is traded each year;

In addition S&P strives for representative coverage of the US economy and focuses on regular corporations not closed end mutual funds or units. These criteria are for inclusion in the index; once in the index a firm would have to “substantially” violate these criteria to be deleted. So, for example, the smallest market cap at present is $0.71 billion, much less than the market cap required for inclusion.

There is some overlap between the three samples: Nicor makes the S&P Gas and McShane sample, but not Vilbert; Southern Co, FPL make the S&P Electric sample and McShane, but not Vilbert, since they are electric companies; and WGL Holdings, Vectren, Piedmont Natural Gas, Northwest Natural Gas, New Jersey Resources and AGL Resources make both the McShane and Vilbert samples, but are too small to be in the S&P500 index. By and large the McShane and Vilbert companies that are not included in S&P Gas or Electric are simply too small: the biggest market cap of the firms in Vilbert, for example, is AGL Resources at $3 billion, which is significantly below the $5 billion required for inclusion in the S & P Index.

So how risky are these US comparables? In Schedule 3 is a graph of their beta coefficients since January 1973. These betas are estimated in the conventional way using monthly data over five year time periods. The first observation is for the five year period from January 1973 until December 1977; then each month a new beta is estimated by adding the new month and deleting the oldest one. This procedure allows an examination of the betas over time, since betas reported by Ms. McShane and Dr. Vilbert are mechanically adjusted by averaging with 1.0. This procedure increases the beta estimates for these low risk firms on the assumption that the observed beta has estimation error and the true beta is 1.0, which is the average for all stocks. By observing the betas over time we can visually confirm whether or not the betas trend towards 1.0 or have any other pattern over time.

In looking at the betas several observations are apparent:

- Generally utility risk has declined in the US over time;
- For the last twenty years all four samples have moved together indicating relatively homogenous "utility" risk;
- There is no evidence that US utility betas "regress" towards 1.0 as is implied in the beta adjustment models implicitly used by Ms. McShane and Dr. Vilbert.
- US utility betas exhibit the same "Internet Bubble" effect[1] observed in Canada: betas were very low in the early 2000's and were negative for the large S&P Electrics sample. However, the effect was not as severe as in Canada;
- The most recent beta estimates are around 0.4-0.6 which is a return to their "normal" range of the last twenty years;
- The S&P Gas sample is relatively unreliable, not only are the estimates higher than the others, but there are now only two firms in the sample since Peoples Energy Ltd merged with WPS Resources in February 2007 to form Integrys Energy Group;
- The S&P Electric sample seems to be marginally higher risk than either the McShane or Vilbert samples.

For the last 25 years, including data from January 1984 until December 2007, the average betas were as follows:

Average Betas 1984-2007

Vilbert	McShane	S &P Electric	S&P Gas
0.257	0.318	0.400	0.486

This 25 year period covers the period after interest rates and inflation declined significantly so the effects of regulatory lag were reduced. The fact that the McShane and Vilbert samples generally have lower betas confirms that their selection criteria have formed samples of relatively low risk US utilities.

If we take the intersection of the McShane and Vilbert samples we have the following firms: AGL, New Jersey Resources; Northwest; Piedmont, Vectren and WGL.[2] The betas for these firms, along

1 This was probably also an Enron or California electric effect.
2 It is not immediately obvious why for 5 out of 6 of these firms their S & P bond ratings differ in the schedules prepared by Ms. McShane and Dr. Vilbert. It could be that some are corporate ratings and others ratings attached to particular bond issues.

with the sample average, is graphed in Schedule 5, where the long run secular decline in beta risk is very obvious. Their actual year end betas were as follows:

	AGL	NJ Resour	Northwest	Piedmont	Vectren	WGL	Average
31/12/1998	0.586	0.460	0.471	0.505	0.339	0.482	0.473739
31/12/1999	0.424	0.326	0.189	0.297	0.136	0.286	0.276559
31/12/2001	0.263	0.240	0.070	0.160	0.168	0.204	0.184257
31/12/2001	0.263	0.240	0.070	0.160	0.168	0.204	0.184257
31/12/2002	0.227	0.092	-0.097	0.097	0.215	0.149	0.113864
31/12/2003	0.205	0.029	-0.176	-0.038	0.334	0.129	0.080543
31/12/2004	0.301	0.106	0.014	0.121	0.456	0.224	0.203392
30/12/2005	0.383	-0.046	0.058	0.253	0.341	0.222	0.201797
29/12/2006	0.375	0.024	0.142	0.330	0.514	0.269	0.27566
31/12/2007	0.496	0.514	0.750	0.578	0.564	0.697	0.599749

From this data I conclude that US utility betas are similar to those for Canadian utility holding companies (UHCs) and that the general range of 0.45-0.55 as a forward beta estimate that I have been using continues to be reasonable for operating companies.

It is interesting to look at the composite financial information available in the Analyst Handbook. In Schedules 6 & 7 are the debt ratios and times interest earned ratios for both the S&P electric and gas firms. Note that these averages are for the firms that were in the S&P index at that time. For example in 1993 there were 24 Electric and 13 Gas companies in the S&P 500 index, but by 2006 this had dropped to 11 and 3 respectively as mergers and acquisitions reduced the number of "pure play" utilities. Consequently we should not view these values as a "time series," since the firms involved have changed over time. However, the debt ratios and interest coverage ratios at a point in time reflect the values for electric and gas companies included in the index at that point in time and are still useful for comparison purposes.

It is important to note that the average debt ratio reported by S & P over the whole time period was 63.47% in a range 50.4%-83.47% for the Electrics and an average of 64.25% in a range 53.63%-78.99% for the Gas Utilities. Similar to Canada the use of preferred shares declined from 3 - 6% in 1993 to 0 - 1.3% by 2006. The average times interest earned coverage ratio was

2.64 for the Electrics in a range 1.90-3.39 and an average 2.71 in a range 1.79-3.35 for the gas utilities. These S & P utilities are all relatively large holding companies with significant operating assets, as well as often non-regulated operations. As a result the parent company debt ratios reflect a variety of influences much as did the debt ratio of Westcoast Energy before it was bought by Duke. They therefore reflect the decisions of management rather than the decisions of regulators. What is clear is that average debt ratios of 64% plus some preferred shares, implies common equity ratios not unlike those for regulated utilities in Canada.

The market to book ratios for these utilities is graphed in Schedule 8 and was well above 1.0 throughout this period and has been increasing for the last several years.

Table 2: Characteristics of the Gas LDC Sample

Company [1]		Revenue (2006) ($MM) [2]	Regulated Assets [3]	Cap. (2006) ($MM) [4]	S&P Credit Rating (2007) [5]	Beta Estimate [6]	Long-Term Growth Estimate [7]
AGL Resources Inc (FL, GA, MD, NJ, TN, VA)		2,621	MR	3,049	A	0.90	4.8%
Atmos Energy Corp (CO, GA, IA, IL, KS, KY, LA, MO, MS, TN, TX, VA)		6,152	R	2,619	BBB	0.67	5.7%
The Laclede Group (IL, IN, MO)	•	1,998	R	759	A	0.82	4.2%
New Jersey Resources (NJ)		3,300	MR	1,380	A	0.67	4.1%
Northwest Natural Gas (OR,WA)	•	1,013	R	1,151	AA	0.60	5.2%
Piedmont Natural Gas (NC, SC, TN)	•	1,925	R	2,049	A	0.67	4.5%
South Jersey Industries (NJ)		931	MR	974	BBB	0.52	6.5%
Southwest Gas Corp (AZ, CA, NV)	•	2,025	R	1,601	BBB	0.75	5.5%
Vectren Corp (IN, OH)		2,042	R	2,170	A	0.90	3.4%
WGL Holdings Inc (DC, MD, VA)	•	2,638	R	1,607	AA	0.75	4.3%

Sources and Notes

[1] Operating region as reported in company annual reports for significant operations.

[2] Bloomberg, August 28, 2007.

[3] Key: R – Regulated (More than 80 % of assets regulated).
MR – Mostly Regulated (50 % to 80 % of assets regulated).
Source: 2006 Company 10-K's. See Table MJV-13.

[4] Bloomberg, August 28, 2007.

[5] Bloomberg, August 28, 2007.

[6] Value Line Investment Survey – see Workpaper # 1 to Table MJV-20.

[7] See Table MJV-16.

• Company included in gas LDC sub-sample (see text for discussion).

SCHEDULE 2

Filed: 2007-11-30
EB-2007-0905
Exhibit C2
Tab 1
Schedule 1
Page 232 of 261
Schedule 13

INDIVIDUAL COMPANY RISK DATA FOR BENCHMARK SAMPLE OF US ELECTRIC AND GAS UTILITIES

	Value Line									S & P		Moody's	Average
	Safety	Earnings Predictability	Financial Strength	Forecast Common Equity Ratio 2010-2012	Forecast Return On Average Common Equity 2010-2012	Dividend Payout Forecast 2010-2012	Beta	Research Insight Beta 1/	Common Equity Ratio 2006	Business Profile	Debt Rating	Debt Rating 2/	Market/ Book Ratio 1994-2006
AGL Resources	2	75	B++	50.8%	14.2%	58.1%	0.95	0.58	42.7%	4	A-	A3	1.76
Consol. Edison	1	85	A++	50.5%	9.1%	70.6%	0.75	0.43	47.0%	2	A	A2	1.49
FPL Group	1	80	A+	51.0%	12.4%	51.8%	0.85	0.69	44.6%	5	A	A2	1.89
Integrys Energy	2	70	B++	49.5%	11.1%	65.7%	0.85	0.66	42.4%	5	A-	A3	1.62
New Jersey Resources	1	95	A	69.3%	10.7%	54.6%	0.80	0.39	50.2%	2	A+	na	2.19
NICOR Inc.	3	75	A	69.0%	13.2%	63.5%	1.30	0.99	50.7%	3	AA	A3	2.28
Northwest Nat. Gas	1	80	A	52.0%	11.6%	60.0%	0.75	0.44	48.1%	1	AA-	A3	1.56
NSTAR	1	95	A	55.5%	15.7%	58.3%	0.80	0.64	34.4%	1	A+	A2	1.74
Piedmont Natural Gas	2	80	B++	52.8%	11.2%	71.9%	0.80	0.60	47.0%	2	A	A3	2.00
SCANA Corp.	2	95	A	49.0%	11.1%	61.5%	0.85	0.70	43.4%	4	A-	A3	1.64
Southern Co.	1	95	A	44.0%	13.0%	74.0%	0.70	0.33	40.6%	4	A	A3	2.08
Vectren Corp.	2	70	A	51.0%	10.5%	71.5%	0.95	0.71	40.6%	4	A-	Baa1	1.91
WGL Holdings Inc.	1	65	A	64.5%	11.1%	63.3%	0.85	0.54	52.2%	3	AA-	A2	1.71
Mean	**2**	**82**	**A**	**54.5%**	**11.9%**	**63.4%**	**0.86**	**0.59**	**44.9%**	**3**	**A**	**A2**	**1.84**
Median	**1**	**80**	**A**	**51.0%**	**11.2%**	**63.3%**	**0.85**	**0.60**	**44.6%**	**3**	**A**	**A3**	**1.76**
Weighted Average	**1**	**86**	**A**	**50.0%**	**12.0%**	**64.6%**	**0.80**	**0.53**	**43.5%**	**4**	**A**	**A2**	**1.84**

1/ Calculated using monthly data against the S&P 500 (60 months ending June 2007); adjusted towards the market mean of 1.0.

2/ Rating for WGL Holdings is Washington Gas Light.

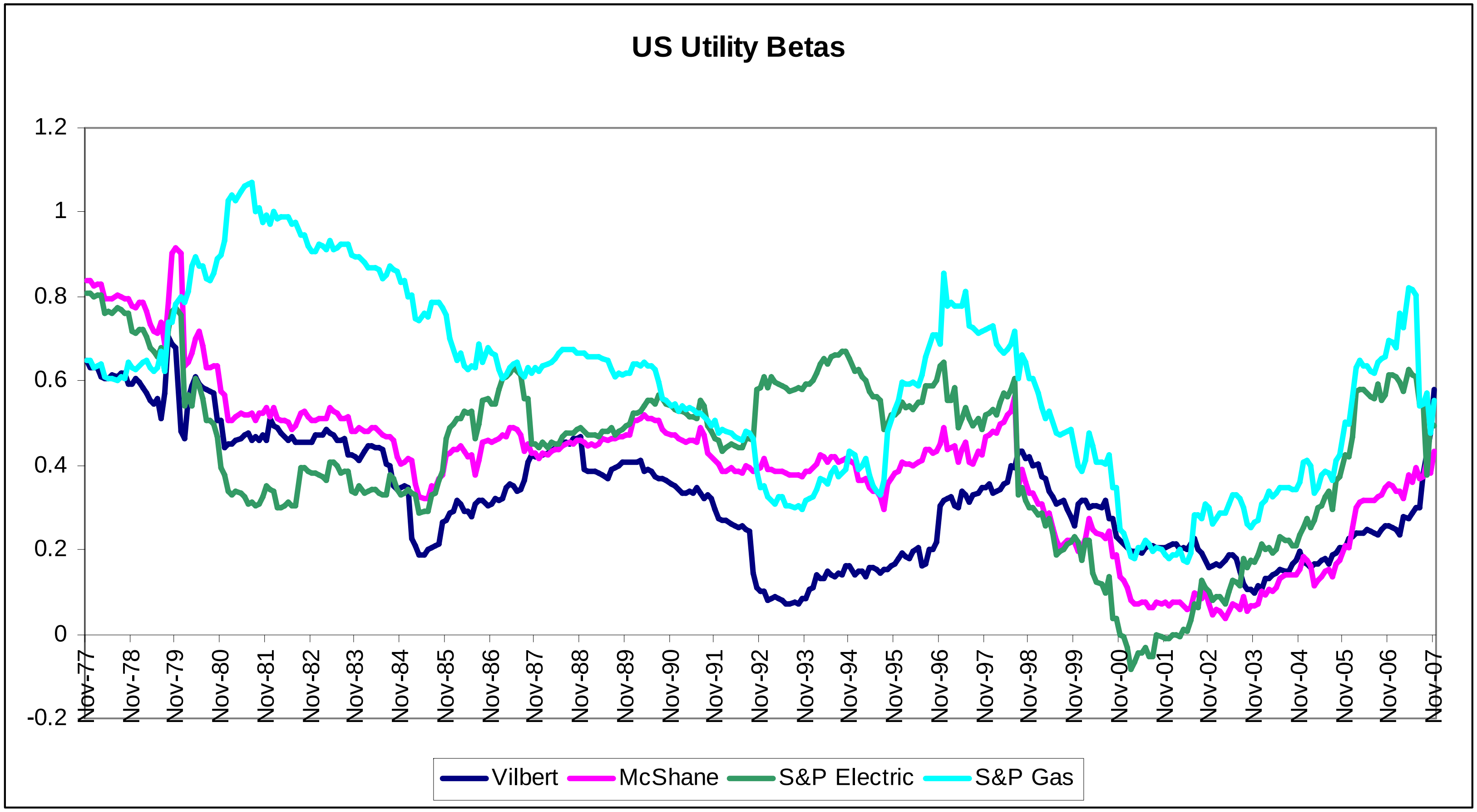
Source: Standard and Poor's Research Insight, Value Line (June 2007), www.Moodys.com,
Standard and Poor's, *Issuer Ranking: U.S. Integrated Utility And Merchant Power Companies, Strongest To Weakest* (July 24, 2007) and

SCHEDULE 3

Standard and Poors Utility Index (5510)

Utilities (5510)
- **Electric Utilities (551010)**
  - **Electric Utilities (55101010)**
    - Allegheny Energy (AYE)
    - American Electric Power (AEP)
    - Edison Int'l (EIX)
    - Entergy Corp. (ETR)
    - Exelon Corp. (EXC)
    - FirstEnergy Corp. (FE)
    - FPL Group (FPL)
    - Pinnacle West Capital (PNW)
    - PPL Corp. (PPL)
    - Progress Energy, Inc. (PGN)
    - Southern Co. (SO)
- **Gas Utilities (551020)**
  - **Gas Utilities (55102010)**
    - NICOR Inc. (GAS)
    - Peoples Energy (PGL)
    - Questar Corp. (STR)
- **Multi-Utilities (551030)**
  - **Multi-Utilities (55103010)**
    - Ameren Corporation (AEE)
    - CenterPoint Energy (CNP)
    - CMS Energy (CMS)
    - Consolidated Edison (ED)
    - Dominion Resources (D)
    - DTE Energy Co. (DTE)
    - Duke Energy (DUK)
    - Keyspan Energy (KSE)
    - NiSource Inc. (NI)
    - PG&E Corp. (PCG)
    - Public Serv. Enterprise Inc. (PEG)
    - Sempra Energy (SRE)
    - TECO Energy (TE)
    - Xcel Energy Inc (XEL)
- **Water Utilities (551040)**
  - **Water Utilities (55104010)**
- **Independent Power Producers & Energy Traders (551050)**
  - **Independent Power Producers & Energy Traders (55105010)**
    - AES Corp. (AES)
    - Constellation Energy Group (CEG)
    - Dynegy Inc. (New) Class A (DYN)
    - TXU Corp. (TXU)

SCHEDULE 4



US Utility Betas
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0.6
0.4
0.2
0
-0.2
Nov-77
Nov-78
Nov-79
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Nov-81
Nov-82
Nov-83
Nov-84
Nov-85
Nov-86
Nov-87
Nov-88
Nov-89
Nov-90
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Nov-96
Nov-97
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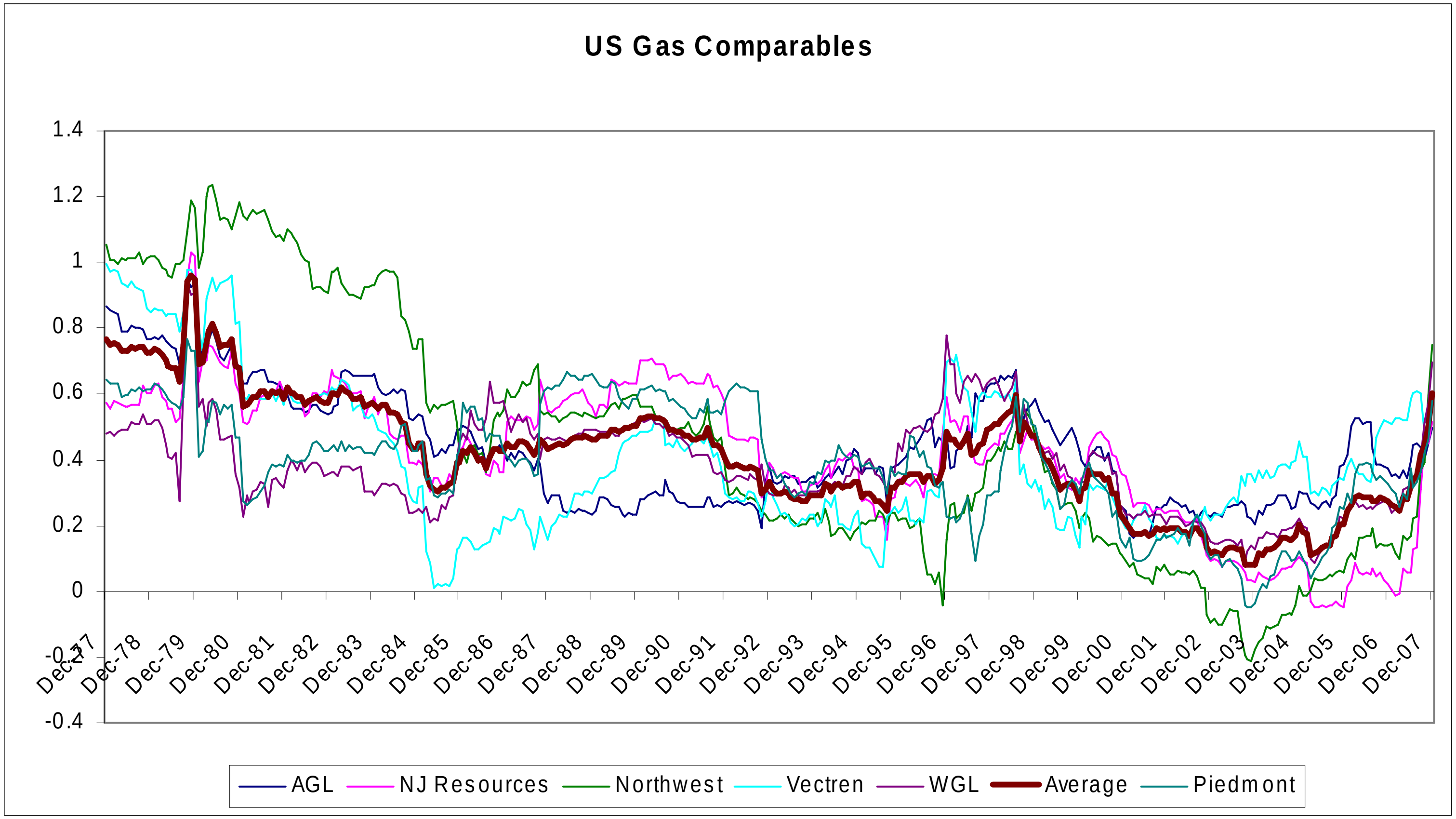
Vilbert
McShane
S&P Electric
S&P Gas


US Gas Comparables
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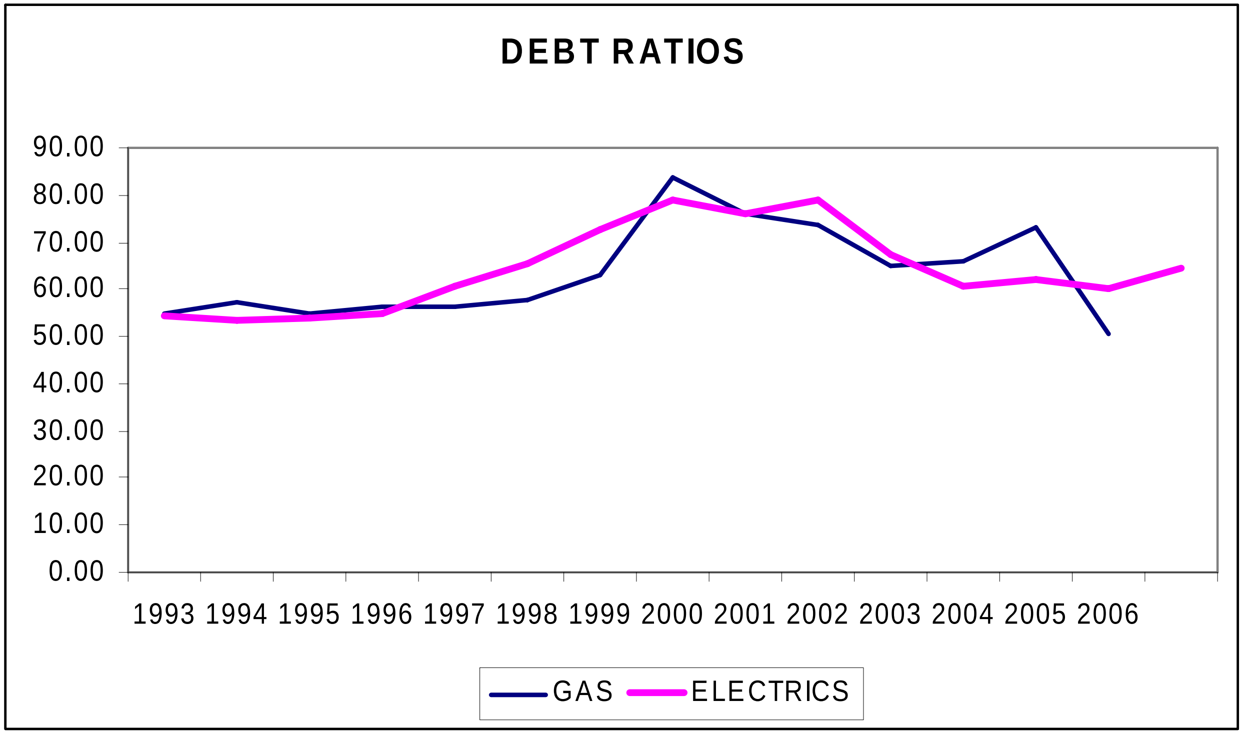
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
Dec-77
Dec-78
Dec-79
Dec-80
Dec-81
Dec-82
Dec-83
Dec-84
Dec-85
Dec-86
Dec-87
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Dec-07
AGL
NJ Resources
Northwest
Vectren
WGL
Average
Piedmont

SCHEDULE 6


DEBT RATIOS
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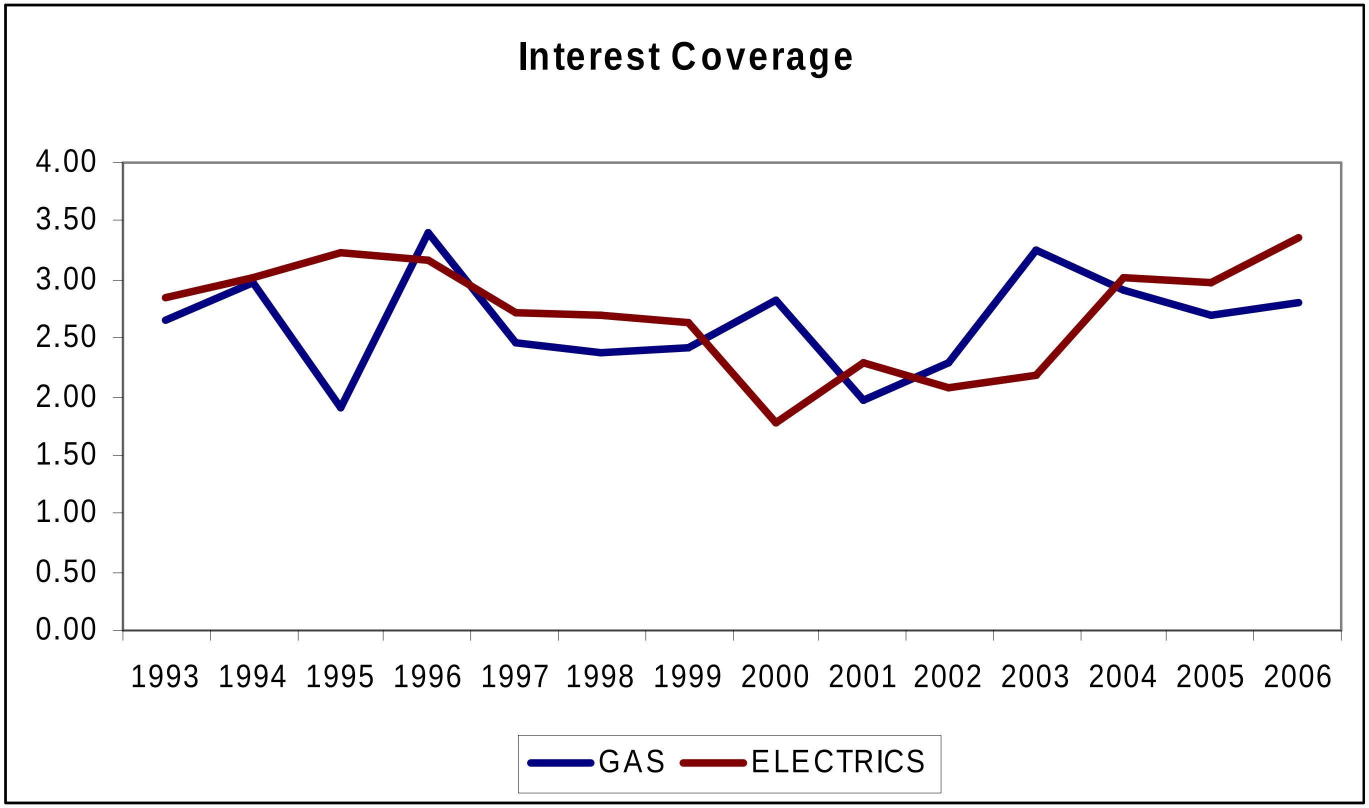
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006
GAS
ELECTRICS


Interest Coverage
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3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1993
1994
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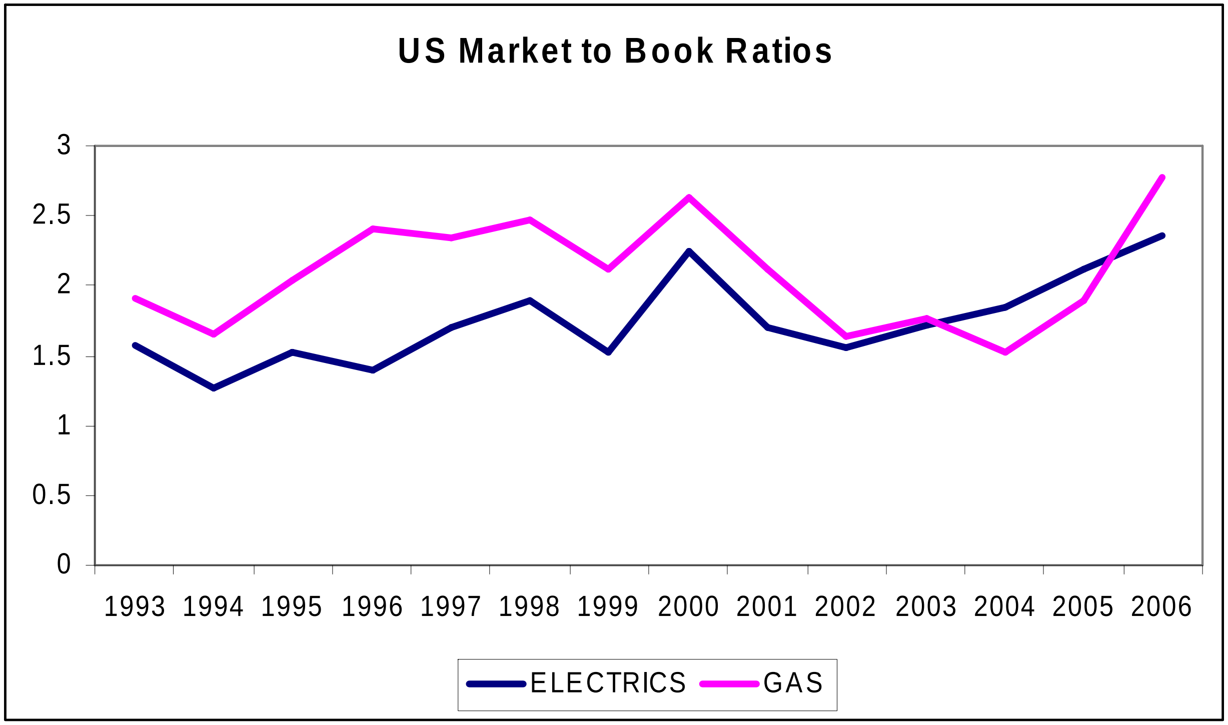
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
GAS
ELECTRICS


US Market to Book Ratios
3
2.5
2
1.5
1
0.5
0
1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006
ELECTRICS
GAS