I. INTRODUCTION

We are Thomas D Crowley and Daniel L Fapp We are economists and, respectively, the President and a Vice President of L E Peabody & Associates, Inc Our qualifications and experiences are attached as Exhibit Nos 1 and 2, respectively, to our Opening Verified Statement that was filed in this proceeding on September 27, 2007 ("Crowley/Fapp Opening VS").[1]

In this Reply Verified Statement, we respond to certain comments submitted by Dr Stewart C Myers ("Myers") and Dr R Glenn Hubbard and Dr Bruce E Stangle ("Hubbard/Stangle") on behalf of the Association of American Railroads ("AAR") in the AAR's opening statement in this proceeding Specifically, we comment on the following issues (1) the appropriate surrogate for the risk-free rates of return to use in developing Beta estimates, developing the equity risk premium and applying the inputs to the Capital Asset Pricing Model ("CAPM"), (2) the appropriate time period over which to develop Beta estimates as well as the reasonableness of the STB's estimated railroad company Betas, (3) the proper procedures to develop estimates of the equity risk premium, as well as the reasonableness of the STB's estimate of the equity risk premium, (4) the use of a multi-stage Discounted Cash Flow ("DCF") model in estimating the railroad industry cost of equity, and (5) other related issues raised by Myers and Hubbard/Stangle

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1 We add that developing the cost of capital for railroads has been a regular part of the practice of each of us during our tenure at L E Peabody & Associates Inc (36 years in the case of Mr Crowley and ten years in the case of Mr Fapp) Our analyses have been relied upon by a broad cross-section of clients including the United States Department of Transportation and other government agencies, utility companies, mining companies, and railroad companies Our comments here, like our previous comments, including those submitted by Mr Crowley concerning the 2005 cost of capital (in which Mr Fapp assisted), are well-documented in terms of reliance on respected studies and publications, including various publications by Dr Myers

We summarize our testimony below under the following topical headings and in the accompanying Exhibits

II Risk-Free Rates Of Return

III Beta Estimates

IV Equity Risk Premium Estimates

V Use of Multi-Stage DCF Model

VI Other Issues

II. RISK-FREE RATES OF RETURN

As we indicated in our Opening VS, the choice of the risk-free rate of return is a major factor in developing the inputs to, and the development of, the CAPM. Analysts use the risk-free rate to develop both Beta estimates and estimates of the equity risk premium. In addition, the risk-free rate of return is a direct input into the CAPM. [2/]

The STB has proposed using yield-to-maturity ("YTM") on 10-year Treasury Bonds ("T-Bonds") as its estimate of the risk-free rate. [3/] The STB stated that it chose the 10-Year T-Bond because it is the longest T-Bond continuously issued, because a large majority of analysts use T-Bonds with maturities of 10 years or longer in their analyses and because the longer-term yield better matches the long-term nature of railroad investments. [4/]

Both Myers and Hubbard/Stangle take issue with the STB's proposed use of the 10-Year T-Bond as a surrogate for the general risk-free rate, as well as how the STB applied the 10-Year T-Bond in the STB's proposed CAPM methodology. First, Myers states that in developing an estimate of the equity risk premium, the STB should use the YTM on the underlying debt instrument and not the then current yield on the debt. [5/] Second, Hubbard/Stangle state that the STB should consider only the portion of the T-Bond price associated with default risk of the bond and not the interest rate risk

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2/ See Crowley/Fapp Opening VS at 7

3/ See STB Ex Parte No. 664, *Methodology To Be Employed In Determining The Railroad Industry's Cost of Capital*, served August 20, 2007 ("Ex Parte 664") at 10

4/ Id

5/ See Myers at 9

of the bond when estimating the equity risk premium [6] Third, both Hubbard/Stangle and Myers state that the source of the long-term risk-free rate of return used in developing the equity risk premium should also be the same source used in developing a CAPM estimated cost of equity [7] Fourth, Myers states that the STB should develop Beta estimates using a short-term Treasury Bill ("T-Bill") rate instead of a long-term T-Bond rate as proposed by the STB [8]

We concur with Hubbard/Stangle and Myers that the STB should use the YTM in developing an estimate of the equity risk premium rather than the current yield and that only the portion of the T-Bond rate of return associated with the coupon default risk should be considered in developing the equity risk premium We note though, that while we did not have access to the STB's proprietary CRSP T-Bond data, the STB did forward to us detailed descriptions of the data it acquired from CRSP These descriptions indicate that the STB acquired from CRSP the YTM on 10-Year T-Bonds, and apparently used this data in its calculations

We also agree with Hubbard/Stangle and Myers that the T-Bond rate used in developing the equity risk premium should also be the risk-free rate used in a CAPM estimate of the cost of equity [9]

Finally, we also concur with Myers that in developing Beta estimates, the effective YTM on short-term T-Bills should be used instead of the longer-term T-Bond YTM We tested the difference

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[6] See Hubbard/Stangle at 12-13

[7] See Hubbard/Stangle at 10-11 and Myers at 9

[8] See Myers at 10

[9] Myers also states that the STB used a 20-Year T-Bond to develop its equity risk premium However, examination of the STB's workpapers shows no 20-Year T-Bond data was acquired or used by the STB Without direct access to the STB's workpapers, which is prohibited given the STB's license agreement with CRSP, we are unable to determine if Myers' statement is correct We agree that use of data that did not include the CRSP restrictions would facilitate the discussion of such matters

in using T-Bill and T-Bond data over the 1997 to 2005 time period and found the difference *de minimus*. These results are displayed in Exhibit No. 4 to this verified statement.[10/]

[10/] Exhibit No. 1 through Exhibit No. 3 were included with our opening verified statement filed in this proceeding on September 27, 2007.

III. BETA ESTIMATES

Beta on common equity measures the systematic risk of stock relative to the risk of the market as a whole [11] Analysts and financial researches have developed various methods for estimating Betas, but most customarily develop estimates of equity Beta through the use of an ordinary least squares ("OLS") regression model To develop Beta estimates using OLS, the following four preliminary issues must be resolved (1) the length of the total time period over which returns are measured, (2) the periodicity of the measurement within the time period selected, (3) the choice of a market index to use as a market proxy, and (4) the risk-free rate

The STB proposed a 10 year, or 120 month, analysis period in its OLS regression model using monthly New York Stock Exchange ("NYSE") Index returns as its surrogate for the return on the market and 10-Year T-Bond data as its surrogate for the risk-free rate As discussed above, Myers suggested the use of short-term T-Bill return data in lieu of the 10-Year T-Bond data in the OLS estimate, in which we concur, and neither Hubbard/Stangle nor Myers take strong exception to the use of NYSE data as a surrogate for the market [12] Also, neither Hubbard/Stangle nor Myers stated that the use of monthly data was inappropriate Use of weekly data would provide more data points, but the trade-off could well be the introduction of additional statistical noise

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[11] See Crowley/Fapp Opening VS at 15

[12] Myers indicates that the NYSE Index is not as widely used as the Standard & Poor's Composite Index ("S&P 500"), but does not appear to directly state the STB should disregard using the NYSE S&P 500 data has the virtue of being readily available without the CRSP restrictions We note that Value Line appears to derive its Beta estimates from NYSE data

Hubbard/Stangle and Myers take issue with the STB's proposed use of a 10-year OLS regression period [13/] Both Hubbard/Stangle and Myers point out that most commercial suppliers of Beta estimates use analysis periods of five (5) years or less Additionally, both Hubbard/Stangle and Myers express concerns that a 10 year regression period would incorporate data that is no longer relevant in a changed railroad industry and incorporate atypical general economic data Finally, both parties believe that the STB's methodologies produce Beta estimates that are too low relative to Beta estimates produced by financial data firms We discuss Hubbard/Stangle's and Myers's time period concerns below

A. APPROPRIATE TIME PERIOD

In Ex Parte 664, the STB proposes to calculate Beta estimates for the individual railroads using 10 years, or 120 months of data [14/] The STB believes a 10 year period balances the desire to eliminate statistical noise and achieve stability in the estimate, while allowing for the fact that a railroad's Beta may change over time [15/]

Hubbard/Stangle and Myers take exception to the STB's proposed use of a 10 year analysis period Both indicate that most commercial financial data suppliers use analysis periods of five (5) years or less in their estimates of company Betas [16] Hubbard/Stangle believe that the railroad

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[13/] Both Myers and Hubbard/Stangle also indicate that they believe if the STB were to continue to develop its own estimates of railroad company Betas using OLS regression, that parties should regress with an intercept term See Hubbard/Stangle at n 8, and Myers at n 12 This is our position as well See Crowley/Fapp Opening VS at 22-23 However, to test the impact of the intercept on the STB's Beta estimates, we performed OLS regressions using the STB's proposed procedures, but including an intercept term in the OLS analysis The results, which we include in Exhibit No 5 to this verified statement, show very little impact on the STB's Beta estimates

[14/] See Ex Parte 664 at 11

[15/] Id

[16/] See Hubbard/Stangle 8 and Myers at 10

industry has changed too much in the preceding decade, and that 10 years of data may not capture the current returns expected of the railroads [17] Myers also believes that utilizing 10 years of historic data would incorporate the impact of the "dot com" boom of the late 1990's, which may inappropriately impact the Beta estimates [18]

As we noted in the in our Opening Verified Statement, the STB's proposed use of a 10 year analysis period is outside the norm of analysis periods used by commercial suppliers of financial data [19] We also stated that the relative maturity of the railroad industry would not greatly impact Beta estimates based on 10 years of data instead of five years of data To test this assumption, we developed railroad specific Beta estimates using the STB's proposed methodology using five year analysis periods in lieu of the 10 year periods proposed by the STB As shown in Exhibit No 6 to this verified statement, the Betas produced using 60 month analysis periods are very similar to the Betas estimated by the STB for this range of data [20]

There is also research indicating that the use of a longer analysis period in the development of OLS regression analysis period may be beneficial by providing more stable estimates of Beta Early studies of Beta estimates highlighted the fact that Beta estimates of individual securities tend to be

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17 See Hubbard/Stangle at 7
18 See Myers at 10
19 See Crowley/Fapp Opening VS at 16
20 This is not to say the estimates are identical, but when viewed against Beta comparisons presented by others in this proceeding, the differences are relatively small For example, the single largest absolute difference shown in Exhibit No 6 to this verified statement is the CSX Beta estimates for 1999 with a difference of 0 28 In comparison, Myers's Table 1a shows an absolute difference in the Beta comparisons for NS of 1 12 The differences implicit in the Beta estimates contained in Exhibit No 6 pale in comparison to this extreme range

substantially more unstable than the Betas of a portfolio of securities [21] This instability could be mitigated however by the use of longer analysis periods Dr Jerome Baesel used monthly data to estimate Betas using estimation intervals of one year, two years. four years. six years and nine years [22] Dr Baesel found that as the estimation period increased, the stability of the Beta increased as well, concluding, " the forecaster will be better off using longer estimation interval "[23]

A recent study of equity returns in the Australian market found that longer measurement periods improve the accuracy of Beta estimates A report prepared for the Energy Networks Association investigated the optimal estimation period for equity Betas [24] The researchers in the study developed equity Beta estimates using 4, 5, 6, 7, 8, 9 and 10 years of monthly observation periods, and used the estimates to forecasts returns in the subsequent quarter [25] They then compared the forecast performance of the computed Betas The results indicated that Beta estimates created from longer estimation intervals outperformed those from intervals of five (5) years or less The researchers concluded

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21 See "*On the Assessment of Risk*," Blume, Marshall, *Journal of Finance*, Vol 26, March 1971, pp 1-11 This is also consistent with Myers findings that the Beta of a portfolio of railroad equities was more stable than the Betas of the individual railroads See Richard A Brealey, Stewart C Myers and Franklin Allen, *Principles of Corporate Finance*, 8th Edition 2006 (" Brealey, Myers & Allen") at 221

22 See "*On the Assessment of Risk Some Further Considerations*," Baesel, Jerome B , *Journal of Finance*, Vol 29, December 1974, pp 1491-1494

23 Id

24 See "*The Performance of Alternative Techniques for Estimating Equity Betas for Australian Firms*," Stephen Gray, Jason Hall, Jerry Bowman, Tim Brailsford, Robert Faff and Bob Officer, May 2005

25 There are suggestions that CAPM is strictly theoretical and incapable of empirical testing However, the referenced study specifically analyzed the accuracy of Beta estimates comparing forecasted to actual returns If CAPM were purely theoretical and enjoyed no empirical support, it would not be the preferred method for determining the cost of equity Nor would it regularly be taught in business schools

> From this analysis, it can be concluded that the optimal estimation window to be used in OLS equity Beta estimation is longer than 4, 5 or 6 years Using a longer time series of data improves the performance of equity Beta estimates relative to the 4-or 5-year OLS equity Beta estimates that are produced by some data services [26]

The STB chose a 10 year Beta estimation period to eliminate statistical noise and to achieve stability in its Beta estimate, while allowing for change in the equity Beta The use of a 10-year Beta would achieve the goals of reducing the impact of data noise and providing stability In addition, assuming the conclusions reached by Gray, *et al*, can be superimposed on the U S market, it appears that a longer estimate would provide for better, more stable results This would appear to mitigate Hubbard/Stangle's concern that a 10 year estimation interval would provide a poorer estimates of future returns

B. REASONABLENESS OF THE STB'S BETA ESTIMATES

Hubbard/Stangle and Myers express concerns regarding the reasonableness of the STB's Beta estimates Myers believes that the STB's Beta estimation procedures do not follow standard industry practices, and generate, in part, downward biased estimates of the railroad industry cost of equity [27] Hubbard/Stangle contend that the STB's Beta estimates are significantly lower than those produced by commercial financial data firms, leading, again in part, to lower cost of equity estimates [28]

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[26] Id at 25

[27] See Myers at 11-12 Myers also believes the STB's use of a 5 2 percent equity risk premium also plays a key part in developing unreasonably low railroad cost of equity estimates

[28] See Hubbard/Stangle at 14

We believe that the concerns expressed by Hubbard/Stangle and Myers are misplaced The STB estimates of the individual railroad Betas are within the range of Beta estimates developed by financial and investment research firms and other reliable sources of Beta estimates We discuss the rationale for our position below

1. **The STB's 2005 Estimates Are Reasonable When Compared Against An Appropriate Range of Estimates**

Hubbard/Stangle contend that the STB's Beta estimates, when combined with the STB estimated equity risk premium and a 10-year T-Bond rate, produce cost of equity estimates significantly lower than those produced using inputs from commercial data providers [29] We will address the issues regarding the equity risk premium later in this verified statement, but address Hubbard/Stangle's concerns with the STB's Beta estimates in this section

Hubbard/Stangle's Exhibit 3a compares the STB's 2005 Beta estimates to Betas developed by Ibbotson, Value Line and Bloomberg They also compare the STB's 2005 CAPM cost of equity to that produced by data prepared in whole, or in part, by Ibbotson, Value Line, and Bloomberg [30] From this data, Hubbard/Stangle conclude that the STB's estimates are below the range developed by commercial users

While Ibbotson, Value Line and Bloomberg are respected developers of financial data, they do not constitute the universe of respected financial reporting firms Other highly respected firms that

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[29] See Hubbard/Stangle at 14

[30] Hubbard/Stangle use an equity risk premium estimated by Ibbotson in combination with the Beta estimates developed by Bloomberg and Value Line, and a risk-free rate of return developed from a 20-Year T-Bond

produce financial information include Standard & Poor's and Reuters Provestor We have supplemented Hubbard/Stanglc's Exhibit 3a to include the 2005 Beta estimates produced by Standard & Poor's and Reuters Provestor and summarize the results in Table 3 below [31/]

[31/] Table 1 and Table 2 were included with our opening verified statement filed in this proceeding on September 27, 2007

Table 3

Restatement of Hubbard/Stangle Exhibit 3a - 2005 Cost of Equity

	Railroads (1)	Beta (2)	Cost of Equity (3)
SFB Estimate			
1	Burlington Northern Santa Fe Corp	0 85	8 69%
2	CSX Corp	0 83	8 57%
3	Norfolk southern Corp	0 85	8 69%
4	Union Pacific Corp	0 68	7 78%
Ibbotson			
5	Burlington Northern Santa Fe Corp	0 64	9 13%
6	CSX Corp	0 83	10 48%
7	Norfolk southern Corp	0 89	10 90%
8	Union Pacific Corp	0 59	8 78%
Value Line			
9	Burlington Northern Santa Fe Corp	0 95	11 33%
10	CSX Corp	1 00	11 68%
11	Norfolk southern Corp	1 00	11 68%
12	Union Pacific Corp	0 85	10 62%
Bloomberg			
13	Burlington Northern Santa Fe Corp	0 94	11 23%
14	CSX Corp	1 20	13 07%
15	Norfolk southern Corp	1 19	13 01%
16	Union Pacific Corp	0 81	10 32%
Standard & Poor's			
17	Burlington Northern Santa Fe Corp	0 53	8 35%
18	CSX Corp	0 71	9 63%
19	Norfolk southern Corp	0 66	9 27%
20	Union Pacific Corp	0 44	7 72%
Reuters Provestor			
21	Burlington Northern Santa Fe Corp	0 53	8 34%
22	CSX Corp	0 70	9 52%
23	Norfolk southern Corp	0 62	8 98%
24	Union Pacific Corp	0 41	7 50%
25	**Median Without S&P and Reuters**		11 07%
26	**Median With S&P and Reuters**		9 97%

Source Exhibit No 7

As shown in Table 3, when Hubbard/Stangle's Exhibit 3a is updated to incorporate Beta estimates produced by Standard & Poor's and Reuters Provestor, the STB's estimates are clearly within the norm Specifically, the STB's estimates of the cost of equity compare favorably with those produced using the Standard & Poor's and Reuter's Beta estimates The STB cost of equity estimates are within the range of estimates developed from data used by commercial suppliers [32/]

2. The STB's Beta Estimates Compare *Favorably To Those Developed Using* Commercially And Publicly Available Data

As we stated above, the universe of respected firms generating company specific Beta estimates is not limited to Ibbotson, Value Line and Bloomberg [33] Standard & Poor's also is a highly respected financial research company, which produces Beta estimates for a wide range of companies as part of its S&P Stock Reports In addition, to commercial suppliers of railroad company Beta estimates, Brealey, Myers & Allen also included in their text estimates of the 2003 railroad company Betas We discuss each below

To evaluate the reasonableness of the STB's estimated railroad company Betas, we looked for historical examples of railroad Beta calculations One interesting source of historic betas was found in Brealey, Myers & Allen, in which the authors included 2003 Beta estimates for the four railroads

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[32/] Also note that the STB's estimates use a lower risk-free rate than that used by Hubbard/Stangle If a 20-Year T-Bond rate is used instead of the 10-Year T-Bond applied by the STB, the STB's estimates would increase by an additional 30 basis points

[33] In our verified statement in STB Ex Parte No 558 (Sub-No 10), *Railroad Industry Cost of Capital – 2006*, and in Mr Crowley's verified statement in Ex Parte No 558 (Sub-No 9), *Railroad Industry Cost of Capital--2005*, we utilized Ibbotson data to estimate railroad company Betas and the equity risk premiums We chose to use Ibbotson data in those analyses because it is widely used and accepted, and we wished to avoid any arguments about our potential use of "non-standard" data However, our use of Ibbotson data should not be taken to imply that we believe it is the only producer of acceptable financial data We could have used other data and achieved similar results

included in the STB's cost of capital determination [34/] As shown in Table 4 below, the Betas included by Brealey. Myers & Allen are significantly lower than those developed by the STB

Table 4
2003 Railroad Betas Developed By The STB, And Included in Brealey Myers & Allen

	Railroad (1)	STB [1/] (2)	Brealey Myer & Allen [2/] (3)
1	BNSF	0 83	0 53
2	CSX	0 85	0 58
3	Norfolk Southern	0 82	0 47
4	Union Pacific	0 68	0 47

[1] STB Ex Parte 664 workpapers
[2] Brealey, Myers & Allen page 221

As Table 4 above demonstrates, utilizing the approaches and data proposed by the STB produces a 2004 Beta estimates substantially higher than the Betas included in Brealey, Myers & Allen

In addition to the Betas included by Brealey, Myers & Allen. we also compared the STB's Beta estimates from 1998 to 2006 versus the Betas produced by Standard & Poor's for the same time periods We display the results in Table 5 below

[34/] See Brealey, Myers & Allen at 221 The authors did not indicate the source of their Beta estimates, but we assume that they are consistent with the estimates used by Myers in this proceeding

Table 5

Comparison of STB and S&P Beta Estimates

		BNSF		CSX		NS		UP	
	Year [1]	STB Beta [2]	S&P Beta [3]	STB Beta [2]	S&P Beta [3]	STB Beta [2]	S&P Beta [3]	STB Beta [2]	S&P Beta [4]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	1998	1 05	0 96	1 06	1 17	0 93	1 08	0 82	0 71
2	1999	1 09	0 82	1 04	0 82	0 90	0 75	0 88	0 71
3	2000	1 07	0 80	0 99	0 72	0 78	0 63	0 84	0 57
4	2001	0 88	0 61	0 82	0 48	0 90	0 53	0 75	0 35
5	2002	0 78	0 56	0 79	0 53	0 78	0 61	0 64	0 43
6	2003	0 83	0 53	0 85	0 53	0 82	0 45	0 68	0 45
7	2004	0 83	0 52	0 82	0 57	0 80	0 52	0 66	0 36
8	2005	0 85	0 53	0 83	0 71	0 85	0 66	0 68	0 44
9	2006	0 86	0 84	0 87	0 98	0 89	0 73	0 69	0 69

[1] 1997 S&P Beta data was unavailable 2006 STB Betas estimated based on the STB's procedures described in Ex Parte No 661 decision

[2] Source STB Ex parte 664 workpapers

[3] Standard & Poor's reported Betas

As the data in Table 5 above indicates, the Beta estimates developed by the STB are comparable to those developed by Standard & Poor's

IV. EQUITY RISK PREMIUM ESTIMATES

As it stated in Ex Parte 664, the STB proposes to use monthly NYSE return data along with 10-year T-Bond data to develop its estimates of the equity risk premium [35/] For Beta estimation purposes, the STB proposes using 10 years of NYSE data and risk-free rate data in its OLS regression analysis For the equity risk premium used in the CAPM, the STB suggests using 50 years of NYSE and 10-Year T-Bond data

We agree with Myers that the equity risk premium used in developing the railroad company Beta estimates should use a short-term T-Bill rate and not the 10-Year T-Bond proposed by the STB, although the impact is minimal We also believe that Hubbard/Stangle and Myers are in general conceptual agreement on the use of NYSE Index data to reflect expected returns on the market, although the S&P 500 could be used instead and would make little difference However, Hubbard/Stangle and Myers oppose the STB's proposed use of 50 years of historic data to estimate the equity risk premium They believe that the estimated equity risk premium the STB has developed is at the bottom, or even below, the likely range of the risk premium in the United States We discuss Hubbard/Stangle's and Myers' concerns below

A. APPROPRIATE TIME PERIOD

The STB proposes to use monthly NYSE data over a 50 year time period to estimate the equity risk premium As we stated in our Opening Verified Statement, we believed that the STB's

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35/ See Ex Parte 664 at 10

proposed 50 year interval meets the general parameters needed to develop an equity risk premium from historic data First, it reduces the inherent volatility associated with short-term estimates [36/] Second, it provides greater assurance of developing an estimated premium above a fairly priced market [37/]

Hubbard/Stangle and Myers on the other hand oppose the use of a 50 year period as too short Myers indicates that noise created by stock-market volatility can make it very difficult to pin down a true average [38] Given the imprecision created by this volatility. Myers indicates that standard sources of historical average equity risk premium estimates have turned to longer, not shorter time periods Hubbard/Stangle express similar sentiments stating that analysts often rely upon long-horizon risk premium estimates to reduce estimation error [39/] As such, the 50 year period proposed by the STB strikes Hubbard/Stangle as too short by industry standards

We believe that the concerns noted by Hubbard/Stangle and Myers are overstated and that the STB's proposed 50 year interval is sufficient to estimate the equity risk premium and is, if anything, likely to prove to be on the high side As a mater of practicality, the choice of the time period must satisfy two criteria First, the chosen time period should include a sufficient number of months to allow for the construction of a meaningful frequency distribution [40] Second, the choice must take into consideration that variability of returns was higher in the 1930's than in subsequent periods [41]

[36/] See Crowley/Fapp Opening VS at 10
[37/] See Crowley/Fapp Opening VS at 11
[38/] See Myers at 9
[39/] See Hubbard/Stangle at 12
[40/] See Fama, Eugene F , *Foundations of Finance*. New York Basic Books, 1976 at 27
[41/] Id

Hubbard/Stangle also contend that the STB's use of a 50 year historical period does not make use of all "available historic data," and that by ignoring this additional data the equity risk premium has been understated by 1 9 percent [42] We have several problems with Hubbard/Stangle's contention First, there is no clear definition what encompasses "all the available data " For example, Ibbotson chose 1926 as its starting point for its equity risk premium analyses because that is the year that CRSP chose as a starting point believing that this is when good-quality financial data first became available [43] However, Myers chose to use an equity risk premium based on data extending back 26 years earlier to 1900 [44] The equity risk premium used by Myers certainly contains more data, but produces a 6 6 percent premium, which is 0 5 percent lower than the 7 1 percent premium cited by Hubbard/Stangle The amount of data does not appear to be the issue to Hubbard/Stangle, but rather the equity risk premium the data produces

Second, even using a long historic period does not mean that the equity risk premium will be the 7 1 percent Hubbard/Stangle prefer A review of the Ibbotson Risk Premium Over Time Report shows that moving from a 1926 starting-point to one only three years forward to 1929 reduces the equity risk premium to 6 3 percent [45] The year 1929 was an aberration since it included the market crash preceding the Great Depression But this demonstration just points to the arbitrary nature of selecting a starting-point for calculating a historic equity risk premium The fact is an analyst could

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[42] See Hubbard/Stangle at 13
[43] See Pratt at 120
[44] See Myers at 11
[45] See Ibbotson Risk Premium Overtime Report Table A-1, Page 2 of 6

choose a starting period that suites his or her needs and still encompass "all the available data" however the analyst wishes to define that term

When choosing the study period, both the level of the rates and variability should be considered These criteria suggest that a reasonable historic average equity risk premium can be developed using data from as late as the 1950's [46] The STB's proposed approach meets these standards. and should provide an adequate estimate of the equity risk premium

B. REASONABLENESS OF THE STB'S EQUITY RISK PREMIUM ESTIMATE

The STB estimated the 2005 equity risk premium to equal 5 2 percent, presumably based upon the procedures it outlines in its Ex Parte 664 decision [47] The STB's workpapers suggest that the 5 2% (which was fixed. rather than "rolling")is not necessarily a definitive figure, but may have instead been intended as a starting point for the discussion of the proper method for developing and deploying an equity risk premium in CAPM [48] As we indicated in our Opening VS regarding the STB's solicitation of comments on whether to use a fixed or floating equity risk premium estimate , we believe that the STB should update its estimate of the equity risk premium annually, and should not rely upon a fixed estimate [49]

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[46] See Harrington. Diana R , *Modern Portfolio Theory & The Capital Asset Pricing Model A User's Guide* Prentice Hall. 1983 at 116

[47] See STB Ex Parte 664 electronic workpaper "S TB COC CAPM workpaper xls " The STB presumably used its stated Ex Parte 664 methodology since the STB could not provide its actual risk premium calculations given licensing restrictions on the CRSP data used

[48] For example, the STB's electronic workpaper caveats the 5 2 percent equity risk premium estimate as "Risk premium10 as of 2005 for now "

[49] See Crowley/Fapp Opening VS at 11-14

The question then becomes, is the 5.2 percent a reasonable estimate of the 2005 equity risk premium? Hubbard/Stangle and Myers believe the answer is no. Hubbard/Stangle state that the equity risk premium is more likely in the 7 percent range, while Myers uses a 6.6 percent equity risk premium in his calculation of The Burlington Northern Sante Fe Corporation's ("BNSF") 2005 cost of equity.[50/]

We believe the STB's estimated 2005 equity risk premium of 5.2 percent is within the range of reasonable estimates produced by researchers and practitioners. As Hubbard/Stangle themselves point out, the determination of the equity risk premium is an open question in which there is no definitive answer.[51/] This does not obviate the need for developing an estimate, though. While we cannot say with certainty that the STB estimate is the one "correct" answer, we can say whether it falls within the accepted norm of estimates. Our research indicates it does.

First, it must be remembered that the 5.2 percent used by the STB is reflective of 2005 only. As we showed in Table 1 of our Opening VS, we found that the equity risk premium using the STB's described rolling procedures ranged between approximately 5.0 and 7.6 percent between 1997 and 2006. This seems to fall directly in the range of equity risk premiums used by analysts and

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50/ See Hubbard/Stangle at 11 and 13 and Myers at 11. BNSF is the corporate parent of BNSF Railway Company.

51/ See Hubbard/Stangle at 11. Hubbard/Stangle's claim that the STB understated the equity risk premium by 1.9 percent by not making use of "all the available historical data" seems a bit disingenuous. First, there is no clear definition of what represents "all the available historical data." Myers, for example, uses an equity risk premium estimate based on data back to 1900 which produces an equity risk premium lower than that suggested by Hubbard/Stangle. Hubbard/Stangle could be likely chastised for not using "all the available data" based on the estimate used by Myers. Second, depending upon the approach used in estimating the risk premium from historic data, the STB's estimate appears to be more than reasonable. Dimson, Marsh and Staunton estimated the equity risk premium from 1900 to 2000 using various econometric models and developed an equity risk premium of 5.4 percent. See "*Triumph of Optimism: 101 Years of Global Investment Returns*," Princeton University Press. In this case, the estimated equity risk premium developed from "all available data" was nearly equal to that estimated by the STB.

researchers For example, Brealey, Myers & Allen indicate that the STB's estimate lies within the bounds of a reasonable estimate

> Out of this debate only one firm conclusion emerges Do not trust anyone who claims to *know* what returns investors expect History contains some clues, but ultimately we have to judge whether investors on average have received what they expected Many financial economists rely on the evidence of history and therefore work with a risk premium of 7 5 percent The remainder generally use a somewhat lower figure Brealey, Myers and Allen have no official position on the issue, but we believe that a range of 5 to 8 percent is reasonable for the risk premium in the United States [52/]

Other evidence supports the STB's calculation of a 2005 risk premium of 5 2 percent A study published in the North American Actuarial Journal compiled evidence from recent research on the equity risk premium, and cataloged the empirical values of the equity risk premium implied [53/] The researchers did not limit themselves to estimates based on historical averages, but also reviewed estimates based on econometric analysis of historical data, as well as estimates of the projected equity risk premium

The study was wide ranging, and included estimates from a large number of sources, ranging from Ibbotson Associates and Brealey and Myers, to the United States Social Security Administration The researchers found that estimates of the equity risk premium based on historical averages and analysis of expected returns on historical data ranged from approximately 3 8 to 8 4

[52/] See Brealey, Myers & Allen at 154 (emphasis in original)

[53/] See "*Equity Risk Premium Expectations Great and Small*" Derrig, Richard A and Orr, Elisha D , *North American Actuarial Journal*, January, 2004, pp 45 to 69

percent, while projected premiums ranged from 0 to 5 percent [54] Once again, the STB's estimate for 2005 falls within what can be considered a reasonable range

Finally, we note that the Kansas City Southern Railway Company ("KCS") presented evidence in this proceeding using an estimate of the equity risk premium lower than the 5 2 percent used by the STB KCS included in its comments a calculation of a KCS specific CAPM cost of equity prepared by KCS's expert Mr Nelson Walsh, Vice Chairman of the Investment Banking Group at Morgan Stanley Mr Walsh developed his KCS specific cost of equity utilizing Morgan Stanley's estimation of the market risk premium of 4 percent [55] Mr Walsh states that the 4 percent equity risk premium is supported by various academic studies, which are not specifically referenced in his verified statement, and Kansas City Southern's filing adds that "the market risk premium was calculated using Morgan Stanley's standard assumption for market risk premium "[56] However, given that a respected investment banking firm such as Morgan Stanley relies upon an estimated market risk premium of 4 percent gives credence to the reasonableness of the STB's estimate of 5 2 percent for 2005 If anything, the STB's figure is likely to prove to be overstated

In sum, as we stated in our Opening VS in this proceeding, no definitive estimate of the equity risk premium exists Instead, the best that we can use is a reasonable estimate of the premium We believe using the STB's proposed methodology will produce such a reasonable estimate

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[54] Id at 64
[55] See Walsh VS at 3
[56] Mr Walsh uses the market risk premium in conjunction with a predicted beta, and it thus appears that the market risk premium is *ex ante* in nature

V. USE OF MULTI-STAGE DCF MODELS

The STB recognized in its Ex Parte 664 decision that the single-stage DCF approach the STB, and its predecessor agency the Interstate Commerce Commission, had relied upon for a number of years to develop the railroad industry cost of equity was flawed, and had been displaced by more sophisticated approaches to estimating required returns on equity One of the updated approaches reviewed by the STB as part of this proceeding was a multi-stage DCF approach, which utilized multiple growth rates along with expected dividend yields to estimate the cost of equity The STB indicated its reluctance in utilizing a multi-stage DCF approach given the approach's lack of foundation for preferring one multi-stage approach over another, and its openness to manipulation

Hubbard/Stangle and Myers believe that the STB has unjustifiable disregarded the multi-stage DCF approach in favor of the CAPM, and should at the very least balance its CAPM produced results with those generated by application of a reasonable multi-stage DCF model Hubbard/Stangle feel the CAPM is no more straightforward than a DCF approach or more reliant on objective facts than the DCF [57] They also contend that a properly constructed multi-stage DCF approach would be a useful cross-check to the STB's CAPM cost of equity [58]

Myers expresses similar sentiments stating that the STB did not adequately consider multi-stage DCF models as alternatives or supplements to the CAPM [59] Myers also indicates that the STB made

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[57] See Hubbard/Stangle at 15
[58] See Hubbard/Stangle at 16
[59] See Myers at 12-13

numerous errors in its development of the multi-stage DCF model the STB referenced in its Ex Parte 664 decision Specifically, Myers argues that the STB incorrectly discounted the models terminal-value twice, giving the results what Myers terms "an arbitrary haircut "[60] Myers also states that the STB should not assume a company's initial growth stage will last for 20 years, but should rather assume the initial stage will last for only five (5) to 10 years [61] Myers contends that the 4 6 percent terminal growth rate used in the STB's multi-stage DCF model is lower than that forecasted long-term growth in the economy expected by respected forecasters [62]

As a threshold matter, we agree that in developing its multi-stage DCF approach the STB made the error in discounting the terminal value twice indicated by Myers We also agree with Myers that normally an initial growth period would not extend for as long as 20 years, unless there was some very unique underlying situation Finally, we agree again with Myers that a terminal growth rate somewhat higher than the 4 6 percent used by the STB should be considered [63]

However, even with these corrections, we continue to have concerns regarding the utility of using a multi-stage DCF model to estimate the railroad industry cost of equity As the STB emphasized in its Ex Parte 664 decision, there is no theoretical justification for choosing one multi-stage DCF approach over the other Myers has pointed to this one issue previously in his writings on the use of multi-stage DCF models in regulatory settings

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[60] See Myers at 12-13
[61] See Myers at 13
[62] Id
[63] For example, in his reply verified statement filed on behalf of the WCTL in Ex Parte No 558 (Sub-No 9), *Railroad Industry Cost of Capital - 2005*, Dr James E Hodder estimated the long-term growth rate in the U S Gross Domestic Product would be around 6 percent

> Anyone who has reviewed and tried to absorb [the DCF model results] will be frustrated at the inexplicable scatter of the DCF cost of equity estimates It is tempting to look for some simple rule or message in these results Unfortunately, the scatter is the rules and is the message DCF is not one method but many. it is difficult (probably impossible) to say which growth rate measure or variable growth method is correct [64]

This lack of a single theoretically justifiable model, as well as uncertainty of terminal growth value, railroad growth rates, appears to leave a multi-stage DCF model open to outcome-oriented manipulation

If the STB does chose to use a multi-stage DCF approach in conjunction with, and not a replacement for, a CAPM approach, we suggest it follow the following guidelines in its development of the model

1 The initial stage should not extend beyond the five (5) year period reflected in the truncated consensus analysts estimates of the future short-term railroad growth developed by IBES This is the approach recommended by Hubbard/Stangle[65] in this proceeding and advocated by Myers/Borucki[66] and Brealey, Myers & Allen [67]

2 Beginning in year 6, the railroad industry's short-term growth rate would be gradually adjusted to the long-term growth rate over a reasonable period of time, say 10 years Brealey, Myers & Allen suggest using such an approach [68]

64/ See "*Discounted Cash Flow Estimates of the Cost of Equity Capital - A Case Study*," Myers, Stewart C , and Borucki, Lynda S , *Financial Markets, Institutions & Instruments*, Volume 3, Number 3, 1994, 9-45, 27 ("Myers/Borucki")

65/ See Hubbard/Stangle at 16

66/ See Myers/Borucki at 21

67/ See Brealey, Myers & Allen at 70-71

68/ Id

3 The final, or terminal, stage should reflect the long-term expected growth rate in the United States Gross Domestic Product Hubbard/Stangle[69] recommend this method, as do Brealey, Myers & Allen [70]

We have developed the railroad industry cost of equity applying the procedures outlined above for the years 1997 through 2006 based on data contained in the STB's 1999 to 2005 Ex Parte 558 decisions, and based on the AAR's evidence submitted in STB Ex Parte No 558 (Sub-No 10) We have also used the 6% terminal growth value previously suggested by Dr Hodder The results are shown in Table 6 below comparing the multi-stage DCF costs of equity to the costs of equity developed by the STB and the AAR using a single-stage DCF model and the CAPM railroad industry cost of equity developed by the STB

[69] See Hubbard/Stangle at 16
[70] See Brealey, Myers & Allen at 71

Table 6

Estimates of the Railroad Industry Cost of Equity

	Year (1)	Single Stage DCF Railroad Industry Cost of Equity (2)	Multi-Stage DCF Railroad Industry Cost of Equity (3)	STB CAPM Railroad Industry Cost of Equity (4)
1	1997	13 8%	9 5%	11 9%
2	1998	13 1%	9 0%	10 2%
3	1999	12 9%	9 0%	10 7%
4	2000	13 9%	10 7%	10 7%
5	2001	12 8%	8 7%	9 2%
6	2002	12 6%	8 3%	8 3%
7	2003	12 7%	8 7%	8 0%
8	2004	13 2%	8 8%	8 2%
9	2005	15 2%	8 9%	8 4%
10	2006	16 1%	8 8%	9 0%

Sources Column (2) from STB Ex parte 558 decisions and AAR filings in Ex Parte No 558 (Sub No 10) Column (3) from Exhibit No 8, Column (4) from STB Ex Parte 664 and L E Peabody & Associates, Inc analysis

As Table 6 above shows, the multi-stage DCF develops a cost of equity that is quite consistent with the CAPM model results developed by the STB

VI. OTHER ISSUES

In addition to the above comments regarding the application and implementation of the CAPM and multi-stage DCF models, we respond to several statements made by Hubbard/Stangle and Myers in their respective verified statements regarding aspects of the railroad industry cost of capital Specifically, we comment on Hubbard/Stangle's suggestion of using the Ibbotson calculation of the industry average cost of capital for line-haul railroads as a cross-check on the STB's calculations We also comment on Myers "asymmetric risk" argument We discuss both these issues below

A. IBBOTSON INDUSTRY COST OF CAPITAL

Hubbard/Stangle suggest that the STB consider cross-checking its calculations of the railroad industry cost of equity against the cost of equity included in the annual Ibbotson Associates *Cost of Capital Yearbook* [71] Hubbard/Stangle also contend that Ibbotson estimates of the railroad industry cost of equity represent a readily available alternative to the CAPM that does not require any additional resources on the part of the STB or the parties involved It is unclear whether Hubbard/Stangle propose using the Ibbotson *Cost of Capital Yearbook* data as a supplement to, or a replacement for, the STB's calculations of the railroad industry cost of equity, but in either case, the STB should not give any weight to their proposal

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[71] See Hubbard/Stangle at 16 Morningstar Inc acquired Ibbotson Associates in 2006, which now publishes the *Cost of Capital* Yearbook under the Morningstar name

Ibbotson prepares reports for 300 U S -based industries that include a wide range of industry aggregate data, including industry betas, multiples, costs of equity estimates, and weighted average costs of capital [72] Ibbotson classifies its industry reports by Standard Industrial Classification ("SIC") codes, and produces reports at the 1,2, 3 and 4-digit SIC Code levels For example, data from BNSF would be included in four separate industry groupings SIC Code 4 (Transportation, Communications, Electric, Gas, and Sanitary Services), SIC Code 40 (Railroad Transportation), SIC Code 401 (Railroads), and SIC Code 4011 (Railroads, Line-Haul Operating) The number of companies included in the industry groupings decreases as the SIC Code numbering increases For example, SIC Code 4 includes 306 companies in the industry group average statistics, while SIC Code 40 includes only 9 companies The lowest level which contains the Class I railroads included in the STB's cost of capital determination is SIC Code 4011, which includes eight (8) companies - BNSF, CSX Corporation ("CSX"), Genesee & Wyoming Incorporated ("G&W"), KCS, Norfolk Southern Corporation ("NS"), Pioneer Railcorp ("Pioneer"), Providence & Worcester Railroad ("P&W") and Union Pacific Corporation ("UP")

It is readily apparent that a comparison of the Ibbotson cost of equity calculations from its SIC Code 4011 report to a S TB railroad industry cost of capital would miss the mark The inclusion of the four additional railroads (G&W, KCS, Pioneer and P&W) beyond the four included in the current STB cost of capital determination, would make the comparison problematic at best But the inclusion of three short-line and regional railroad companies (G&W, Pioneer and P&W) makes the

---

[72] See Morningstar's website at http //corporate morningstar com/ib/asp/subject aspx?xmlfile=1426 xml for a complete description of their industry reports

comparison suspect Pioneer for example has a total market cap of only $20 million, and has virtually no trading activity on its common stock P&W is not far behind with a market cap of approximately $80 million as of October 26, 2007, again with relatively light trading activity While the market caps for Pioneer, P&W and G&W are so small that their inclusion in a market weighted cost of equity calculation may be irrelevant, the same cannot be said for KCS, which presumably would impact the industry average

The Ibbotson cost of equity estimates also suffer from a lack of openness and clarity While not casting doubt on the authors' veracity, it is impossible to "tease out" the impact of including four additional railroads without being able to see their underlying calculations of the different cost of equity estimates For example, in developing their three-stage DCF cost of equity estimates, where did Ibbotson obtain its growth estimates for the short, medium and long-term? Hubbard/Stangle make some general references to Ibbotson's procedures, but do not give specifics Second, how are the growth estimates weighted between the eight railroads included in the Ibbotson analysis? Without this information, we would be unable to determine if the Ibbotson estimates over or understate the cost of equity based on an average of only the four railroads included in the STB's cost of equity determination

Given the apples to oranges nature of the Ibbotson industry costs of equity and the STB's cost of equity estimates, a meaningful comparison is just not possible, and Hubbard/Stangle's suggestions should be disregarded

B. RAILROAD INDUSTRY "ASYMMETRIC RISK"

Myers concludes his verified statement by making the following statement

> The midpoint of a range for the cost of equity may under- or overstate the true cost of equity Some imprecision is inevitable Given the imprecision, the Board should weigh the costs of underestimating the true cost of equity against the costs of overestimating it Underestimates are generally more costly They deter capital investment If the Board wants to encourage the railroad industry to modernize and expand capacity, it is better off settling on a higher cost of equity than a lower one
>
> Setting a higher cost of equity may also give railroads a cushion to offset asymmetric risk Railroads face asymmetric risk when competition or regulation limits upside profitability, with no offsetting downside protection [73]

Myers passes off his comments with a sense of academic air, but in truth, he is asking for nothing more than the continued subsidization of the railroads by captive shippers He indicates that underestimating the railroad industry cost of equity is more costly then overestimating the costs, so therefore it is better to err on the side of the railroads As Myers presumably knows, there are costs associated with overestimates as well, costs which are borne by shippers in the form of higher than justified rail rates Myers has not attempted to weigh these additional costs, and seems to ignore their consequence

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[73] See Myers at 14

Myers statement that the STB should err towards the high side in estimating the railroad industry cost of equity to allow for potential shortcomings in available capital or for "asymmetric risk" also sounds suspiciously like the "fudge factors" that his other writings urge readers to avoid In Brealey, Myers & Allen, the authors specifically advise against making adjustments to costs of capital to account for "bad outcomes "

> But in everyday usage, risk simply means "bad outcome " People think of risks of a project as a list of things that can go wrong For example,
>
> - A geologist looking for oil worries about the risk of a dry hole
> - A pharmaceutical manufacturer worries about the risk that cures for baldness may not be approved by the Food and Drug Administration
> - The owner of a resort hotel in a politically unstable part of the world worries about the risk of expropriation
>
> Managers add fudge factors to discount rates to offset worries such as these
>
> This sort of adjustment makes us nervous First, the bad outcomes we cited appear to reflect unique (i e , diversifiable) risks that would not effect the expected rate of return demanded by investors [74]

In this situation, the railroads face the "bad outcome" of potential actions by the STB which may or may not limit railroad future income and potential access to capital Myers seems to imply the way to handle this is to increase the railroad cost of equity to provide a "cushion" to offset this risks

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[74] See Brealey, Myers & Allen at 223

Myers' other writings soundly advise that the railroads should not be given an additional cushion of support that they do not deserve or require

Finally, the STB has already addressed and rejected Myers "asymmetric risk" claim in prior STB proceedings Myers first raised his asymmetric risk argument in FMC [75] where he argued a hypothetical stand-alone railroad ("SARR") would face asymmetric risk from other SARR's entering the market if the original SARR's earnings exceed expectations This truncated upside earnings potential would not be offset by a similar limit on downside earnings, thereby increasing the risk to the SARR, and fostering a higher cost of capital [76] The STB rejected Myers argument as "unrealistic "

UP raised Myers' asymmetric risk argument again in WPL [77] Like in FMC, the STB again rejected Myers' argument In WPL, UP extended this argument to so-called real world railroads UP argued in WPL that even though the UP does not operate in a contestable market like a SARR, a real world railroad would still face asymmetric risk requiring a higher cost of capital [78] The STB rejected this new argument as being a violation of the efficient market hypothesis [79]

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[75] STB Docket No 42022, *FMC Wyoming Corporation and FMC Corporation vs Union Pacific Railroad Company*, 4 S T B 699, 846 ("FMC")

[76] See FMC at 846

[77] Docket No 42051, *Wisconsin Power And Light Company vs Union Pacific Railroad Company*, 5 S T B 955, 982-984 ("WPL")

[78] See WPL at 982-984

[79] The Efficient Market Hypothesis asserts that security prices reflect all publicly known and available information, including all potential risks See Brealey, Myers & Allen at 337

> To the extent UP may face some (more limited) asymmetric earnings risk itself, as its counsel suggests, UP has not shown why that risk is not already reflected in its cost of capital We presume efficient capital markets recognize and reflect all of the risks faced by railroads, which is why in FMC we treated a real options adjustment as a collateral attack on the railroad cost-of-capital figure that we use in our SAC analysis Here, UP maintains that its proposed adjustment is not to the cost-of-capital figure itself (nor to the revenue estimates directly), but rather would introduce an additional cost component to the annual capital carrying charges The result of its proposed adjustment, however, is the same as if it applied a higher cost of capital or lowered the revenue projections [80]

Once again in this proceeding, Myers has raised his asymmetric risk argument attempting to justify a higher than required railroad industry cost of equity As the STB stated in WPL, the risks faced by railroads are well known and discussed nearly daily in the investment and railroad communities and thus should already be accounted for in the railroads security prices Myers has not stated anything new in his latest submission, and he has done nothing more than refer to his prior submissions There is thus no need to set the cost of equity at a higher than justified position to account for asymmetric risks

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[80] See WPL at 984

VERIFICATION

COMMONWEALTH OF VIRGINIA)
)
CITY OF ALEXANDRIA)

I, THOMAS D CROWLEY, verify under penalty of perjury that I have read the foregoing Verified Statement of Thomas D. Crowley, that I know the contents thereof, and that the same are true and correct Further, I certify that I am qualified and authorized to file this statement

Thomas D. Crowley

Sworn to and subscribed
before me this day of October 25, 2007

Notary Public for the State of Virginia

My Commission expires March 31, 2010

VERIFICATION

COMMONWEALTH OF VIRGINIA)
)
CITY OF ALEXANDRIA)

I, DANIEL L. FAPP, verify under penalty of perjury that I have read the foregoing Verified Statement of Daniel L. Fapp, that I know the contents thereof, and that the same are true and correct Further, I certify that I am qualified and authorized to file this statement.

Daniel L Fapp

Sworn to and subscribed
before me this day of October 25,2007.

Notary Public for the State of Virginia

My Commission expires March 31, 2010

Comparison of STB Beta Estimates
With Beta Estimates Using Short-Term Risk-Free Rates

		BNSF		CSX		NS		UP	
	Year	With T-Bond 1/	With T-Bill 2/	With T-Bond 1/	With T-Bill 2/	With T-Bond 1/	With T-Bill 2/	With T-Bond 1/	With T-Bill 2/
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	1997	1 175	1 178	1 209	1 211	1 083	1 083	0 976	0 979
2	1998	1 051	1 055	1 062	1 066	0 934	0 936	0 824	0 826
3	1999	1 088	1 088	1 038	1 041	0 901	0 901	0 875	0 875
4	2000	1 068	1 068	0 978	0 981	0 782	0 782	0 843	0 844
5	2001	0 878	0 878	0 821	0 820	0 897	0 895	0 753	0 753
6	2002	0 783	0 784	0 785	0 782	0 778	0 780	0 637	0 637
7	2003	0 828	0 827	0 848	0 846	0 821	0 822	0 679	0 679
8	2004	0 831	0 835	0 820	0 820	0 796	0 803	0 660	0 663
9	2005	0 853	0 857	0 830	0 829	0 853	0 860	0 679	0 680

1/ Source STB Ex Parte No 664 workpapers

2/ Source 10 year regression using CRSP NYSE and railroad return data, 3-Month T-Bills as the risk-free rate

Comparison of STB Beta Estimates Run With And Without Intercept Terms In The OLS

		BNSF		CSX		NS		UP	
	Year	Without an Intercept 1/	With an Intercept 2/	Without an Intercept 1/	With an Intercept 2/	Without an Intercept 1/	With an Intercept 2/	Without an Intercept 1/	With an Intercept 2/
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	1997	1 18	1 15	1 21	1 21	1 08	1 08	0 98	0 97
2	1998	1 05	1 03	1 06	1 08	0 93	0 94	0 82	0 84
3	1999	1 09	1 10	1 04	1 06	0 90	0 92	0 88	0 89
4	2000	1 07	1 07	0 98	1 00	0 78	0 83	0 84	0 85
5	2001	0 88	0 88	0 82	0 83	0 90	0 92	0 75	0 76
6	2002	0 78	0 78	0 79	0 79	0 78	0 78	0 64	0 64
7	2003	0 83	0 83	0 85	0 86	0 82	0 83	0 68	0 68
8	2004	0 83	0 82	0 82	0 83	0 80	0 79	0 66	0 65
9	2005	0 85	0 84	0 83	0 84	0 85	0 85	0 68	0 67

1/ Source STB Ex Parte No 664 workpapers

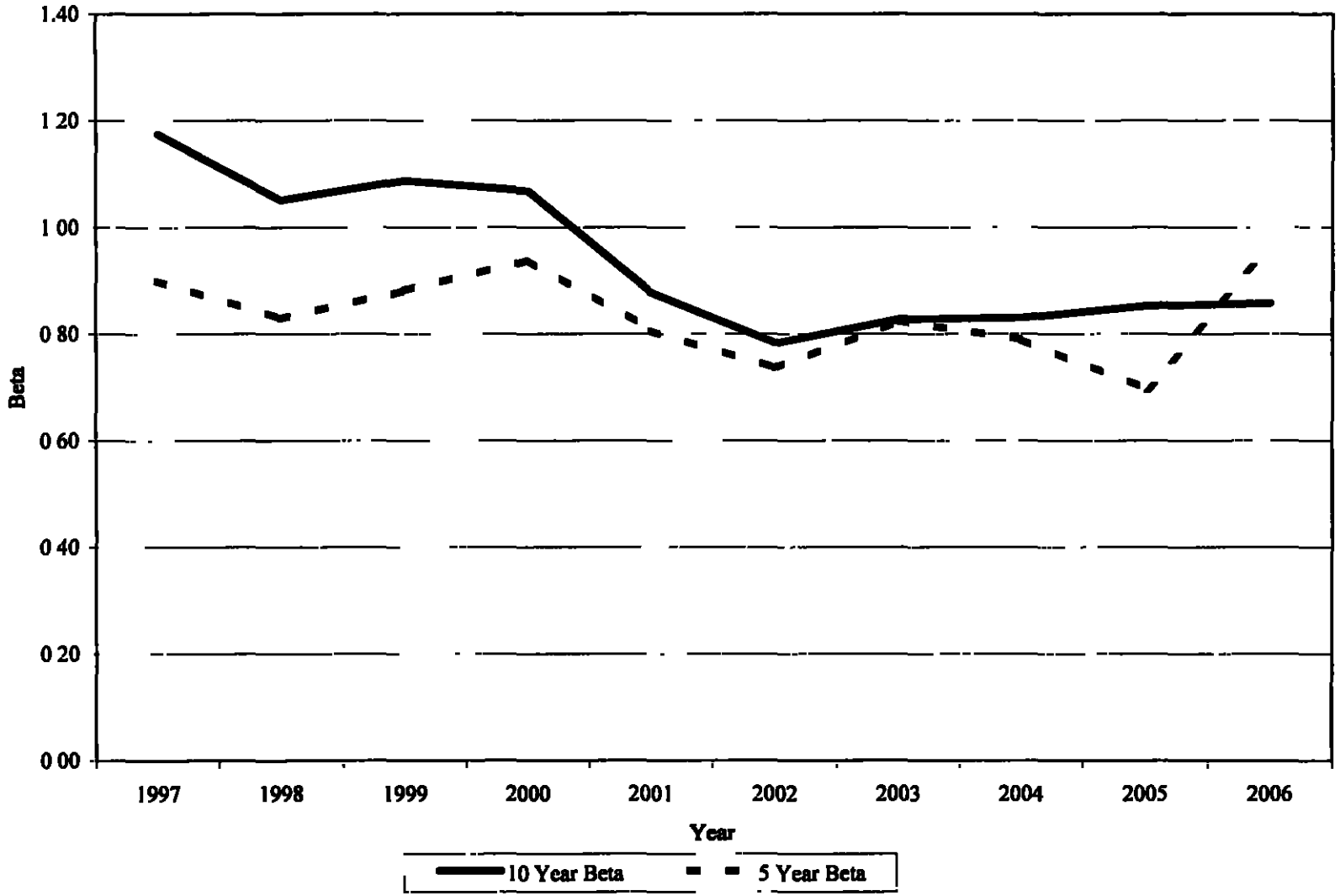
2/ Source 10 year regression using CRSP NYSE and railroad return data. 10-Year T-Bonds as the risk-free rate and including an intercept term

Comparison of STB 10 Year Betas and Five Year Betas Developed With T-Bills

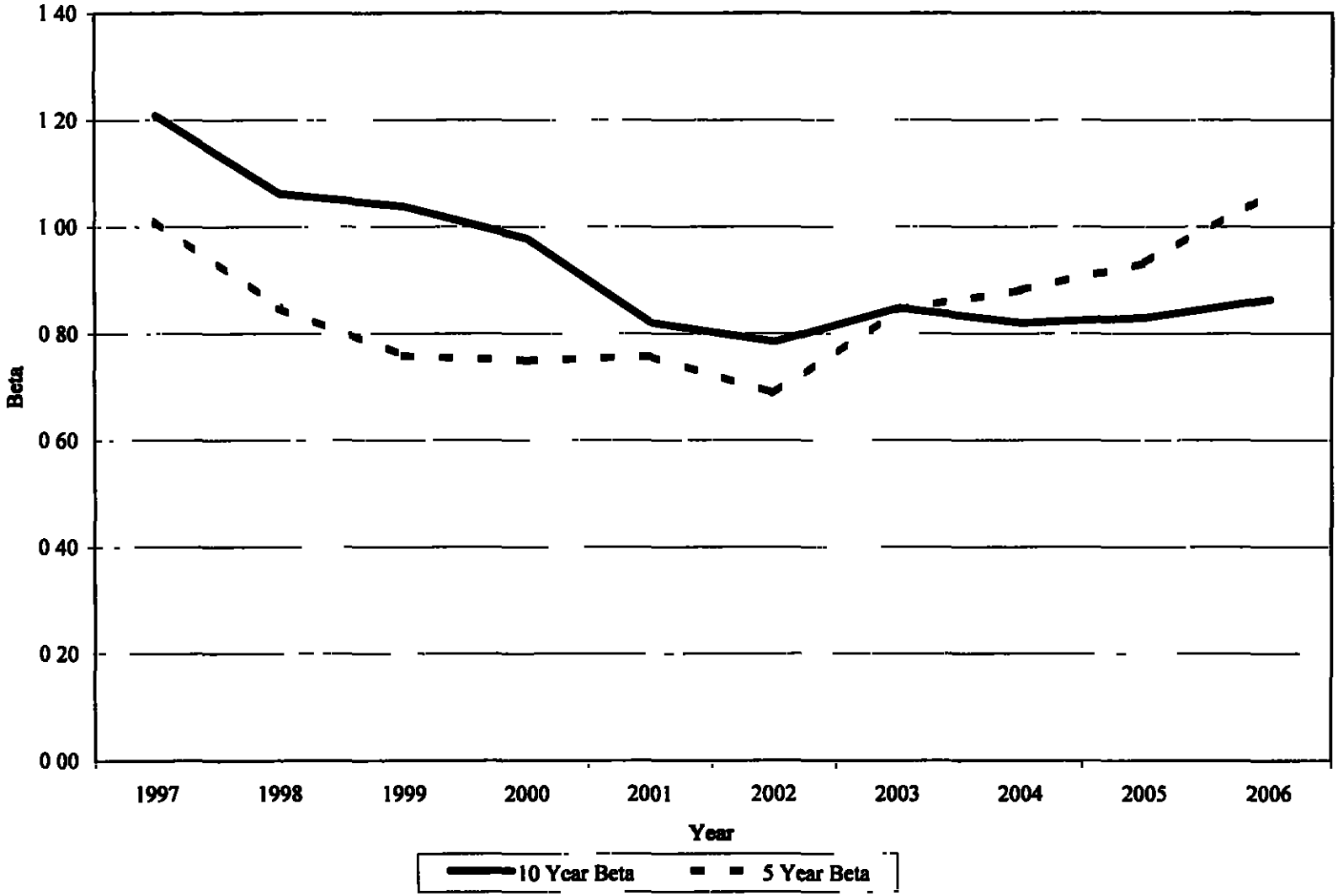
		BNSF		CSX		NS		UP	
	Year	10 year 1/	5 Year 2/	10 year 1/	5 Year 2/	10 year 1/	5 Year 2/	10 year 1/	5 Year 2/
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	1997	1 18	0 90	1 21	1 01	1 08	1 05	0 98	0 87
2	1998	1 05	0 83	1 06	0 85	0 93	0 85	0 82	0 65
3	1999	1 09	0 88	1 04	0 76	0 90	0 82	0 88	0 79
4	2000	1 07	0 94	0 98	0 75	0 78	0 73	0 84	0 67
5	2001	0 88	0 81	0 82	0 76	0 90	0 89	0 75	0 65
6	2002	0 78	0 74	0 79	0 69	0 78	0 67	0 64	0 54
7	2003	0 83	0 82	0 85	0 85	0 82	0 80	0 68	0 71
8	2004	0 83	0 79	0 82	0 88	0 80	0 79	0 66	0 54
9	2005	0 85	0 70	0 83	0 93	0 85	1 02	0 68	0 70
10	2006	0 86	0 96	0 86	1 06	0 89	0 90	0 69	0 77

1/ Source 1997 to 2005 STB Ex Parte No 664 workpapers 2006 L E Peabody & Associates Inc estimate
2/ Betas reflect a 60 period regression utilizing NYSE monthly returns and 3-Month T-Bill rate

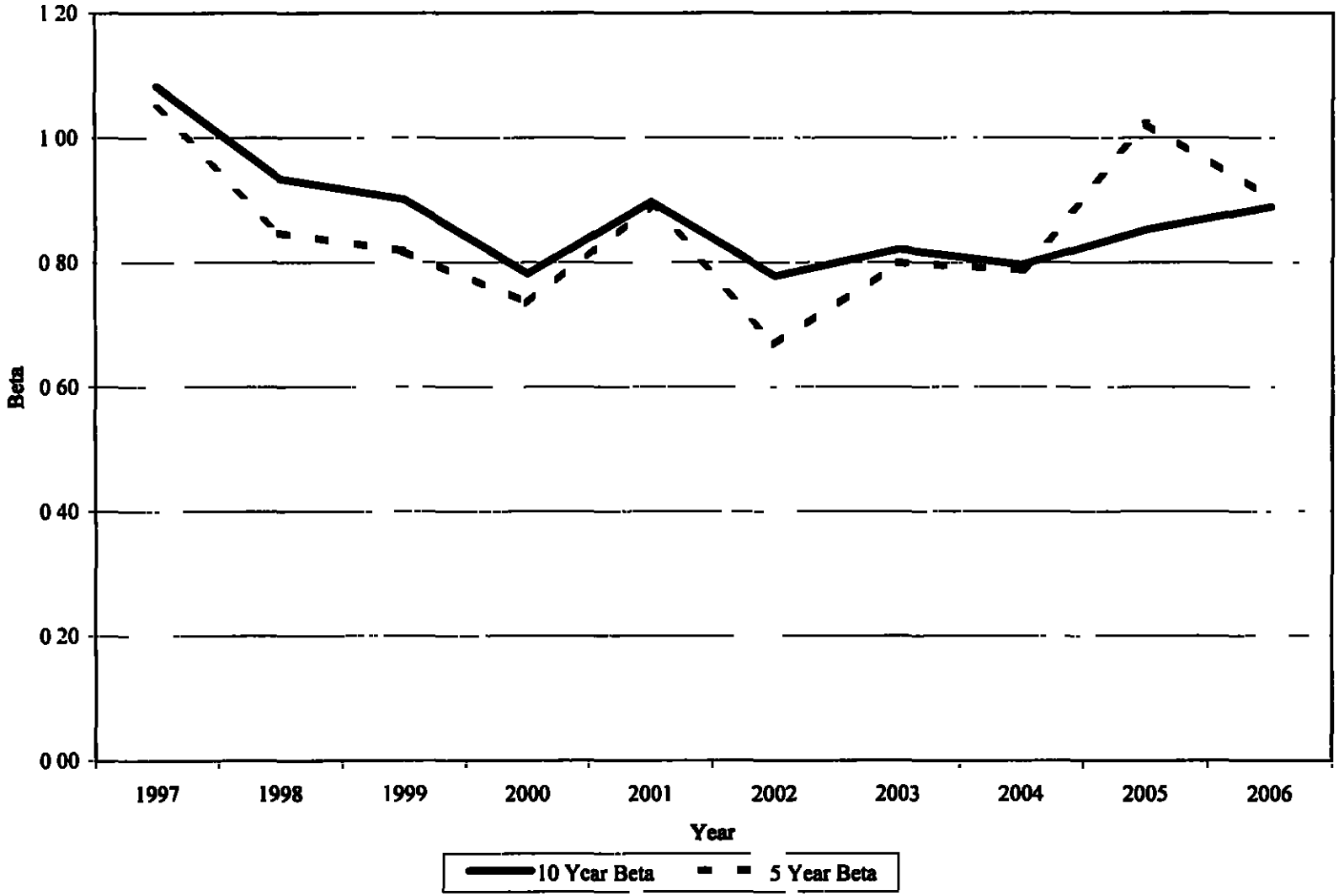
Comparison STB 10 Year BNSF Betas To 5 Year Betas Regressed Using 3 Month T-Bill Rates



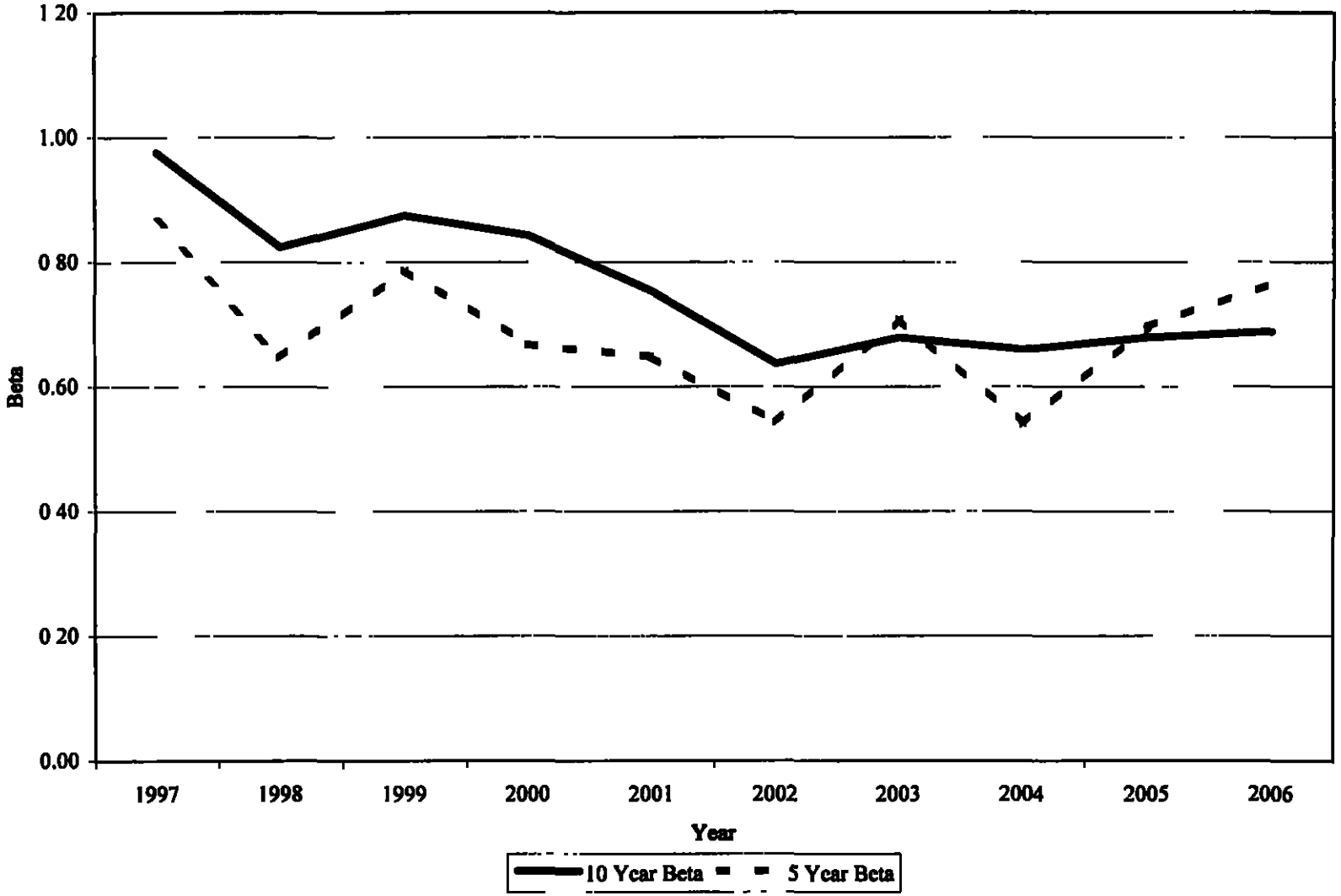
Comparison STB 10 Year CSX Betas To 5 Year Betas Regressed Using 3 Month T-Bill Rates



Comparison STB 10 Year NS Betas To 5 Year Betas Regressed Using 3 Month T-Bill Rates



Comparison STB 10 Year UP Betas To 5 Year Betas Regressed Using 3 Month T-Bill Rates



Restatement of Hubbard/Stangle Exhibit 3a -- 2005 Cost of Equity

	Railroads (1)	Risk-Free Rate (2)	Beta (3)	Risk Premium (4)	Cost of Equity (5)
	STB Estimate				
1	Burlington Northern Sante Fe Corp	4 25%	0 85	5 20%	8 69%
2	CSX Corp	4 25%	0 83	5 20%	8 57%
3	Norfolk Southern Corp	4 25%	0 85	5 20%	8 69%
4	Union Pacific Corp	4 25%	0 68	5 20%	7 78%
	Ibbotson				
5	Burlington Northern Sante Fe Corp	4 60%	0 64	7 08%	9 13%
6	CSX Corp	4 60%	0 83	7 08%	10 48%
7	Norfolk Southern Corp	4 60%	0 89	7 08%	10 90%
8	Union Pacific Corp	4 60%	0 59	7 08%	8 78%
	Value Line				
9	Burlington Northern Sante Fe Corp	4 60%	0 95	7 08%	11 33%
10	CSX Corp	4 60%	1 00	7 08%	11 68%
11	Norfolk Southern Corp	4 60%	1 00	7 08%	11 68%
12	Union Pacific Corp	4 60%	0 85	7 08%	10 62%
	Bloomberg				
13	Burlington Northern Sante Fe Corp	4 60%	0 94	7 08%	11 23% 1/
14	CSX Corp	4 60%	1 20	7 08%	13 07% 1/
15	Norfolk Southern Corp	4 60%	1 19	7 08%	13 01% 1/
16	Union Pacific Corp	4 60%	0 81	7 08%	10 32% 1/
	Standard & Poor's 2/				
17	Burlington Northern Sante Fe Corp	4 60%	0 53	7 08%	8 35%
18	CSX Corp	4 60%	0 71	7 08%	9 63%
19	Norfolk Southern Corp	4 60%	0 66	7 08%	9 27%
20	Union Pacific Corp	4 60%	0 44	7 08%	7 72%
	Reuters Provestor 3/				
21	Burlington Northern Sante Fe Corp	4 60%	0 53	7 08%	8 34%
22	CSX Corp	4 60%	0 70	7 08%	9 52%
23	Norfolk Southern Corp	4 60%	0 62	7 08%	8 98%
24	Union Pacific Corp	4 60%	0 41	7 08%	7 50%
24	**Median Without S&P and Reuters**				**11 07%**
25	**Median With S&P and Reuters**				**9 97%**

1/ Straight application of the CAPM does not produce the figures shown in Hubbard/Stangle's Exhibit 3a due most likely to rounding of the Beta To ensure commonality, the percentages presented by Hubbard/Stangle are used

2/ Standard & Poor's Stock Reports Only July 2005 estimates were available for S&P

3/ Reuters Provestor Plus Company Reports Only May 2005 estimates were available for Reuters

1997 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	11 53%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	2 11%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	9 43%

	Year	Annual Dividend Growth 5/	Dividend 6/	Discounted Dividend 7/
	(1)	(2)	(3)	(4)
6	1	11 53%	2 3516	2 1490
7	2	11 53%	2 6227	2 1903
8	3	11 53%	2 9251	2 2324
9	4	11 53%	3 2623	2 2753
10	5	11 53%	3 6385	2 3191
11	6	10 98%	4 0379	2 3520
12	7	10 42%	4 4588	2 3734
13	8	9 87%	4 8989	2 3830
14	9	9 32%	5 3554	2 3807
15	10	8 77%	5 8248	2 3663
16	11	8 21%	6 3031	2 3401
17	12	7 66%	6 7859	2 3023
18	13	7 11%	7 2681	2 2535
19	14	6 55%	7 7444	2 1943
20	15	6 00%	8 2090	2 1256
21	*Terminal 8/*		*253 9778*	*65 7628*
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

1/ STB Ex Parte No 558 decision for stated year
2/ Estimated future growth in Gross-Domestic Product
3/ Assumed value
4/ Value derived through iterations that sets Line 23 equal to zero
5/ For Years 1 to 5, Line 1
For years 6 to 15, prior year Column (2) - [Line (1) - Line (2)] − 10
6/ Year 1 equal to [1 + Column (2), Line 6] x Line 3 x Line 4 Years 2 to 15 equal to previous year Column (3) x [1 + current year Column (2)]
7/ Column (3) − [(1+ Line 5)^ Current Year Column (1)]
8/ For Column (3), [Column (3), Line 20 x (1+ Line 2)] − (Line 5 - Line 2)
For Column (4), Column (3), Line 21 − [(1 + Line 4)^Column (1), Line 20]
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22

1998 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	11 18%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	1 83%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	8 91%

	Year (1)	Annual Dividend Growth 5/ (2)	Dividend 6/ (3)	Discounted Dividend 7/ (4)
6	1	11 18%	2 0322	1 8659
7	2	11 18%	2 2594	1 9047
8	3	11 18%	2 5120	1 9443
9	4	11 18%	2 7928	1 9848
10	5	11 18%	3 1050	2 0261
11	6	10 66%	3 4361	2 0587
12	7	10 14%	3 7847	2 0819
13	8	9 63%	4 1490	2 0956
14	9	9 11%	4 5269	2 0993
15	10	8 59%	4 9157	2 0931
16	11	8 07%	5 3125	2 0769
17	12	7 55%	5 7138	2 0510
18	13	7 04%	6 1159	2 0156
19	14	6 52%	6 5145	1 9713
20	15	6 00%	6 9054	1 9186
21	Terminal 8/		251 2660	69 8121
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

1/ STB Ex Parte No 558 decision for stated year
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8/ For Column (3), [Column (3), Line 20 x (1+ Line 2)] − (Line 5 - Line 2)
For Column (4), Column (3), Line 21 − [(1 + Line 4)^Column (1), Line 20]
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22

1999 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	10 89%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	1 91%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	8 97%

	Year (1)	Annual Dividend Growth 5/ (2)	Dividend 6/ (3)	Discounted Dividend 7/ (4)
6	1	10 89%	2 1138	1 9398
7	2	10 89%	2 3440	1 9741
8	3	10 89%	2 5992	2 0089
9	4	10 89%	2 8823	2 0443
10	5	10 89%	3 1962	2 0804
11	6	10 40%	3 5286	2 1078
12	7	9 91%	3 8784	2 1260
13	8	9 42%	4 2438	2 1349
14	9	8 93%	4 6230	2 1342
15	10	8 45%	5 0134	2 1240
16	11	7 96%	5 4123	2 1043
17	12	7 47%	5 8164	2 0753
18	13	6 98%	6 2223	2 0374
19	14	6 49%	6 6260	1 9911
20	15	6 00%	7 0236	1 9368
21	Terminal 8/		250 8705	69 1807
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

1/ STB Ex Parte No 558 decision for stated year
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8/ For Column (3) [Column (3), Line 20 x (1+ Line 2)| − (Line 5 - Line 2)
For Column (4), Column (3), Line 21 − |(1 − Line 4)^Column (1), Line 20|
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22

2000 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	10 66%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	3 07%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	10 59%

	Year (1)	Annual Dividend Growth 5/ (2)	Dividend 6/ (3)	Discounted Dividend 7/ (4)
6	1	10 66%	3 3934	3 0684
7	2	10 66%	3 7552	3 0703
8	3	10 66%	4 1555	3 0722
9	4	10 66%	4 5985	3 0740
10	5	10 66%	5 0887	3 0759
11	6	10 19%	5 6074	3 0648
12	7	9 73%	6 1529	3 0409
13	8	9 26%	6 7228	3 0043
14	9	8 80%	7 3141	2 9555
15	10	8 33%	7 9234	2 8950
16	11	7 86%	8 5465	2 8236
17	12	7 40%	9 1787	2 7420
18	13	6 93%	9 8150	2 6513
19	14	6 47%	10 4496	2 5523
20	15	6 00%	11 0766	2 4463
21	Terminal 8/		255 6558	56 4632
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

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For Column (4) Column (3), Line 21 − [(1 + Line 4)^Column (1), Line 20]
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22

2001 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	11 00%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	1 66%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	8 62%

	Year (1)	Annual Dividend Growth 5/ (2)	Dividend 6/ (3)	Discounted Dividend 7/ (4)
6	1	11 00%	1 8412	1 6951
7	2	11 00%	2 0438	1 7323
8	3	11 00%	2 2686	1 7703
9	4	11 00%	2 5181	1 8091
10	5	11 00%	2 7951	1 8488
11	6	10 50%	3 0886	1 8808
12	7	10 00%	3 3975	1 9048
13	8	9 50%	3 7202	1 9202
14	9	9 00%	4 0550	1 9270
15	10	8 50%	4 3997	1 9249
16	11	8 00%	4 7517	1 9140
17	12	7 50%	5 1081	1 8943
18	13	7 00%	5 4656	1 8660
19	14	6 50%	5 8209	1 8297
20	15	6 00%	6 1702	1 7856
21	Terminal 8/		249 8295	72 2970
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

1/ STB Ex Parte No 558 decision for stated year
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8/ For Column (3) [Column (3), Line 20 x (1+ Line 2)] − (Line 5 - Line 2)
For Column (4), Column (3), Line 21 − [(1 + Line 4)^Column (1) Line 20]
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22

2002 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	11 13%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	1 40%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	8 25%

	Year	Annual Dividend Growth 5/	Dividend 6/	Discounted Dividend 7/
	(1)	(2)	(3)	(4)
6	1	11 13%	1 5580	1 4393
7	2	11 13%	1 7314	1 4776
8	3	11 13%	1 9241	1 5170
9	4	11 13%	2 1383	1 5574
10	5	11 13%	2 3763	1 5988
11	6	10 62%	2 6286	1 6338
12	7	10 10%	2 8942	1 6618
13	8	9 59%	3 1717	1 6824
14	9	9 08%	3 4597	1 6953
15	10	8 57%	3 7560	1 7003
16	11	8 05%	4 0584	1 6972
17	12	7 54%	4 3644	1 6861
18	13	7 03%	4 6710	1 6671
19	14	6 51%	4 9753	1 6403
20	15	6 00%	5 2738	1 6063
21	Terminal 8/		248 6693	75 7393
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

1/ STB Ex Parte No 558 decision for stated year
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8/ For Column (3), |Column (3), Line 20 x (1+ Line 2)| − (Line 5 - Line 2)
For Column (4), Column (3), Line 21 − |(1 + Line 4)^Column (1), Line 20|
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 23

2003 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	11 00%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	1 64%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	8 59%

	Year (1)	Annual Dividend Growth 5/ (2)	Dividend 6/ (3)	Discounted Dividend 7/ (4)
6	1	11 00%	1 8202	1 6762
7	2	11 00%	2 0204	1 7134
8	3	11 00%	2 2427	1 7515
9	4	11 00%	2 4893	1 7904
10	5	11 00%	2 7632	1 8301
11	6	10 50%	3 0533	1 8623
12	7	10 00%	3 3586	1 8865
13	8	9 50%	3 6777	1 9023
14	9	9 00%	4 0087	1 9095
15	10	8 50%	4 3494	1 9080
16	11	8 00%	4 6974	1 8976
17	12	7 50%	5 0497	1 8786
18	13	7 00%	5 4032	1 8511
19	14	6 50%	5 7544	1 8155
20	15	6 00%	6 0997	1 7722
21	Terminal 8/		249 7240	72 5548
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

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For Column (4), Column (3) Line 21 − [(1 − Line 4)^Column (1), Line 20]
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22

2004 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	11 39%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	1 67%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	8 72%

	Year	Annual Dividend Growth 5/	Dividend 6/	Discounted Dividend 7/
	(1)	(2)	(3)	(4)
6	1	11 39%	1 8654	1 7157
7	2	11 39%	2 0778	1 7579
8	3	11 39%	2 3145	1 8010
9	4	11 39%	2 5781	1 8452
10	5	11 39%	2 8718	1 8905
11	6	10 85%	3 1834	1 9275
12	7	10 31%	3 5117	1 9558
13	8	9 77%	3 8549	1 9747
14	9	9 23%	4 2108	1 9840
15	10	8 70%	4 5769	1 9835
16	11	8 16%	4 9502	1 9732
17	12	7 62%	5 3273	1 9532
18	13	7 08%	5 7044	1 9236
19	14	6 54%	6 0774	1 8850
20	15	6 00%	6 4420	1 8378
21	Terminal 8/		250 9413	71 5913
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

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8/ For Column (3) |Column (3), Line 20 x (1+ Line 2)| − (Line 5 - Line 2)
For Column (4), Column (3), Line 21 − |(1 − Line 4)^Column (1), Line 20|
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22

2005 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	13 66%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	1 42%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	Implied Railroad Industry Cost of Equity 4/	8 76%

	Year (1)	Annual Dividend Growth 5/ (2)	Dividend 6/ (3)	Discounted Dividend 7/ (4)
6	1	13 66%	1 6172	1 4869
7	2	13 66%	1 8381	1 5539
8	3	13 66%	2 0892	1 6240
9	4	13 66%	2 3745	1 6971
10	5	13 66%	2 6989	1 7736
11	6	12 89%	3 0469	1 8410
12	7	12 13%	3 4164	1 8981
13	8	11 36%	3 8046	1 9435
14	9	10 60%	4 2078	1 9763
15	10	9 83%	4 6214	1 9958
16	11	9 06%	5 0403	2 0014
17	12	8 30%	5 4585	1 9929
18	13	7 53%	5 8696	1 9704
19	14	6 77%	6 2668	1 9343
20	15	6 00%	6 6428	1 8852
21	Terminal 8/		255 1990	72 4255
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

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9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22

2006 Multi-Step DCF Railroad Industry Cost of Equity

1	Railroad Industry 5-Year Estimated Truncated Growth Rate 1/	14 75%
2	Assumed Railroad Industry Perpetual Growth Rate 2/	6 0%
3	Railroad Industry Average Dividend Yield 1/	1 26%
4	Present Value Of Perpetual Railroad Dividends 3/	100
5	*Implied Railroad Industry Cost of Equity* 4/	8 67%

	Year	Annual Dividend Growth 5/	Dividend 6/	Discounted Dividend 7/
	(1)	(2)	(3)	(4)
6	1	14 75%	1 4459	1 3306
7	2	14 75%	1 6591	1 4051
8	3	14 75%	1 9038	1 4837
9	4	14 75%	2 1846	1 5668
10	5	14 75%	2 5069	1 6546
11	6	13 88%	2 8547	1 7339
12	7	13 00%	3 2258	1 8031
13	8	12 13%	3 6170	1 8605
14	9	11 25%	4 0239	1 9047
15	10	10 38%	4 4413	1 9347
16	11	9 50%	4 8633	1 9496
17	12	8 63%	5 2827	1 9488
18	13	7 75%	5 6921	1 9324
19	14	6 88%	6 0835	1 9006
20	15	6 00%	6 4485	1 8540
21	Terminal 8/		256 4724	73 7371
22	Cumulative Present Value 9/			100 0
23	Difference 10/			0

1/ STB Ex Parte No 558 decision for stated year
2/ Estimated future growth in Gross-Domestic Product
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4/ Value derived through iterations that sets Line 23 equal to zero
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For Column (4), Column (3) Line 21 − [(1 + Line 4)^Column (1), Line 20]
9/ Sum of Lines 6 to 21
10/ Line 4 - Line 22