

Railroads

EQUITY RATE					13.00%	
CAPITAL ASSET PRICING MODEL						PAGE
	CAPM Ex Ante		9.82%			6
DIVIDEND GROWTH MODELS (Single Stage)						
	Value Line, based on Dividends Growth		12.50%			7
	Value Line, based on Earnings Growth		13.50%			8
	Value Line, based on Return on Equity		12.00%			9
FCFE GROWTH MODEL (Multi Stage)						
			11.50%			10
	Median		12.00%	9.82% - 13.5%		RANGE
DEBT RATE					5.00%	11
SECURED DEBT (LEASE) RATE					4.75%	11
MARKET CAPITAL STRUCTURE						
	Equity	79%	x 13.00%	=	10.27%	3
	Secured Debt	3%	x 4.75%	=	0.14%	3
	Debt	18%	x 5.00%	=	0.90%	3
	Marginal Tax Rate	24%	= (1-.24)	x 1.04%	<u>0.79%</u>	
WEIGHTED AVERAGE COST OF CAPITAL					11.1%	

rounded

SUPPORT FOR GUIDELINE COMPANIES

WASHINGTON STATE DEPARTMENT OF REVENUE

2023 ASSESSMENT YEAR

RAILROADS

Capital Structure at Book Value

Company	Ticker	Beta	Fin'l Strength	Operating Margin	P/E Ratio	Div'd Yield	Common Stock	%	Preferred Stock	%	Long Term Debt	%	Total Debt & Equity
Union Pacific Corp.	UNP	1.05	A++	50.5%	20.0	2.72%	11,957,860,000	27.4%	-	0.0%	31,648,000,000	72.6%	43,605,860,000
Norfolk Southern Corp.	NSC	1.05	A+	48.5%	18.7	2.20%	12,930,056,900	47.2%	-	0.0%	14,479,000,000	52.8%	27,409,056,900
CSX Corp.	CSX	1.05	B++	50.0%	17.6	1.43%	13,230,000,000	42.5%	-	0.0%	17,896,000,000	57.5%	31,126,000,000
Canadian National	CNI	0.90	A	51.0%	20.7	2.10%	17,072,640,000	61.6%	-	0.0%	10,635,280,000	38.4%	27,707,920,000
Canadian Pacific	CP	1.00	A	50.0%	22.9	0.95%	28,355,850,000	67.9%	-	0.0%	13,424,340,000	32.1%	41,780,190,000
	Mean	1.01		50.0%	20.0	1.88%	16,709,281,380	49.3%		0.0%	17,616,524,000	50.7%	
	Weighted Mean						83,546,406,900	48.7%	-	0.00%	88,082,620,000	51.3%	171,629,026,900
	Median	1.05			20.0	2.10%		47.2%		0.0%		52.8%	
	Std Dev	0.07			1.99	0.7%		16.0%		-		16.0%	
	Coeff Var	0.06			0.10	0.37		32.5%		-		31.6%	
	Harmonic Mean	1.01			19.81	0.02		44.6%				46.6%	
	Max	1.05			22.85	2.72%		67.9%		0.0%		72.6%	
	Min	0.90			17.64	0.95%		27.4%		0.0%		32.1%	

Say **1.00**

**SUPPORT FOR CAPITAL STRUCTURE
MARKET VALUE**

WASHINGTON STATE DEPARTMENT OF REVENUE
2023 ASSESSMENT YEAR
RAILROADS

Capital Structure at Market Value

Company	Ticker	Stock Price	Common Shares	Common Stock	%	Preferred Stock	%	Operating Lease	%	Long Term Debt	%	Total Debt & Equity
Union Pacific Corp.	UNP	205.68	614,800,000	126,452,064,000	78.9%	-	0.0%	5,732,225,644	3.6%	28,100,000,000	17.5%	160,284,289,644
Norfolk Southern Corp.	NSC	245.08	231,514,000	56,739,451,120	77.8%	-	0.0%	2,329,927,164	3.2%	13,846,000,000	19.0%	72,915,378,284
CSX Corp.	CSX	30.87	2,100,000,000	64,827,000,000	78.7%	-	0.0%	1,392,280,723	1.7%	16,135,000,000	19.6%	82,354,280,723
Canadian National	CNI	118.88	691,200,000	82,169,856,000	86.5%	-	0.0%	2,377,407,935	2.5%	10,461,380,000	11.0%	95,008,643,935
Canadian Pacific	CP	75.41	929,700,000	70,108,677,000	83.1%	-	0.0%	1,108,382,018	1.3%	13,112,800,000	15.5%	84,329,859,018
			Mean		81.0%		0.0%		2.5%		16.5%	
			Weighted Mean	400,297,048,120	80.9%	-	0.0%	12,940,223,484	2.6%	81,655,180,000	16.5%	494,892,451,604
			Median		78.9%		0.0%		2.5%		17.5%	
			Harmonic Mean		80.9%				2.1%		15.8%	
			Std Dev		3.7%		0.0%		1.0%		3.5%	
			Coeff Var		22.0%				2.6%		4.8%	
			Max		86.5%		0.0%		3.6%		19.6%	
			Min		77.8%		0.0%		1.3%		11.0%	
			Target		79%		0%		3%		18%	100%

Source:
Stock Price: Yahoo
Market Value Debt: Bond Analysis

SUPPORT FOR MARKET MULTIPLES

WASHINGTON STATE DEPARTMENT OF REVENUE

2023 ASSESSMENT YEAR

RAILROADS

Company	Ticker	Stock Price	Revenues	Multiple	Cash Flow	Multiple	Earnings	Multiple	Book Value	Multiple
Union Pacific Corp.	UNP	205.68	41.00	5.0	15.30	13.4	11.45	18.0	19.45	10.6
Norfolk Southern Corp.	NSC	245.08	55.00	4.5	19.70	12.4	13.90	17.6	55.85	4.4
CSX Corp.	CSX	30.87	7.00	4.4	2.75	11.2	1.95	15.8	6.30	4.90
Canadian National	CNI	118.88	19.35	6.1	7.65	15.5	5.70	20.9	24.70	4.81
Canadian Pacific	CP	75.41	7.30	10.3	3.45	21.9	2.80	26.9	30.50	2.47
		Mean		6.1		14.9		19.8		5.4
		Median		5.0		13.4		18.0		4.8
		Harmonic Mean		5.5		14.1		19.2		4.4
		Max		10.3		21.9		26.9		10.6
		Min		4.4		11.2		15.8		2.47
		Std Dev		2.5		4.2		4.4		3.0
		Coefficient of Variation		0.4		0.3		0.2		0.6
		Percentile .25		4.5		12.4		17.6		4.4
		Percentile .75		6.1		15.5		20.9		4.9
		Say		5.50		14.75		19.25		4.50

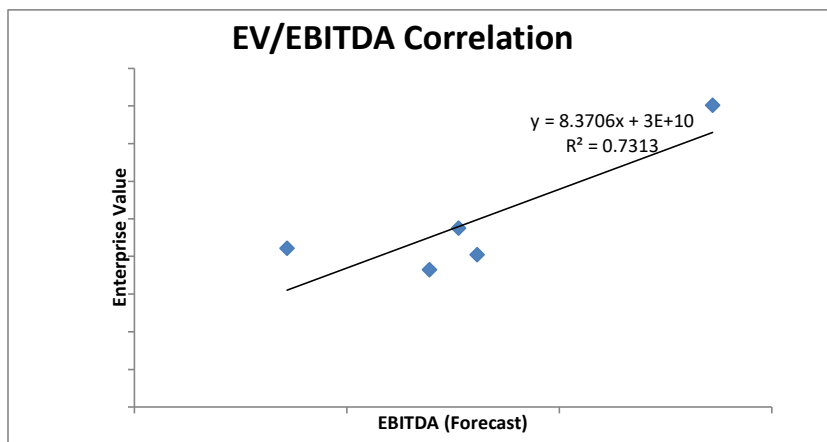
ENTERPRISE VALUE MULTIPLES

WASHINGTON STATE DEPARTMENT OF REVENUE

2023 ASSESSMENT YEAR

RAILROADS

Guideline Companies	Ticker	EV+OL	EBITDA + OL	EV / EBITDA	Annual Cash Flow Rate Change VL	EBITDA	EV / EBITDA	Revenue	EV/Sales	Cash Flow	Debt Service	EV / CF
					forecast							
Union Pacific Corp.	UNP	\$ 160,284,289,644	12,596,000,000	12.73	8.00%	13,603,680,000	11.78	24,411,750,000	6.57	8,651,500,000	1,405,000,000	15.94
Norfolk Southern Corp.	NSC	\$ 72,915,378,284	6,397,000,000	11.40	8.50%	6,940,745,000	10.51	12,330,000,000	5.91	4,230,000,000	692,300,000	14.81
CSX Corp.	CSX	\$ 80,976,280,723	7,394,000,000	10.95	9.00%	8,059,460,000	10.05	14,179,500,000	5.71	5,175,000,000	806,750,000	13.54
Canadian National	CNI	\$ 95,008,643,935	6,933,060,000	13.70	10.00%	7,626,366,000	12.46	12,900,000,000	7.37	5,224,500,000	523,069,000	16.53
Canadian Pacific	CP	\$ 84,329,859,018	3,235,280,000	26.07	11.00%	3,591,160,800	23.48	9,718,500,000	8.68	4,045,500,000	655,640,000	17.94
Mean							13.66		6.85	5,465,300,000		15.75
Median							11.78		6.57	5,175,000,000		15.94
Max							23.48		8.68	8,651,500,000.00		17.94
Min							10.05		5.71	4,045,500,000.00		13.54
Std Dev							5.58		1.21	1,859,833,816.50		1.67
Coefficient of Var							0.41		0.18	0.34		0.11
Harmonic Mean							12.42		6.69	5,082,208,086		15.61
						Say	12.50		6.75			15.75



10.50 put in income direct excluding IPP
12.50 put in income direct including IPP

Forecast EV/EBITDA By Rank

Guideline Companies	EV/EBITDA forecast		
CSX Corp.	10.05	10.28	Low Average
Norfolk Southern Corp.	10.51	10.51	Low Median
		10.50	Say
Union Pacific Corp.	11.78	15.91	Average
Canadian National	12.46	12.46	Median
Canadian Pacific	23.48	12.50	Say

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT CAPITAL ASSET PRICING MODEL

WASHINGTON STATE DEPARTMENT OF REVENUE
2023 ASSESSMENT YEAR
RAILROADS

$$\text{Ex Ante} \\ \text{Ke} = \text{Rf} + \text{B} (\text{Rp})$$

Ke = Cost of Equity	9.82%
----------------------------	--------------

to page 1

Rm =	rate of return	9.82%
Rf =	risk free rate	3.97%
Rp =	risk premium	5.85%
B =	Beta	1.00

Rp = Risk Premium	5.85%
--------------------------	--------------

to above

Shannon Pratt and Roger Grabowski	3.5 - 6%	
Cost of Capital, Applications and Examples, Fifth Edition, 2014		
Dr. Aswath Damodaran	5.94%	chart page 15
http://pages.stern.nyu.edu/~adamodar/	5.85%	adjusted for Rf
2022 Implied Premium		

Rf = Risk Free Rate	3.97%
----------------------------	--------------

to above

Value Line Investment Survey, Selected Yields January 6, 2023, page 1465		
as of 12-27-22		
US Treasury Securities year end data		
5 year	3.94%	
10 year	3.84%	
30 year	3.93%	
30 year Zero	3.81%	
Federal Reserve Statistical Release (http://www.federalreserve.gov/Releases/H15/Current/)		
As of 12-30-22		
Treasury Constant Maturities		
5 year	3.99%	
10 year	3.88%	
20 year	4.14%	
30 year	3.97%	
20 year TIPS	<u>1.62%</u>	2.52%
30 year TIPS	<u>1.67%</u>	2.30%
		TIPS inflation indication

Inflation	2.30%
------------------	--------------

to appraisal template

The Livingston Survey December 16, 2022, page 4, 8		
Inflation median (measured by the Consumer Price Index) over next 10 years		2.50%

Gross Domestic Product (GDP)	4.10%
-------------------------------------	--------------

real GDP + inflation est

Federal Reserve Projected Long Run Real GDP Growth		
Median Projection Value From Dec 14, 2022 Report		1.80%
https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20221214.pdf		

Congressional Budget Office Real GDP Economic Projections		
The Budget and Economic Outlook 2023-2033		
Table 2.3, pg 15		
Average Percentage Change Year To Year	2023-2027	1.80%
https://www.cbo.gov/system/files/2023-02/58848-Outlook.pdf	2028-2033	1.80%

Federal Reserve Bank of Philadelphia		
The Livingston Survey December 16, 2022, page 4, 8		
Average Annual Real GDP Growth Rate for Next 10 Years		1.97%
https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey		

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT

DIVIDEND GROWTH MODEL

WASHINGTON STATE DEPARTMENT OF REVENUE

2023 ASSESSMENT YEAR

RAILROADS

Based on Dividend Growth

$$K_e = (D_1 + BB_1) / P_0 + G_D$$

Ke = Cost of Equity
 D1 = Expected Dividends
 BB1 = Expected Share Repurchase
 P0 = Current Stock Price
 GD = Sustainable Growth -- Dividend

Company	Ticker	Stock Price (Po)	Expected FCFE1	Expected Dividend (D1)	Expected Buyback	Dividend Yield (D1/Po)	Buyback Yield (BB1)	Total Yield	Growth	Ke
Union Pacific Corp.	UNP	205.68	6.78	5.60	1.18	2.72%	0.57%	3.30%	9.00%	12.30%
Norfolk Southern Corp.	NSC	245.08	8.35	5.40	2.95	2.20%	1.20%	3.41%	8.00%	11.41%
CSX Corp.	CSX	30.87	1.08	0.44	0.64	1.43%	2.07%	3.49%	9.50%	12.99%
Canadian National	CNI	118.88	3.42	2.50	0.92	2.10%	0.78%	2.88%	10.00%	12.88%
Canadian Pacific	CP	75.41	2.10	0.72	1.38	0.95%	1.83%	2.79%	10.00%	12.79%
				Mean				3.17%		12.47%
				Median				3.30%		12.79%
				Harmonic Mean				3.15%		12.44%
				Std Dev				0.32%		0.65%
				Coeff Var				10.05%		5.23%
				Max				3.49%		12.99%
				Min				2.79%		11.41%
									Say	12.50%

Source: Value Line Projections 23-25

to page 1

**SUPPORT FOR YIELD CAPITALIZATION EQUITY C
DIVIDEND GROWTH MODEL**

WASHINGTON STATE DEPARTMENT OF REVENUE
2023 ASSESSMENT YEAR
RAILROADS

Based on Earnings Growth

$$K_e = (D_1 + BB_1 / P_0) + G_D$$

Ke = Cost of Equity
D1 = Expected Dividends
P0 = Current Stock Price
G = Sustainable Growth -- Earnings
assumptio Sustainable growth can not exceed inflation plus real GDP

Company	Ticker	Stock Price (Po)	Expected FCFE1	Expected Dividend (D1)	Expected Buyback	Yield (D1/P0)	Buyback Yield (BB1/P0)	Total Yield	Growth	Ke Sustainable Growth
Union Pacific Corp.	UNP	205.68	6.78	5.60	1.18	2.72%	0.57%	3.30%	9.50%	12.80%
Norfolk Southern Corp.	NSC	245.08	8.35	5.40	2.95	2.20%	1.20%	3.41%	10.00%	13.41%
CSX Corp.	CSX	30.87	1.08	0.44	0.64	1.43%	2.07%	3.49%	10.50%	13.99%
Canadian National	CNI	118.88	3.42	2.50	0.92	2.10%	0.78%	2.88%	11.00%	13.88%
Canadian Pacific	CP	75.41	2.10	0.72	1.38	0.95%	1.83%	2.79%	10.00%	12.79%
					Mean	1.88%				13.37%
					Median	2.10%				13.41%
					Harmonic Mean	1.64%				13.35%
					Std Dev	0.69%				0.57%
					Coeff Var	36.88%				4.29%
					Max	2.72%				13.99%
					Min	0.95%				12.79%
										Say 13.50%

Source: Value Line Projections 23-25

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT DIVIDEND GROWTH MODEL

WASHINGTON STATE DEPARTMENT OF REVENUE
2023 ASSESSMENT YEAR
RAILROADS

Based on Return on Equity

$$K_e = (D1 / P_o) + G$$

- Ke = Cost of Equity
- D1 = Expected Dividends
- E1 = Expected Earnings
- Po = Current Price
- G = Sustainable Growth
- b = Retained Earnings % (plowback)
- ROE = Return on Equity

Company	Ticker	Stock Price (Po)	Expected Earnings (E1)	Total Yield	\$ Payout	Payout Ratio	b (1-payout ratio)	ROE	Growth (b*ROE)=(G)	Ke
Union Pacific Corp.	UNP	205.68	10.30	3.30%	6.78	0.66	0.34	55.00%	18.81%	22.10%
Norfolk Southern Corp.	NSC	245.08	13.10	3.41%	8.35	0.64	0.36	22.50%	8.16%	11.57%
CSX Corp.	CSX	30.87	1.75	3.49%	1.08	0.62	0.38	29.00%	11.12%	14.62%
Canadian National	CNI	118.88	5.75	2.88%	3.42	0.60	0.40	25.50%	10.32%	13.20%
Canadian Pacific	CP	75.41	3.30	2.79%	2.10	0.64	0.36	10.00%	3.63%	6.42%
									Mean	13.58%
									Median	13.20%
									Harmonic Mean	11.58%
									Std Dev	5.68%
									Coeff Var	41.86%
									Max	22.10%
									Min	6.42%
									Say	12.00%

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT MULTISTAGE FREE CASH FLOW TO EQUITY MODEL

Washington State Department of Revenue
2023 ASSESSMENT YEAR

Based on Earnings Growth and Required Reinvestment

Company	Ticker	Ke	New Ke
Union Pacific Corp.	UNP	11.17%	12.13%
Norfolk Southern Corp.	NSC	12.26%	12.19%
CSX Corp.	CSX	13.28%	12.90%
Canadian National	CNI	11.45%	11.46%
Canadian Pacific	CP	9.69%	11.10%
Mean		11.57%	11.95%
Harmonic Mean		11.44%	11.92%
Median		11.45%	12.13%
Say		11.50%	12.25%

SUPPORT FOR DEBT RATING AND DEBT YIELD RATE

WASHINGTON STATE DEPARTMENT OF REVENUE

2023 ASSESSMENT YEAR

RAILROADS

Company	Ticker	Mergent's Ratings	S&P Ratings	WAYTM	S&P YTM (avg)	Mergent's Ratings	S&P Ratings	Mergent's	S&P	
Union Pacific Corp.	UNP		A-	4.83%	4.73%		9	Aaa1	AAA+	1
Norfolk Southern Corp.	NSC		BBB+	5.05%	4.99%		10	Aaa2	AAA	2
CSX Corp.	CSX		BBB+	4.99%	4.80%		10	Aaa3	AAA-	3
Canadian Pacific	CP		BBB+	4.94%	4.93%		10	Aa1	AA+	4
Canadian National	CNI		A	4.81%	4.67%		8	Aa2	AA	5
Overall Average Debt Rating			A-	4.92%	4.82%		9.4	Aa3	AA-	6
bond analysis, A-CCC bonds										
All issues 20+ year maturities										
Guideline Companies, All Ratings			4.91%	5.00%						
bond analysis page 12										
Mergent's Bond Record January 2023										
Corporate	Aaa	Aa	A	Baa						
October	5.10%	5.40%	5.74%	6.26%						
November	4.90%	5.23%	5.58%	6.07%						
December	4.43%	4.77%	5.12%	5.59%						
4th Qtr Average	4.81%	5.13%	5.48%	5.97%						
2022 Average	2.67%	2.82%	3.00%	3.33%						
Public Utilities	Aaa	Aa	A	Baa						
October		5.68%	5.88%	6.18%						
November		5.54%	5.75%	6.05%						
December		5.06%	5.28%	5.57%						
4th Qtr Average		5.43%	5.64%	5.93%						
2022 Average		2.97%	3.08%	3.31%						
Industrials	Aaa	Aa	A	Baa						
October	5.10%	5.11%	5.59%	6.33%						
November	4.90%	4.92%	5.40%	6.08%						
December	4.43%	4.48%	4.94%	5.61%						
4th Qtr Average	4.81%	4.84%	5.31%	6.01%						
2022 Average	2.67%	2.66%	2.95%	3.37%						
Debt Yield Rate				5.00%						
Cost of Secured Debt (Operating Lease) Rate				4.75%						

Aa1	AA+	4
Aa2	AA	5
Aa3	AA-	6
A1	A+	7
A2	A	8
A3	A-	9
Baa1	BBB+	10
Baa2	BBB	11
Baa3	BBB-	12
Ba1	BB+	13
Ba2	BB	14
Ba3	BB-	15
B1	B+	16
B2	B	17
B3	B-	18
Caa1	CCC+	19
Caa2	CCC	20

to page 1
to page 1

12/31/2022

Railroad Bond Analysis

2023.5

Company	type	Call	coupon	maturity	Price	Issued / Book	Current yield	YTM	Weighted Ave	S&P Rating	Mkt Val	Mkt : Book	Embedded Rate	Debt Service	WAYTM	WAYTM	Finra YTM
Canadian National			2.950	2024	97.52	\$ 350,000,000	3.03%	8.21%	0.03%	NR	\$ 341,320,000	97.52%		10,325,000	0.000343	0.00477	4.374
Canadian National			2.750	2026	95.42	\$ 500,000,000	2.88%	4.74%	0.03%	NR	\$ 477,100,000	95.42%		13,750,000	0.000283	0.00393	4.347
Canadian National	Notes (frgn)	Z100	6.900	2028	113.31	\$ 475,000,000	6.09%	3.64%	0.02%	NR	\$ 538,222,500	113.31%		32,775,000	0.000207	0.00287	4.169
Canadian National			7.375	2031	118.00	\$ 200,000,000	6.25%	4.49%	0.01%	NR	\$ 236,000,000	118.00%		14,750,000	0.000107	0.00149	4.825
Canadian National			6.250	2034	113.58	\$ 500,000,000	5.50%	4.59%	0.03%	NR	\$ 567,900,000	113.58%		31,250,000	0.000274	0.00381	4.708
Canadian National	Secured (fr Put-able)		6.712	2036	116.88	\$ 250,000,000	5.74%	4.88%	0.01%	NR	\$ 292,200,000	116.88%		16,780,000	0.000146	0.00202	4.979
Canadian National			6.200	2036	114.50	\$ 450,000,000	5.41%	4.64%	0.02%	NR	\$ 515,250,000	114.50%		27,900,000	0.000250	0.00347	4.723
Canadian National	SR Notes		6.375	2037	114.45	\$ 300,000,000	5.57%	4.89%	0.02%	NR	\$ 343,350,000	114.45%		19,125,000	0.000175	0.00243	4.984
Canadian National	SR Notes		3.500	2042	83.54	\$ 250,000,000	4.19%	4.87%	0.01%	NR	\$ 208,850,000	83.54%		8,750,000	0.000145	0.00202	4.795
Canadian National	SR Notes		4.500	2043	92.52	\$ 250,000,000	4.86%	5.12%	0.02%	NR	\$ 231,300,000	92.52%		11,250,000	0.000153	0.00212	5.087
Canadian National	SR Notes		3.200	2046	79.47	\$ 650,000,000	4.03%	4.70%	0.04%	NR	\$ 516,555,000	79.47%		20,800,000	0.000365	0.00507	4.644
Canadian National	SR Notes		3.650	2048	85.70	\$ 600,000,000	4.26%	4.64%	0.03%	NR	\$ 514,200,000	85.70%		21,900,000	0.000332	0.00462	4.62
Canadian National	SR Notes		4.450	2049	97.49	\$ 650,000,000	4.56%	4.62%	0.04%	NR	\$ 633,685,000	97.49%		28,925,000	0.000359	0.00498	4.617
Canadian National	SR Notes		2.450	2050	68.56	\$ 600,000,000	3.57%	4.51%	0.03%	NR	\$ 411,360,000	68.56%		14,700,000	0.000323	0.00449	4.452
14		1400		sum	1390.94	\$ 6,025,000,000	Percent of 99.35%		0.35%		\$ 5,827,292,500	96.72%	4.53%	\$ 272,980,000		4.810%	
CSX Corp	Fixed Rt		3.400	2024	97.92	\$ 550,000,000	3.47%	7.80%	0.05%	BBB+	\$ 538,560,000	97.92%		18,700,000	0.000513	0.00255	4.845
CSX Corp	Fixed Rt		3.350	2025	96.90	\$ 600,000,000	3.46%	5.56%	0.04%	BBB+	\$ 581,400,000	96.90%		20,100,000	0.000399	0.00198	4.552
CSX Corp			2.600	2026	93.58	\$ 700,000,000	2.78%	5.41%	0.05%	BBB+	\$ 655,060,000	93.58%		18,200,000	0.000453	0.00225	4.472
CSX Corp			3.250	2027	95.94	\$ 850,000,000	3.39%	4.53%	0.05%	BBB+	\$ 815,490,000	95.94%		27,625,000	0.000460	0.00228	4.284
CSX Corp			3.800	2028	97.92	\$ 800,000,000	3.88%	4.32%	0.04%	BBB+	\$ 783,360,000	97.92%		30,400,000	0.000413	0.00205	4.257
CSX Corp	MTN Ser C		6.800	2028	111.39	\$ 200,000,000	6.10%	3.99%	0.01%	BBB+	\$ 222,780,000	111.39%		13,600,000	0.000095	0.00047	4.57
CSX Corp			4.250	2029	99.29	\$ 350,000,000	4.28%	4.40%	0.02%	BBB+	\$ 347,515,000	99.29%		14,875,000	0.000184	0.00091	4.383
CSX Corp	SR Notes		2.400	2030	87.65	\$ 400,000,000	2.74%	4.64%	0.02%	BBB+	\$ 350,600,000	87.65%		9,600,000	0.000222	0.00110	4.46
CSX Corp	SR Notes		4.100	2032	97.26	\$ 950,000,000	4.22%	4.49%	0.05%	BBB+	\$ 923,970,000	97.26%		38,950,000	0.000510	0.00253	4.447
CSX Corp	NOTES	Z100	6.000	2036	109.30	\$ 400,000,000	5.49%	4.98%	0.02%	BBB+	\$ 437,200,000	109.30%		24,000,000	0.000238	0.00118	5.05
CSX Corp	NOTES	Z100	6.150	2037	111.58	\$ 700,000,000	5.51%	4.95%	0.04%	BBB+	\$ 781,060,000	111.58%		43,050,000	0.000414	0.00206	5.004
CSX Corp	Fixed Rt nts		6.220	2040	113.28	\$ 660,000,000	5.49%	5.02%	0.04%	BBB+	\$ 747,648,000	113.28%		41,052,000	0.000396	0.00196	5.057
CSX Corp	NOTES		5.500	2041	107.81	\$ 550,000,000	5.10%	4.83%	0.03%	BBB+	\$ 592,955,000	107.81%		30,250,000	0.000317	0.00158	4.838
CSX Corp	NOTES		4.750	2042	96.66	\$ 600,000,000	4.91%	5.03%	0.04%	BBB+	\$ 579,960,000	96.66%		28,500,000	0.000361	0.00179	5.021
CSX Corp			4.400	2043	93.56	\$ 300,000,000	4.70%	4.92%	0.02%	BBB+	\$ 280,680,000	93.56%		13,200,000	0.000176	0.00088	4.907
CSX Corp	NOTES		4.100	2044	89.34	\$ 800,000,000	4.59%	4.94%	0.05%	BBB+	\$ 714,720,000	89.34%		32,800,000	0.000472	0.00234	4.916
CSX Corp			3.800	2046	84.54	\$ 800,000,000	4.49%	4.96%	0.05%	BBB+	\$ 676,320,000	84.54%		30,400,000	0.000473	0.00235	4.909
CSX Corp			4.750	2048	96.03	\$ 650,000,000	4.95%	5.04%	0.04%	BBB+	\$ 624,195,000	96.03%		30,875,000	0.000391	0.00194	5.026
CSX Corp			4.300	2048	91.30	\$ 850,000,000	4.71%	4.92%	0.05%	BBB+	\$ 776,050,000	91.30%		36,550,000	0.000499	0.00248	4.907
CSX Corp			3.350	2049	77.23	\$ 600,000,000	4.34%	4.94%	0.04%	BBB+	\$ 463,380,000	77.23%		20,100,000	0.000354	0.00176	5.015
CSX Corp			4.500	2049	92.54	\$ 400,000,000	4.86%	5.03%	0.02%	BBB+	\$ 370,160,000	92.54%		18,000,000	0.000240	0.00119	5.015
CSX Corp	SR Notes		3.800	2050	82.97	\$ 500,000,000	4.58%	4.97%	0.03%	BBB+	\$ 414,850,000	82.97%		19,000,000	0.000297	0.00147	4.945
CSX Corp	FR SR Note		3.950	2050	86.41	\$ 600,000,000	4.57%	4.87%	0.03%	BBB+	\$ 518,460,000	86.41%		23,700,000	0.000349	0.00173	4.853
CSX Corp	SR Notes		2.500	2051	66.29	\$ 500,000,000	3.77%	4.71%	0.03%	BBB+	\$ 331,450,000	66.29%		12,500,000	0.000281	0.00140	4.655
CSX Corp	SR Notes		4.500	2052	93.18	\$ 900,000,000	4.83%	4.95%	0.05%	BBB+	\$ 838,620,000	93.18%		40,500,000	0.000532	0.00264	4.939
CSX Corp	SR Notes		4.500	2054	92.26	\$ 450,000,000	4.88%	5.00%	0.03%	BBB+	\$ 415,170,000	92.26%		20,250,000	0.000269	0.00133	4.99
CSX Corp	SR Notes		4.250	2066	85.58	\$ 600,000,000	4.97%	5.08%	0.04%	BBB+	\$ 513,480,000	85.58%		25,500,000	0.000364	0.00181	5.073
CSX Corp	SR Notes		4.650	2068	91.57	\$ 600,000,000	5.08%	5.14%	0.04%	BBB+	\$ 549,420,000	91.57%		27,900,000	0.000368	0.00183	5.131
28		2800		sum	2639.28	\$ 16,860,000,000	% of book 94.26%		1.00%		\$ 15,844,513,005	93.98%	4.21%	\$ 710,177,000		4.986%	
Norfolk Southern			3.850	2024	99.11	\$ 400,000,000	3.88%	5.71%	0.03%	BBB+	\$ 396,440,000	99.11%		15,400,000	0.000273	0.00133	4.798
Norfolk Southern			3.650	2025	97.59	\$ 300,000,000	3.74%	5.36%	0.02%	BBB+	\$ 292,770,000	97.59%		10,950,000	0.000192	0.00094	4.674
Norfolk Southern	Notes	Z100	5.590	2025	101.93	\$ 367,000,000	5.48%	4.23%	0.02%	BBB+	\$ 374,083,100	101.93%		20,515,300	0.000186	0.00090	4.695
Norfolk Southern			2.900	2026	95.12	\$ 600,000,000	3.05%	5.03%	0.04%	BBB+	\$ 570,720,000	95.12%		17,400,000	0.000360	0.00175	4.469
Norfolk Southern			3.150	2027	94.42	\$ 799,999,999	3.34%	4.92%	0.05%	BBB+	\$ 755,359,999	94.42%		25,200,000	0.000471	0.00229	4.567
Norfolk Southern	Notes	Z100	7.800	2027	112.82	\$ 800,000,000	6.91%	3.82%	0.04%	BBB+	\$ 902,560,000	112.82%		62,400,000	0.000365	0.00177	4.491
Norfolk Southern			3.800	2028	98.10	\$ 400,000,000	3.87%	4.27%	0.02%	BBB+	\$ 392,400,000	98.10%		15,200,000	0.000204	0.00099	4.190
Norfolk Southern			2.550	2029	88.81	\$ 400,000,000	2.87%	4.92%	0.02%	BBB+	\$ 355,240,000	88.81%		10,200,000	0.000235	0.00114	4.481
Norfolk Southern	Notes	Z100	5.640	2029	102.78	\$ 350,000,000	5.49%	5.05%	0.02%	BBB+	\$ 359,730,000	102.78%		19,740,000	0.000211	0.00103	5.117
Norfolk Southern	SR Notes	Z100	7.250	2031	113.99	\$ 700,000,000	6.36%	4.97%	0.04%	BBB+	\$ 797,930,000	113.99%		50,750,000	0.000416	0.00202	5.109
Norfolk Southern	SR Notes	Z100	2.300	2031	85.76	\$ 500,000,000	2.68%	4.59%	0.03%	BBB+	\$ 428,800,000	85.76%		11,500,000	0.000274	0.00133	4.361
Norfolk Southern	SR Notes		3.000	2032	89.07	\$ 600,000,000	3.37%	4.58%	0.03%	BBB+	\$ 534,420,000	89.07%		18,000,000	0.000328	0.00160	4.469
Norfolk Southern	Notes	Z100	7.050	2037	115.20	\$ 750,000,000	6.12%	5.43%	0.05%	BBB+	\$ 864,000,000	115.20%		52,875,000	0.000487	0.00237	5.500
Norfolk Southern	Notes		4.837	2041	97.51	\$ 596,000,000	4.96%	5.05%	0.04%	BBB+	\$ 581,159,600	97.51%		28,828,520	0.000360	0.00175	5.044
Norfolk Southern	SR NTS		3.950	2042	88.52	\$ 600,000,000	4.46%	4.91%	0.04%	BBB+	\$ 53						

Norfolk Southern			4.050	2052	85.97	\$	749,994,000	4.71%	4.98%	0.04%	BBB+	\$	644,769,842	85.97%		30,374,757	0.000446	0.00217	4.595
Norfolk Southern	SR Notes		3.700	2053	80.56	\$	400,000,000	4.59%	4.97%	0.02%	BBB+	\$	322,240,000	80.56%		14,800,000	0.000237	0.00115	4.948
Norfolk Southern	SR Notes		4.550	2053	93.39	\$	750,000,000	4.87%	4.98%	0.04%	BBB+	\$	700,425,000	93.39%		34,125,000	0.000446	0.00217	4.974
Norfolk Southern	Notes	Z100	7.900	2097	130.74	\$	350,000,000	6.04%	6.02%	0.03%	BBB+	\$	457,590,000	130.74%		27,650,000	0.000252	0.00122	6.025
Norfolk Southern	FR SR Note	Z100	6.000	2105	91.70	\$	550,000,000	6.54%	6.55%	0.04%	BBB+	\$	504,350,000	91.70%		33,000,000	0.000430	0.00209	6.545
Norfolk Southern	SR NOTES		5.100	2118	92.11	\$	600,000,000	5.54%	5.54%	0.04%	BBB+	\$	552,660,000	92.11%		30,600,000	0.000397	0.00193	5.539
Norfolk Southern	SR NOTES		4.100	2121	75.16	\$	600,000,000	5.46%	5.47%	0.04%	BBB+	\$	450,960,000	75.16%		24,600,000	0.000392	0.00191	5.464
31			3100	sum	2883.71	\$	17,212,162,999	% of book	93.02%	1.04%		\$	15,971,878,227	92.79%		4.50%	\$	774,040,819	5.050%
Union Pacific Corp			3.750	2024	98.97	\$	400,000,000	3.79%	5.90%	0.03%	A-	\$	395,880,000	98.97%		15,000,000	0.000282	0.00066	4.686
Union Pacific Corp			3.150	2024	98.18	\$	500,000,000	3.21%	6.98%	0.04%	A-	\$	490,900,000	98.18%		15,750,000	0.000417	0.00098	4.875
Union Pacific Corp			3.646	2024	98.93	\$	439,192,000	3.69%	5.88%	0.03%	A-	\$	434,492,646	98.93%		16,012,940	0.000308	0.00073	4.701
Union Pacific Corp			3.750	2025	98.34	\$	500,000,000	3.81%	4.93%	0.03%	A-	\$	491,700,000	98.34%		18,750,000	0.000294	0.00069	4.468
Union Pacific Corp	FR Note		3.250	2025	97.52	\$	500,000,000	3.33%	5.01%	0.03%	A-	\$	487,600,000	97.52%		16,250,000	0.000299	0.00070	4.285
Union Pacific Corp			2.750	2026	95.80	\$	500,000,000	2.87%	4.57%	0.03%	A-	\$	479,000,000	95.80%		13,750,000	0.000273	0.00064	4.210
Union Pacific Corp			3.000	2027	92.59	\$	500,000,000	3.24%	5.38%	0.03%	A-	\$	462,950,000	92.59%		15,000,000	0.000321	0.00076	4.149
Union Pacific Corp	SR NOTES		2.150	2027	92.58	\$	500,000,000	2.32%	4.49%	0.03%	A-	\$	462,900,000	92.58%		10,750,000	0.000268	0.00063	4.172
Union Pacific Corp	Deb	NC	3.950	2028	98.79	\$	1,500,000,000	4.00%	4.25%	0.08%	A-	\$	1,481,850,000	98.79%		59,250,000	0.000762	0.00179	4.193
Union Pacific Corp			3.700	2029	97.59	\$	1,000,000,000	3.79%	4.20%	0.05%	A-	\$	975,900,000	97.59%		37,000,000	0.000502	0.00118	4.152
Union Pacific Corp	Deb	Z100	6.625	2029	113.20	\$	600,000,000	5.85%	3.91%	0.03%	A-	\$	679,200,000	113.20%		39,750,000	0.000280	0.00066	4.127
Union Pacific Corp	SR NOTES		2.400	2030	88.33	\$	750,000,000	2.72%	4.51%	0.04%	A-	\$	662,475,000	88.33%		18,000,000	0.000404	0.00095	4.347
Union Pacific Corp	SR NOTES		2.375	2031	87.25	\$	850,000,000	2.72%	4.41%	0.04%	A-	\$	741,625,000	87.25%		20,187,500	0.000448	0.00105	4.208
Union Pacific Corp	SR NOTES		2.800	2032	88.65	\$	1,250,000,000	3.16%	4.43%	0.07%	A-	\$	1,108,125,000	88.65%		35,000,000	0.000662	0.00156	4.329
Union Pacific Corp	SR NOTES		4.500	2033	101.02	\$	900,000,000	4.45%	4.37%	0.05%	A-	\$	909,180,000	101.02%		40,500,000	0.000469	0.00111	4.371
Union Pacific Corp			5.375	2033	97.53	\$	200,000,000	5.51%	5.72%	0.01%	A-	\$	195,060,000	97.53%		10,750,000	0.000137	0.00032	5.688
Union Pacific Corp	SR NOTES	Z100	6.250	2034	111.84	\$	250,000,000	5.59%	4.79%	0.01%	A-	\$	279,600,000	111.84%		15,625,000	0.000143	0.00034	4.872
Union Pacific Corp			3.375	2035	89.16	\$	450,000,000	3.79%	4.61%	0.02%	A-	\$	401,220,000	89.16%		15,187,500	0.000248	0.00058	4.557
Union Pacific Corp			3.600	2037	89.38	\$	500,000,000	4.03%	4.68%	0.03%	A-	\$	446,900,000	89.38%		18,000,000	0.000279	0.00066	4.610
Union Pacific Corp	Deb		6.150	2037	147.03	\$	250,000,000	4.18%	2.11%	0.01%	A-	\$	367,575,000	147.03%		15,375,000	0.00063	0.00015	2.596
Union Pacific Corp			4.375	2038	94.93	\$	750,000,000	4.61%	4.87%	0.04%	A-	\$	711,975,000	94.93%		32,812,500	0.000436	0.00103	4.841
Union Pacific Corp			3.550	2039	87.60	\$	500,000,000	4.05%	4.69%	0.03%	A-	\$	438,000,000	87.60%		17,750,000	0.000280	0.00066	4.631
Union Pacific Corp			5.780	2040	97.41	\$	375,890,000	5.93%	6.03%	0.03%	A-	\$	366,154,449	97.41%		21,726,442	0.000271	0.00064	6.019
Union Pacific Corp	SR NOTES		4.750	2041	88.68	\$	500,000,000	5.36%	5.80%	0.03%	A-	\$	443,400,000	88.68%		23,750,000	0.000346	0.00082	5.737
Union Pacific Corp	SR NOTES		3.200	2041	83.48	\$	1,000,000,000	3.83%	4.59%	0.05%	A-	\$	834,800,000	83.48%		32,000,000	0.000549	0.00129	4.538
Union Pacific Corp			4.300	2042	88.40	\$	300,000,000	4.86%	5.30%	0.02%	A-	\$	265,200,000	88.40%		12,900,000	0.000190	0.00045	5.261
Union Pacific Corp	SR NOTES		3.375	2042	84.86	\$	500,000,000	3.98%	4.61%	0.03%	A-	\$	424,300,000	84.86%		16,875,000	0.000275	0.00065	4.574
Union Pacific Corp			4.250	2043	91.26	\$	325,000,000	4.66%	4.96%	0.02%	A-	\$	296,595,000	91.26%		13,812,500	0.000193	0.00045	4.937
Union Pacific Corp	Fixed Rate		4.750	2043	92.96	\$	500,000,000	5.11%	5.34%	0.03%	A-	\$	464,800,000	92.96%		23,750,000	0.000319	0.00075	5.311
Union Pacific Corp	Fixed Rate		4.821	2044	97.07	\$	700,000,000	4.97%	5.05%	0.04%	A-	\$	679,490,000	97.07%		33,747,000	0.000423	0.00100	5.046
Union Pacific Corp	Fixed Rate		4.050	2045	90.30	\$	500,000,000	4.49%	4.78%	0.03%	A-	\$	451,500,000	90.30%		20,250,000	0.000286	0.00067	4.751
Union Pacific Corp	SR NOTES		4.150	2045	89.11	\$	350,000,000	4.66%	4.99%	0.02%	A-	\$	311,885,000	89.11%		14,525,000	0.000208	0.00049	4.970
Union Pacific Corp	SR NOTES		4.050	2046	87.32	\$	600,000,000	4.64%	5.00%	0.04%	A-	\$	523,920,000	87.32%		24,300,000	0.000358	0.00084	4.980
Union Pacific Corp	SR NOTES		3.350	2046	78.07	\$	300,000,000	4.29%	4.99%	0.02%	A-	\$	234,210,000	78.07%		10,050,000	0.000179	0.00042	4.935
Union Pacific Corp	SR NOTES		4.000	2047	87.95	\$	500,000,000	4.55%	4.87%	0.03%	A-	\$	439,750,000	87.95%		20,000,000	0.000291	0.00069	4.851
Union Pacific Corp	SR NOTES		4.500	2048	93.32	\$	1,500,000,000	4.82%	4.98%	0.09%	A-	\$	1,399,800,000	93.32%		67,500,000	0.000892	0.00210	4.963
Union Pacific Corp			4.300	2049	86.61	\$	1,000,000,000	4.96%	5.27%	0.06%	A-	\$	866,100,000	86.61%		43,000,000	0.000629	0.00148	5.247
Union Pacific Corp	SR NOTES		3.250	2050	77.75	\$	1,000,000,000	4.18%	4.74%	0.06%	A-	\$	777,500,000	77.75%		32,500,000	0.000566	0.00133	4.715
Union Pacific Corp	SR NOTES		3.799	2051	85.80	\$	1,044,261,000	4.43%	4.73%	0.06%	A-	\$	895,975,938	85.80%		39,671,475	0.000590	0.00139	4.706
Union Pacific Corp			2.950	2052	72.71	\$	850,000,000	4.06%	4.71%	0.05%	A-	\$	618,035,000	72.71%		25,075,000	0.000478	0.00113	4.675
Union Pacific Corp	SR NOTES		4.950	2052	102.65	\$	600,000,000	4.82%	4.78%	0.03%	A-	\$	615,900,000	102.65%		29,700,000	0.000342	0.00081	4.780
Union Pacific Corp	SR NOTES		3.500	2053	80.64	\$	1,250,000,000	4.34%	4.73%	0.07%	A-	\$	1,008,000,000	80.64%		43,750,000	0.000706	0.00166	4.711
Union Pacific Corp	SR NOTES		3.875	2055	85.67	\$	450,000,000	4.52%	4.76%	0.03%	A-	\$	385,515,000	85.67%		17,437,500	0.000256	0.00060	4.750
Union Pacific Corp			3.950	2059	84.15	\$	500,000,000	4.69%	4.90%	0.03%	A-	\$	420,750,000	84.15%		19,750,000	0.000293	0.00069	4.884
Union Pacific Corp			3.839	2060	83.19	\$	1,841,766,000	4.61%	4.83%	0.11%	A-	\$	1,532,165,135	83.19%		70,705,397	0.001062	0.00250	4.815
Union Pacific Corp	SR NOTES		3.550	2061	78.59	\$	650,000,000	4.52%	4.79%	0.04%	A-	\$	510,835,000	78.59%		23,075,000	0.000372	0.00088	4.772
Union Pacific Corp	SR NOTES		2.973	2062	69.28	\$	1,044,449,000	4.29%	4.72%	0.06%	A-	\$	723,594,267	69.28%		31,051,469	0.000589	0.00139	4.685
Union Pacific Corp	SR NOTES		5.150	2063	103.35	\$	400,000,000	4.98%	4.96%	0.02%	A-	\$	413,400,000	103.35%		20,600,000	0.000237	0.00056	4.956
Union Pacific Corp	SR NOTES		4.375	2065	83.57	\$	600,000,000	5.24%	5.37%	0.04%	A-	\$	501,420,000	83.57%		26,250,000	0.000385	0.00091	5.357
Union Pacific Corp	SR NOTES		4.100	2067	85.47	\$	500,000,000	4.80%	4.92%	0.03%	A-	\$	427,350,000	85.47%		20,500,000	0.000294	0.00069	4.905
Union Pacific Corp	SR NOTES		3.750	2070	78.50	\$	750,000,000	4.78%	4.94%	0.04%	A-	\$	588,750,000	78.50%		28,125,000	0.000442	0.00104	4.929
Union Pacific Corp	SR NOTES		3.799	2071	79.92	\$	1,005,137,000	4.75%	4.90%	0.06%	A-	\$	803,305,490	79.92%		38,185,155	0.000588	0.00139	4.886
Union Pacific Corp	SR NOTES		3.850	2072	80.91	\$	500,000,000	4.76%	4.88%	0.03%	A-	\$	404,550,000	80.91%		19,250,000	0.000292	0.00069	4.878
53 Book Value	5300		sum	4834.16	\$	35,525,695,000	% of book	91.21%	1.96%		\$	31,733,057,926	89.32%		3.83%	\$	1,360,262,378	4.825%	
Kansas City Southern			3.125	2026	95.64	\$	250,000,000	3.27%	5.02%	0.02%	BBB	\$	239,100,000	95.64%		7,812,500	0.000150	0.00155	4.55
Kansas City Southern			2.875	2029	100.45	\$	425,000,000	2.86%	2.79%	0.01%	BBB	\$	426,912,500	100.45%		12,218,750	0.000141	0.00146	4.613
K																			

Canadian Pacific	SR NOTES	7.125	2031	115.13	\$	350,000,000	6.19%	4.69%	0.02%	\$	402,955,000	115.13%		24,937,500	0.000196	0.00203	4.962
Canadian Pacific	SR NOTES	5.750	2033	106.21	\$	250,000,000	5.41%	4.92%	0.01%	\$	265,525,000	106.21%		14,375,000	0.000147	0.00152	4.961
Canadian Pacific	SR NOTES	4.800	2035	99.23	\$	300,000,000	4.84%	4.89%	0.02%	\$	297,690,000	99.23%		14,400,000	0.000175	0.00181	4.882
Canadian Pacific	SR NOTES	5.950	2037	108.58	\$	450,000,000	5.48%	5.06%	0.03%	\$	488,610,000	108.58%		26,775,000	0.000272	0.00281	5.097
Canadian Pacific	SR NOTES	5.750	2042	104.44	\$	250,000,000	5.51%	5.37%	0.02%	\$	261,100,000	104.44%		14,375,000	0.000160	0.00166	5.373
Canadian Pacific	SR NOTES	4.800	2045	96.58	\$	550,000,000	4.97%	5.06%	0.03%	\$	531,190,000	96.58%		26,400,000	0.000333	0.00344	5.056
Canadian Pacific	SR NOTES	6.125	2115	110.80	\$	900,000,000	5.53%	5.52%	0.06%	\$	997,200,000	110.80%		55,125,000	0.000594	0.00614	5.524
18 Book Value		1800	sum	1759.08	\$	8,097,816,000	% of book	97.73%	0.48%	\$	7,899,283,193	97.55%	4.46%	360,819,411		4.943%	

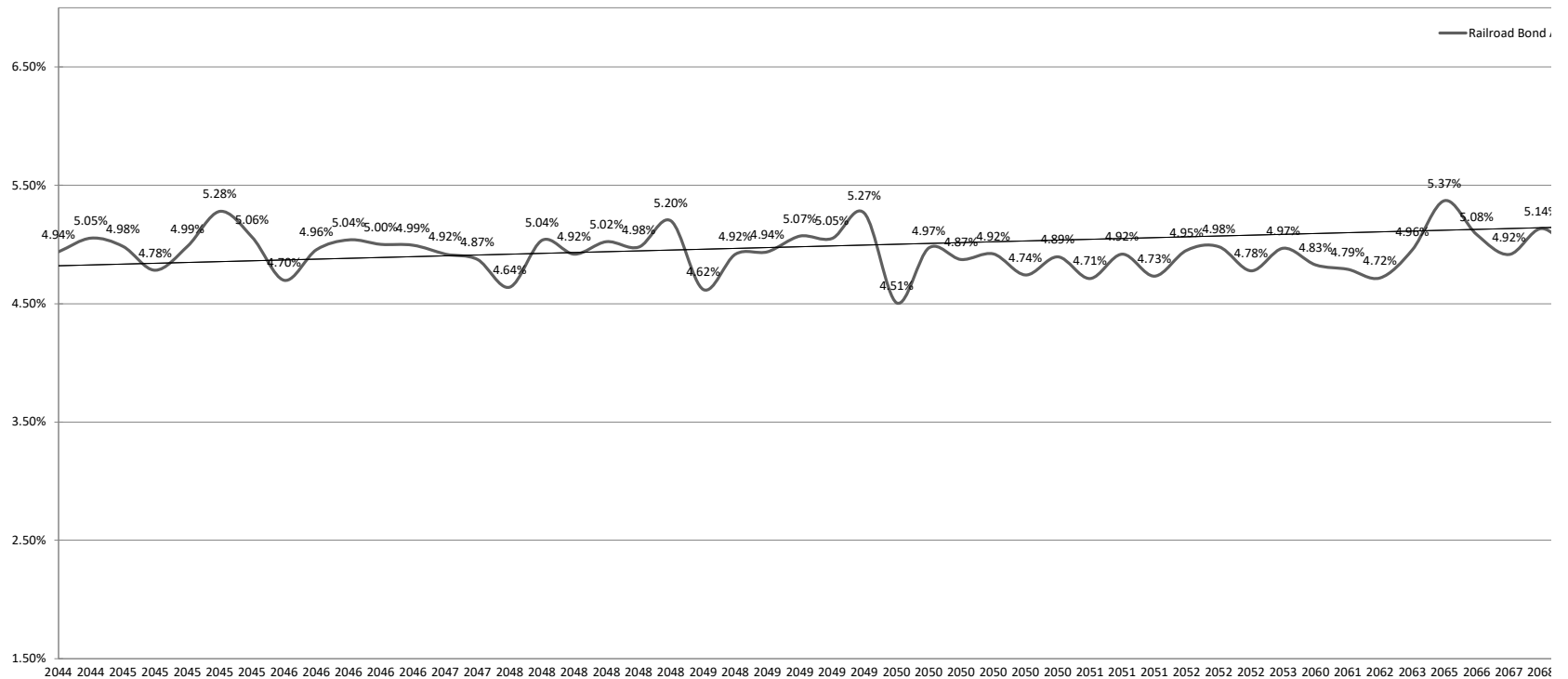
Total \$ 83,720,674,005.00 **Total \$ 77,276,024,851.56** **92.30%** **4.15%** **\$ 3,478,279,608** **4.914%** **4.923%** **4.818**

Source: Finra

Embedded debt rate 4.15%
Weighted average yield to maturity 4.91%
Debt service / Market value 4.50%

This includes short term. For 20+ year maturities see below

20+ Year, All Ratings, Railroad Bond Analysis



12/31/2021

Railroad Bond Analysis

Company	type	Call	coupon	maturity	Price	Issued / Book	current yield	yield to matu	Weighted Ave Rating	Mkt Val	Mkt : Book	Embedded Rat Debt Service	WAYTM	WAYTM	Finra YTM
CSX Corp	NOTES		4.100	2044	89.34	\$ 800,000,000	4.59%	4.94%	0.05% BBB+	\$ 714,720,000	89.34%	32,800,000	0.000969		4.916
Union Pacific Corp	Fixed Rate		4.821	2044	97.07	\$ 700,000,000	4.97%	5.05%	0.04% A-	\$ 679,490,000	97.07%	33,747,000	0.000868		5.046
Norfolk Southern	FR SR Note		4.450	2045	93.07	\$ 500,000,000	4.78%	4.98%	0.03% BBB+	\$ 465,350,000	93.07%	22,250,000	0.000611		4.966

Union Pacific Corp	Fixed Rate	4.050	2045	90.30	\$	500,000,000	4.49%	4.78%	0.03%	A-	\$	451,500,000	90.30%		20,250,000	0.000587	4.751
Union Pacific Corp	SR NOTES	4.150	2045	89.11	\$	350,000,000	4.66%	4.99%	0.02%	A-	\$	311,885,000	89.11%		14,525,000	0.000428	4.97
Kansas City Southern	SR NOTES	4.950	2045	95.83	\$	499,165,000	5.17%	5.28%	0.03%	BBB	\$	478,349,820	95.83%		24,708,668	0.000647	5.268
Canadian Pacific	SR NOTES	4.800	2045	96.58	\$	550,000,000	4.97%	5.06%	0.03%		\$	531,190,000	96.58%		26,400,000	0.000683	5.056
Canadian National	SR Notes	3.200	2046	79.47	\$	650,000,000	4.03%	4.70%	0.04%	NR	\$	516,555,000	79.47%		20,800,000	0.000749	4.644
CSX Corp		3.800	2046	84.54	\$	800,000,001	4.49%	4.96%	0.05%	BBB+	\$	676,320,001	84.54%		30,400,000	0.000973	4.909
Norfolk Southern	FR SR Note	4.650	2046	94.82	\$	600,000,000	4.90%	5.04%	0.04%	BBB+	\$	568,920,000	94.82%		27,900,000	0.000742	5.033
Union Pacific Corp	SR NOTES	4.050	2046	87.32	\$	600,000,000	4.64%	5.00%	0.04%	A-	\$	523,920,000	87.32%		24,300,000	0.000736	4.98
Union Pacific Corp	SR NOTES	3.350	2046	78.07	\$	300,000,000	4.29%	4.99%	0.02%	A-	\$	234,210,000	78.07%		10,050,000	0.000368	4.935
Norfolk Southern		3.942	2047	86.56	\$	749,169,000	4.55%	4.92%	0.04%	BBB+	\$	648,480,686	86.56%		29,532,242	0.000904	4.882
Union Pacific Corp	SR NOTES	4.000	2047	87.95	\$	500,000,000	4.55%	4.87%	0.03%	A-	\$	439,750,000	87.95%		20,000,000	0.000598	4.851
Canadian National	SR Notes	3.650	2048	85.70	\$	600,000,000	4.26%	4.64%	0.03%	NR	\$	514,200,000	85.70%		21,900,000	0.000683	4.62
CSX Corp		4.750	2048	96.03	\$	650,000,000	4.95%	5.04%	0.04%	BBB+	\$	624,195,000	96.03%		30,875,000	0.000803	5.026
CSX Corp		4.300	2048	91.30	\$	850,000,000	4.71%	4.92%	0.05%	BBB+	\$	776,050,000	91.30%		36,550,000	0.001026	4.907
Norfolk Southern		4.150	2048	87.85	\$	500,000,000	4.72%	5.02%	0.03%	BBB+	\$	439,250,000	87.85%		20,750,000	0.000616	5.006
Union Pacific Corp	SR NOTES	4.500	2048	93.32	\$	1,500,000,000	4.82%	4.98%	0.09%	A-	\$	1,399,800,000	93.32%		67,500,000	0.001832	4.963
Kansas City Southern		4.700	2048	93.17	\$	500,000,000	5.04%	5.20%	0.03%	BBB	\$	465,850,000	93.17%		23,500,000	0.000638	5.188
Canadian National	SR Notes	4.450	2049	97.49	\$	650,000,000	4.56%	4.62%	0.04%	NR	\$	633,685,000	97.49%		28,925,000	0.000737	4.617
CSX Corp		4.300	2048	91.30	\$	850,000,000	4.71%	4.92%	0.05%	BBB+	\$	776,050,000	91.30%		36,550,000	0.001026	4.907
CSX Corp		3.350	2049	77.23	\$	600,000,000	4.34%	4.94%	0.04%	BBB+	\$	463,380,000	77.23%		20,100,000	0.000727	5.015
Norfolk Southern		3.400	2049	76.39	\$	400,000,000	4.45%	5.07%	0.02%	BBB+	\$	305,560,000	76.39%		13,600,000	0.000498	5.011
Norfolk Southern		4.100	2049	86.54	\$	400,000,000	4.74%	5.05%	0.02%	BBB+	\$	346,160,000	86.54%		16,400,000	0.000496	5.028
Union Pacific Corp		4.300	2049	86.61	\$	1,000,000,000	4.96%	5.27%	0.06%	A-	\$	866,100,000	86.61%		43,000,000	0.001292	5.247
Canadian National	SR Notes	2.450	2050	68.56	\$	600,000,000	3.57%	4.51%	0.03%	NR	\$	411,360,000	68.56%		14,700,000	0.000663	4.452
CSX Corp	SR Notes	3.800	2050	82.97	\$	500,000,000	4.58%	4.97%	0.03%	BBB+	\$	414,850,000	82.97%		19,000,000	0.000610	4.945
CSX Corp	FR SR Note	3.950	2050	86.41	\$	600,000,000	4.57%	4.87%	0.03%	BBB+	\$	518,460,000	86.41%		23,700,000	0.000718	4.853
Norfolk Southern	SR Notes	3.050	2050	72.64	\$	800,000,000	4.20%	4.92%	0.05%	BBB+	\$	581,120,000	72.64%		24,400,000	0.000966	4.873
Union Pacific Corp	SR NOTES	3.250	2050	77.75	\$	1,000,000,000	4.18%	4.74%	0.06%	A-	\$	777,500,000	77.75%		32,500,000	0.001163	4.715
Kansas City Southern	SR NOTES	3.500	2050	79.54	\$	550,000,000	4.40%	4.89%	0.03%	BBB	\$	437,470,000	79.54%		19,250,000	0.000660	4.863
CSX Corp	SR Notes	2.500	2051	66.29	\$	500,000,000	3.77%	4.71%	0.03%	BBB+	\$	331,450,000	66.29%		12,500,000	0.000578	4.655
Norfolk Southern		2.900	2051	69.91	\$	600,000,000	4.15%	4.92%	0.04%	BBB+	\$	419,460,000	69.91%		17,400,000	0.000724	4.858
Union Pacific Corp	SR NOTES	3.799	2051	85.80	\$	1,044,261,000	4.43%	4.73%	0.06%	A-	\$	895,975,938	85.80%		39,671,475	0.001213	4.706
CSX Corp	SR Notes	4.500	2052	93.18	\$	900,000,000	4.83%	4.95%	0.05%	BBB+	\$	838,620,000	93.18%		40,500,000	0.001093	4.939
Norfolk Southern		4.050	2052	85.97	\$	749,994,000	4.71%	4.98%	0.04%	BBB+	\$	644,769,842	85.97%		30,374,757	0.000917	4.595
Union Pacific Corp	SR NOTES	4.950	2052	102.65	\$	600,000,000	4.82%	4.78%	0.03%	A-	\$	615,900,000	102.65%		29,700,000	0.000703	4.78
Norfolk Southern	SR Notes	3.700	2053	80.56	\$	400,000,000	4.59%	4.97%	0.02%	BBB+	\$	322,240,000	80.56%		14,800,000	0.000488	4.948
Norfolk Southern	SR Notes	4.550	2053	93.39	\$	750,000,000	4.87%	4.98%	0.04%	BBB+	\$	700,425,000	93.39%		34,125,000	0.000917	4.974
Union Pacific Corp	SR NOTES	3.500	2053	80.64	\$	1,250,000,000	4.34%	4.73%	0.07%	A-	\$	1,008,000,000	80.64%		43,750,000	0.001451	4.711
CSX Corp	SR Notes	4.500	2054	92.26	\$	450,000,000	4.88%	5.00%	0.03%	BBB+	\$	415,170,000	92.26%		20,250,000	0.000552	4.99
Union Pacific Corp	SR NOTES	3.875	2055	85.67	\$	450,000,000	4.52%	4.76%	0.03%	A-	\$	385,515,000	85.67%		17,437,500	0.000526	4.75
Union Pacific Corp		3.950	2059	84.15	\$	500,000,000	4.69%	4.90%	0.03%	A-	\$	420,750,000	84.15%		19,750,000	0.000601	4.884
Union Pacific Corp		3.839	2060	83.19	\$	1,841,766,000	4.61%	4.83%	0.11%	A-	\$	1,532,165,135	83.19%		70,705,397	0.002181	4.815
Union Pacific Corp	SR NOTES	3.550	2061	78.59	\$	650,000,000	4.52%	4.79%	0.04%	A-	\$	510,835,000	78.59%		23,075,000	0.000764	4.772
Union Pacific Corp	SR NOTES	2.973	2062	69.28	\$	1,044,449,000	4.29%	4.72%	0.06%	A-	\$	723,594,267	69.28%		31,051,469	0.001209	4.685
Union Pacific Corp	SR NOTES	5.150	2063	103.35	\$	400,000,000	4.98%	4.96%	0.02%	A-	\$	413,400,000	103.35%		20,600,000	0.000486	4.956
Union Pacific Corp	SR NOTES	4.375	2065	83.57	\$	600,000,000	5.24%	5.37%	0.04%	A-	\$	501,420,000	83.57%		26,250,000	0.000791	5.357
CSX Corp	SR Notes	4.250	2066	85.58	\$	600,000,002	4.97%	5.08%	0.04%	BBB+	\$	513,480,002	85.58%		25,500,000	0.000748	5.073
Union Pacific Corp	SR NOTES	4.100	2067	85.47	\$	500,000,000	4.80%	4.92%	0.03%	A-	\$	427,350,000	85.47%		20,500,000	0.000603	4.905
CSX Corp	SR Notes	4.650	2068	91.57	\$	600,000,003	5.08%	5.14%	0.04%	BBB+	\$	549,420,003	91.57%		27,900,000	0.000756	5.131
Kansas City Southern		4.200	2069	86.48	\$	425,000,000	4.86%	4.95%	0.03%	BBB	\$	367,540,000	86.48%		17,850,000	0.000516	4.944
Union Pacific Corp	SR NOTES	3.750	2070	78.50	\$	750,000,000	4.78%	4.94%	0.04%	A-	\$	588,750,000	78.50%		28,125,000	0.000909	4.929
Union Pacific Corp	SR NOTES	3.799	2071	79.92	\$	1,005,137,000	4.75%	4.90%	0.06%	A-	\$	803,305,490	79.92%		38,185,155	0.001207	4.886
Union Pacific Corp	SR NOTES	3.850	2072	80.91	\$	500,000,000	4.76%	4.88%	0.03%	A-	\$	404,550,000	80.91%		19,250,000	0.000599	4.878
Norfolk Southern	Notes Z100	7.900	2097	130.74	\$	350,000,000	6.04%	6.02%	0.03%	BBB+	\$	457,590,000	130.74%		27,650,000	0.000517	6.025
Norfolk Southern	FR SR Note Z100	6.000	2105	91.70	\$	550,000,000	6.54%	6.55%	0.04%	BBB+	\$	504,350,000	91.70%		33,000,000	0.000883	6.545
Norfolk Southern	SR NOTES	5.100	2118	92.11	\$	600,000,000	5.54%	5.54%	0.04%	BBB+	\$	552,660,000	92.11%		30,600,000	0.000815	5.539
Norfolk Southern	SR NOTES	4.100	2121	75.16	\$	600,000,000	5.46%	5.47%	0.04%	BBB+	\$	450,960,000	75.16%		24,600,000	0.000805	5.464
Canadian Pacific	SR NOTES	6.125	2115	110.80	\$	900,000,000	5.53%	5.52%	0.06%		\$	997,200,000	110.80%		55,125,000	0.001220	5.524

Total \$ 40,758,941,006 Total \$ 35,288,526,184 86.58% 4.10% \$ 1,671,088,662 4.979% 4.978

Source: Finra

<https://finra-markets.morningstar.com/BondCenter/Default.jsp>

Embedded debt rate 4.10%
 Weighted average yield to maturity 4.98%
 Debt service / Market value 4.74%
 Finra YTM 4.98%
 SAY 5.00%

DATA INPUT

WASHINGTON STATE DEPARTMENT OF REVENUE

2023 ASSESSMENT YEAR

RAILROADS

Instructions: Data entered on this page will flow to the applicable worksheets.

Guideline Companies		Current Year										Next Year	
		Stock Price 12/31/2022	Beta levered	Revenues Per Share	Cash Flow Per Share	Earnings Per Share	Dividends Per Share	Book Value	Common Shares	Long-Term Debt	Operating Margin	Revenues Per Share	Cash Flow Per Share
Name	Ticker	Yahoo	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL
Union Pacific Corp.	UNP	\$205.68	1.05	\$ 41.00	\$ 15.30	\$ 11.45	\$ 5.08	\$ 19.45	614,800	\$ 31,744,000,000	50.5%	\$ 40.35	\$ 14.30
Norfolk Southern Corp.	NSC	\$245.08	1.05	\$ 55.00	\$ 19.70	\$ 13.90	\$ 4.96	\$ 55.85	231,514	\$ 14,463,000,000	48.5%	\$ 54.80	\$ 18.80
CSX Corp.	CSX	\$30.87	1.05	\$ 7.00	\$ 2.75	\$ 1.95	\$ 0.40	\$ 6.30	2,100,000	\$ 17,895,000,000	50.0%	\$ 6.85	\$ 2.50
Canadian National	CNI	\$118.88	0.90	\$ 19.35	\$ 7.65	\$ 5.70	\$ 2.32	\$ 24.70	691,200	\$ 9,420,000,000	51.0%	\$ 20.00	\$ 8.10
Canadian Pacific	CP	\$75.41	1.00	\$ 7.30	\$ 3.45	\$ 2.80	\$ 0.68	\$ 30.50	929,700	\$ 13,924,000,000	50.0%	\$ 10.45	\$ 4.35

Value Line Issue: [November 18, 2022](#)

The harmonic mean is the preferable method for averaging multiples, such as the price/earning ratio, in which price is in the numerator. If these ratios are averaged using an arithmetic mean (a common error),

High data points are given greater weights than low data points.

The harmonic mean, on the other hand, gives equal weight to each data point

Note:

Canadian Exchange Rate:

0.7400

Value Line figures are all values in US dollars.

						Year 5									Revenues
Earnings Per Share	Dividends Per Share	Common Shares	% Return on Shareholders' Equity	% Retained to Common Equity	All Dividends to Net Profits	Revenues Per Share	Cash Flow Per Share	Earnings Per Share	Dividends Per Share	Common Shares	% Return on Shareholders' Equity	% Retained to Common Equity	All Dividends to Net Profits	2022-2026	
VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	
\$ 10.30	\$ 5.60	605,000	55.0%	25.5%	54.0%	\$ 47.60	\$ 19.55	\$ 15.00	\$ 6.40	565,000	55.0%	32.0%	43.0%	7.00%	
\$ 13.10	\$ 5.40	225,000	22.5%	15.5%	37.0%	\$ 65.10	\$ 25.25	\$ 19.00	\$ 6.25	215,000	25.0%	17.0%	33.0%	7.00%	
\$ 1.75	\$ 0.44	2,070,000	29.0%	22.0%	25.0%	\$ 8.40	\$ 3.35	\$ 2.50	\$ 0.60	1,850,000	33.5%	25.5%	24.0%	8.50%	
\$ 5.75	\$ 2.50	645,000	25.5%	15.5%	39.0%	\$ 26.95	\$ 10.90	\$ 8.40	\$ 3.15	575,000	32.0%	19.5%	38.0%	9.00%	
\$ 3.30	\$ 0.72	930,000	10.0%	8.0%	22.0%	\$ 14.85	\$ 6.45	\$ 5.40	\$ 0.90	875,000	12.5%	10.5%	18.0%	10.50%	

Cash Flow	Earnings	Dividends	Income	Balance Sheet					Cash Flow	
2022-2026	2022-2026	2022-2026	Operating Income	Current Assets	PP & E Gross	Current Liabilities	Long Term Debt	Intangibles (excluding Goodwill)	Depreciation & Amortization	Net Share Repurchases
VL	VL	VL	M*	M*	M*	M*	M*	M*	M*	10-K
8.00%	9.50%	9.00%	\$ 9,917,000,000	\$ 3,952,000,000	\$ 79,673,000,000	\$ 5,520,000,000	\$ 31,648,000,000	\$ 1,254,000,000	\$ 2,246,000,000	\$ 6,282,000,000
8.50%	10.00%	8.00%	\$ 5,002,000,000	\$ 2,007,000,000	\$ 44,748,000,000	\$ 2,649,000,000	\$ 14,479,000,000	\$ -	\$ 1,221,000,000	\$ 3,110,000,000
9.00%	10.50%	9.50%	\$ 5,785,000,000	\$ 3,849,000,000	\$ 48,610,000,000	\$ 2,471,000,000	\$ 17,896,000,000	\$ 198,000,000	\$ 1,500,000,000	\$ 4,731,000,000
10.00%	11.00%	10.00%	\$ 5,473,040,000	\$ 2,380,580,000	\$ 44,794,420,000	\$ 2,843,080,000	\$ 10,635,280,000	\$ 101,380,000	\$ 1,279,460,000	\$ 3,484,660,000
11.00%	10.00%	10.00%	\$ 2,521,920,000	\$ 1,397,860,000	\$ 23,640,780,000	\$ 2,377,620,000	\$ 13,424,340,000	\$ 48,840,000	\$ 631,220,000	

Fair Value	Carrying Value	Operating Lease	ROE	All Div'ds to Net Prof
Debt	Debt	Rent	5 yr	5 yr
10-k	10-k	10-k	VL	VL
\$ 28,100,000,000	\$ 33,300,000,000	\$ 433,000,000	55.0%	43%
\$ 13,846,000,000	\$ 15,082,000,000	\$ 174,000,000	25.0%	33%
\$ 16,135,000,000	\$ 18,047,000,000	\$ 109,000,000	33.5%	24%
\$ 10,461,380,000	\$ 11,410,060,000	\$ 180,560,000	32.0%	38%
\$ 13,112,800,000	\$ 14,541,740,000	\$ 82,140,000	12.5%	18%

SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

WASHINGTON STATE DEPARTMENT OF REVENUE

2023 ASSESSMENT YEAR

RAILROADS

Company	Ticker	Stock Price	2022		2023		2022		2023	
			Actual Earnings Ratio (EPS/P)		Projected Earnings Ratio (PEPS/P)		Cash Flow Ratio (CF/P)		Projected Cash Flow Ratio (PCF/P)	
Union Pacific Corp.	UNP	205.68	11.45	5.57%	10.30	5.01%	15.30	7.44%	14.30	6.95%
Norfolk Southern Corp.	NSC	245.08	13.90	5.67%	13.10	5.35%	19.70	8.04%	18.80	7.67%
CSX Corp.	CSX	30.87	1.95	6.32%	1.75	5.67%	2.75	8.91%	2.50	8.10%
Canadian National	CNI	118.88	5.70	4.79%	5.75	4.84%	7.65	6.44%	8.10	6.81%
Canadian Pacific	CP	75.41	2.80	3.71%	3.30	4.38%	3.45	4.57%	4.35	5.77%
		Mean		5.21%		5.05%		7.08%		7.06%
		Median		5.57%		5.01%		7.44%		6.95%
		Max		6.32%		5.67%		8.91%		8.10%
		Min		3.71%		4.38%		4.57%		5.77%
		stdev		0.01		0.00		0.02		0.01
		cov		0.19		0.10		0.24		0.13
		harmean		5.04%		5.01%		6.71%		6.97%
		Say		5.00%		5.00%		6.50%		7.00%

Source:

Actual earnings: Value Line / Q4 Year End stock price

Estimated Earnings: Value Line / Q4 Year End stock price

Actual Cash Flow: Value Line / Q4 Year End stock price

Estimated Cash Flow: Value Line / Q4 Year End stock price

IMPLIED PREMIUMS FOR US MARKET

Updated January 5, 2023

Source: <http://pages.stern.nyu.edu/~adamodar/>

These implied premiums are calculated using the S&P 500.

Year	Earnings Yield	Dividend Yield	S&P 500	Earnings*	Dividends*	Dividends + Buybacks	Change in Earnings	Change in Dividends	T.Bill Rate	T.Bond Rate	Bond-Bill	Implied Growth	Premium	Analyst Growth Estimate	Implied Premium (FC)	Implied Premium	ERP/Riskfree Rate
1960	5.34%	3.41%	58.11	3.10	1.98				2.66%	2.76%	0.10%	2.45%					
1961	4.71%	2.85%	71.55	3.37	2.04		8.60%	2.91%	2.13%	2.35%	0.22%	2.41%	2.92%		2.92%		1.24
1962	5.81%	3.40%	63.1	3.67	2.15		8.79%	5.21%	2.73%	3.85%	1.12%	4.05%	3.56%		3.56%		0.92
1963	5.51%	3.13%	75.02	4.13	2.35		12.75%	9.45%	3.12%	4.14%	1.02%	4.96%	3.38%		3.38%		0.82
1964	5.62%	3.05%	84.75	4.76	2.58		15.23%	10.08%	3.54%	4.21%	0.67%	5.13%	3.31%		3.31%		0.79
1965	5.73%	3.06%	92.43	5.30	2.83		11.20%	9.42%	3.93%	4.65%	0.72%	5.46%	3.32%		3.32%		0.71
1966	6.74%	3.59%	80.33	5.41	2.88		2.23%	1.96%	4.76%	4.64%	-0.12%	4.19%	3.68%		3.68%		0.79
1967	5.66%	3.09%	96.47	5.46	2.98		0.85%	3.37%	4.21%	5.70%	1.49%	5.25%	3.20%		3.20%		0.56
1968	5.51%	2.93%	103.86	5.72	3.04		4.81%	2.09%	5.21%	6.16%	0.95%	5.32%	3.00%		3.00%		0.49
1969	6.63%	3.52%	92.06	6.10	3.24		6.66%	6.49%	6.58%	7.88%	1.30%	7.55%	3.74%		3.74%		0.47
1970	5.98%	3.46%	92.15	5.51	3.19		-9.72%	-1.61%	6.53%	6.50%	-0.03%	4.78%	3.41%		3.41%		0.52
1971	5.46%	3.10%	102.09	5.57	3.16		1.15%	-0.74%	4.39%	5.89%	1.50%	4.57%	3.09%		3.09%		0.52
1972	5.23%	2.70%	118.05	6.17	3.19		10.76%	0.71%	3.84%	6.41%	2.57%	5.21%	2.72%		2.72%		0.42
1973	8.16%	3.70%	97.55	7.96	3.61		28.93%	13.24%	6.93%	6.90%	-0.03%	8.30%	4.30%		4.30%		0.62
1974	13.64%	5.43%	68.56	9.35	3.72		17.48%	3.14%	8.00%	7.40%	-0.60%	6.42%	5.59%		5.59%		0.76
1975	8.55%	4.14%	90.19	7.71	3.73		-17.54%	0.30%	5.80%	7.76%	1.96%	5.99%	4.13%		4.13%		0.53
1976	9.07%	3.93%	107.46	9.75	4.22		26.39%	13.10%	5.08%	6.81%	1.73%	8.19%	4.55%		4.55%		0.67
1977	11.43%	5.11%	95.1	10.87	4.86		11.53%	15.07%	5.12%	7.78%	2.66%	9.52%	5.92%		5.92%		0.76
1978	12.11%	5.39%	96.11	11.64	5.18		7.07%	6.60%	7.18%	9.15%	1.97%	8.48%	5.72%		5.72%		0.63
1979	13.48%	5.53%	107.94	14.55	5.97		25.01%	15.23%	10.38%	10.33%	-0.05%	11.70%	6.45%		6.45%		0.62
1980	11.04%	4.74%	135.76	14.99	6.44		3.01%	7.81%	11.24%	12.43%	1.19%	11.01%	5.03%		5.03%		0.40
1981	12.39%	5.57%	122.55	15.18	6.83		1.31%	6.08%	14.71%	13.98%	-0.73%	11.42%	5.73%		5.73%		0.41
1982	9.83%	4.93%	140.64	13.82	6.93		-8.95%	1.58%	10.54%	10.47%	-0.07%	7.96%	4.90%		4.90%		0.47
1983	8.06%	4.32%	164.93	13.29	7.12		-3.84%	2.76%	8.80%	11.80%	3.00%	9.09%	4.31%		4.31%		0.37
1984	10.07%	4.68%	167.24	16.84	7.83		26.69%	9.85%	9.85%	11.51%	1.66%	11.02%	5.11%		5.11%		0.44
1985	7.42%	3.88%	211.28	15.68	8.20		-6.91%	4.74%	7.72%	8.99%	1.27%	7.89%	4.03%	6.75%	3.84%		0.43
1986	5.96%	3.38%	242.17	14.43	8.19		-7.93%	-0.15%	6.16%	7.22%	1.06%	5.54%	3.36%	6.96%	3.58%		0.50
1987	6.49%	3.71%	247.08	16.04	9.17		11.10%	11.99%	5.47%	8.86%	3.39%	9.66%	4.18%	8.58%	3.99%		0.45
1988	8.20%	3.68%	277.72	24.12	10.22		50.42%	11.49%	6.35%	9.14%	2.79%	9.76%	4.12%	7.67%	3.77%		0.41
1989	6.80%	3.32%	353.4	24.32	11.73		0.83%	14.80%	8.37%	7.93%	-0.44%	9.58%	3.85%	7.46%	3.51%		0.44
1990	6.58%	3.74%	330.22	22.65	12.35		-6.87%	5.26%	7.81%	8.07%	0.26%	7.39%	3.92%	7.19%	3.89%		0.48
1991	4.58%	3.11%	417.09	19.30	12.97		-14.79%	5.03%	7.00%	6.70%	-0.30%	6.34%	3.27%	7.81%	3.48%		0.52
1992	4.16%	2.90%	435.71	20.87	12.64		8.13%	-2.59%	5.30%	6.68%	1.38%	4.67%	2.83%	9.83%	3.55%		0.53
1993	4.25%	2.72%	466.45	26.90	12.69		28.89%	0.41%	3.50%	5.79%	2.29%	4.73%	2.74%	8.00%	3.17%		0.55
1994	5.89%	2.91%	459.27	31.75	13.36		18.03%	5.34%	5.00%	7.82%	2.82%	7.23%	3.06%	7.17%	3.55%		0.45
1995	5.74%	2.30%	615.93	37.70	14.17		18.74%	6.00%	3.50%	5.57%	2.07%	5.65%	2.44%	6.50%	3.29%		0.59
1996	4.83%	2.01%	740.74	40.63	14.89		7.77%	5.10%	5.00%	6.41%	1.41%	6.13%	2.11%	7.92%	3.20%		0.50
1997	4.08%	1.60%	970.43	44.09	15.52		8.52%	4.25%	5.35%	5.74%	0.39%	5.45%	1.67%	8.00%	2.73%		0.48
1998	3.11%	1.32%	1229.23	44.27	16.20		0.41%	4.37%	4.33%	4.65%	0.32%	4.60%	1.38%	7.20%	2.26%		0.49
1999	3.07%	1.14%	1469.25	51.68	16.71		16.74%	3.16%	5.37%	6.44%	1.07%	5.75%	1.20%	12.50%	2.05%		0.32
2000	3.94%	1.23%	1320.28	56.13	16.27		8.61%	-2.65%	5.73%	5.11%	-0.62%	3.71%	1.65%	12.00%	2.87%		0.56
2001	3.85%	1.37%	1148.09	38.85	15.74	30.08	-30.79%	-3.24%	1.80%	5.05%	3.25%	3.56%	1.73%	10.30%	3.62%	2.91%	0.72
2002	5.23%	1.83%	879.82	46.04	16.08	29.83	18.51%	2.15%	1.20%	3.81%	2.61%	3.57%	2.29%	8.00%	4.10%	4.73%	1.08
2003	4.87%	1.61%	1111.91	54.69	17.88	31.58	18.79%	11.19%	1.00%	4.25%	3.25%	5.35%	2.12%	11.00%	3.69%	4.74%	0.87
2004	5.58%	1.60%	1211.92	67.68	19.407	40.60	23.75%	8.54%	2.18%	4.22%	2.04%	4.90%	2.02%	8.50%	3.65%	4.86%	0.86
2005	5.47%	1.79%	1248.29	76.45	22.38	61.17	12.96%	15.32%	4.31%	4.39%	0.08%	6.16%	2.20%	8.00%	4.08%	5.22%	0.93
2006	6.18%	1.77%	1418.3	87.72	25.05	73.16	14.74%	11.93%	4.88%	4.70%	-0.18%	5.93%	1.97%	12.50%	4.16%	6.12%	0.89
2007	5.62%	1.89%	1468.36	82.54	27.73	95.36	-5.91%	10.70%	3.31%	4.02%	0.71%	5.03%	2.06%	5.00%	4.37%	4.59%	1.09
2008	7.24%	3.11%	903.25	65.39	28.05	67.52	-20.78%	1.15%	1.59%	2.21%	0.62%	2.11%	4.05%	4.00%	6.43%	6.92%	2.91
2009	5.35%	2.00%	1115.10	59.65	22.31	37.43	-8.78%	-20.46%	0.14%	3.84%	3.70%	0.28%	2.60%	7.20%	4.36%	4.64%	1.14
2010	6.65%	1.84%	1257.64	83.66	23.12	55.53	40.25%	3.63%	0.13%	3.29%	3.16%	3.33%	2.24%	6.95%	5.20%	6.09%	1.58
2011	7.72%	2.07%	1257.60	97.05	26.02	71.28	16.01%	12.54%	0.03%	1.88%	1.85%	2.75%	2.71%	7.18%	6.01%	8.34%	3.20
2012	7.18%	2.13%	1426.19	102.47	30.44	75.90	5.58%	16.99%	0.05%	1.76%	1.71%	2.93%	2.47%	5.27%	5.78%	7.30%	3.28
2013	5.81%	1.96%	1848.36	107.45	36.28	88.13	4.86%	19.19%	0.07%	3.04%	2.97%	5.01%	2.03%	4.28%	4.96%	4.99%	1.63
2014	5.49%	1.92%	2058.90	113.01	39.44	101.98	5.17%	8.71%	0.05%	2.17%	2.12%	2.77%	2.24%	5.58%	5.78%	5.48%	2.66
2015	5.20%	2.11%	2043.94	106.32	43.16	106.10	-5.92%	9.43%	0.21%	2.27%	2.06%	2.96%	2.46%	5.51%	6.12%	5.16%	2.70
2016	4.86%	2.01%	2238.83	108.86	45.03	108.67	2.39%	4.33%	0.51%	2.45%	1.94%	2.64%	2.41%	5.54%	5.69%	4.50%	2.32
2017	4.67%	1.86%	2673.61	124.94	49.73	108.28	14.77%	10.44%	1.39%	2.41%	1.02%	3.22%	2.36%	7.05%	5.08%	4.75%	2.11
2018	5.92%	2.14%	2506.85	148.34	53.61	136.65	18.73%	7.80%	2.37%	2.68%	0.31%	3.24%	2.50%	4.12%	5.96%	5.55%	2.22
2019	5.03%	1.82%	3230.78	162.35	58.80	150.50	9.44%	9.68%	1.55%	1.92%	0.37%	2.57%		3.96%	5.20%	5.06%	2.71
2020	3.68%	1.51%	3756.07	138.12	56.70	127.78	-14.92%	-3.57%	0.09%	0.93%	0.84%	0.74%	1.65%	5.42%	4.72%	4.94%	5.08
2021	4.33%	1.24%	4766.18	206.38	59.20	147.24	47.67%	4.41%	0.06%	1.51%	1.45%	1.71%	1.72%	6.47%	4.24%	4.90%	2.81
2022	5.72%	1.78%	3839.50	219.49	68.34	181.99	6.35%	15.44%	4.42%	3.88%	-0.54%	5.59%	2.16%	6.41%	5.94%	5.11%	1.53

**2023 Multistage Earnings Growth Model
Railroad Industry**

Company Ticker 4.10% GDP
20.0 Industry P/E
33.0% Target Dividend Payout Ratio (All dividends to net profit)
32.0% Target ROE

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		-31.39%	131.39%	11.45		stock price =	(205.68)
1	-10.04%	34.19%	65.81%	10.30	6.78		6.78
2	10.94%	30.82%	69.18%	11.43	7.91		7.91
3	9.86%	28.05%	71.95%	12.55	9.03		9.03
4	8.98%	25.74%	74.26%	13.68	10.16		10.16
5	8.24%	23.16%	76.84%	14.81	11.38		11.38
6	7.41%	20.57%	79.43%	15.91	12.63		12.63
7	6.58%	17.98%	82.02%	16.95	13.90		13.90
8	5.76%	15.40%	84.60%	17.93	15.17		15.17
9	4.93%	12.81%	87.19%	18.81	16.40		16.40
10	4.10%	12.81%	87.19%	19.58	17.07	407.07	424.15
11+	4.10%	12.81%	87.19%	20.39	17.77		

Value Line Dividends Growth Rate **IRR = 11.17%**

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		-17.99%	117.99%	13.90		stock price =	(245.08)
1	-5.76%	36.26%	63.74%	13.10	8.35		8.35
2	11.60%	32.49%	67.51%	14.62	9.87		9.87
3	10.40%	29.43%	70.57%	16.14	11.39		11.39
4	9.42%	26.90%	73.10%	17.66	12.91		12.91
5	8.61%	24.08%	75.92%	19.18	14.56		14.56
6	7.71%	21.26%	78.74%	20.66	16.27		16.27
7	6.80%	18.45%	81.55%	22.06	17.99		17.99
8	5.90%	15.63%	84.37%	23.37	19.71		19.71
9	5.00%	12.81%	87.19%	24.53	21.39		21.39
10	4.10%	12.81%	87.19%	25.54	22.27	530.92	553.18
11+	4.10%	12.81%	87.19%	26.59	23.18		

Value Line Dividends Growth Rate **IRR = 12.26%**

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		-32.05%	132.05%	\$ 1.95		stock price =	(30.87)
1	-10.26%	38.35%	61.65%	1.75	1.08		1.08
2	12.27%	34.16%	65.84%	1.96	1.29		1.29
3	10.93%	30.79%	69.21%	2.18	1.51		1.51
4	9.85%	28.03%	71.97%	2.39	1.72		1.72
5	8.97%	24.99%	75.01%	2.61	1.96		1.96
6	8.00%	21.94%	78.06%	2.82	2.20		2.20
7	7.02%	18.90%	81.10%	3.02	2.45		2.45
8	6.05%	15.86%	84.14%	3.20	2.69		2.69
9	5.07%	12.81%	87.19%	3.36	2.93		2.93
10	4.10%	12.81%	87.19%	3.50	3.05	72.71	75.76
11+	4.10%	12.81%	87.19%	3.64	3.17		

Value Line Dividends Growth Rate **IRR = 13.28%**

Canadian National		CNI						
Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow	
0		2.74%	97.26%	5.70				stock price = (118.88)
1	0.88%	40.47%	59.53%	5.75	3.42			3.42
2	12.95%	35.83%	64.17%	6.49	4.17			4.17
3	11.47%	32.15%	67.85%	7.24	4.91			4.91
4	10.29%	29.15%	70.85%	7.98	5.66			5.66
5	9.33%	25.88%	74.12%	8.73	6.47			6.47
6	8.28%	22.61%	77.39%	9.45	7.31			7.31
7	7.24%	19.35%	80.65%	10.14	8.17			8.17
8	6.19%	16.08%	83.92%	10.76	9.03			9.03
9	5.15%	12.81%	87.19%	11.32	9.87			9.87
10	4.10%	12.81%	87.19%	11.78	10.27	244.90		255.17
11+	4.10%	12.81%	87.19%	12.26	10.69			10.69
<i>Value Line Dividends Growth Rate</i>							IRR =	11.45%

Canadian Pacific		CP						
Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow	
0		55.80%	44.20%	2.80				stock price = (75.41)
1	17.86%	36.26%	63.74%	3.30	2.10			2.10
2	11.60%	32.49%	67.51%	3.68	2.49			2.49
3	10.40%	29.43%	70.57%	4.07	2.87			2.87
4	9.42%	26.90%	73.10%	4.45	3.25			3.25
5	8.61%	24.08%	75.92%	4.83	3.67			3.67
6	7.71%	21.26%	78.74%	5.20	4.10			4.10
7	6.80%	18.45%	81.55%	5.56	4.53			4.53
8	5.90%	15.63%	84.37%	5.89	4.97			4.97
9	5.00%	12.81%	87.19%	6.18	5.39			5.39
10	4.10%	12.81%	87.19%	6.43	5.61	133.74		139.35
11+	4.10%	12.81%	87.19%	6.70	5.84			
<i>Value Line Dividends Growth Rate</i>							IRR =	9.69%

Union Pacific Corp
Implied Constant Growth - Union Pacific Corp
2022

Share Price	\$	205.68
Dividend Per Share	\$	5.08
Share Repurchase	\$	10.22

Expected Long-Term Growth Rate: 4.10%

Indexed Equity Value at Year 0:	[1] = P0	100
Equity Payout Yield at Year 1:	[2] = D1/P0	7.44%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]	12.13%
Implied Constant Long-Term Growth:	[4] = [3] - [2]	4.69%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @	12.13%
		-100				
2021	33.16%	7.4	1	7.4	6.6	
2022	-6.54%	7.0	2	7.8	6.2	
2023	8.13%	7.5	3	8.2	5.8	
2024	8.13%	8.1	4	8.5	5.4	
2025	8.13%	8.8	5	8.9	5.0	
2026	8.13%	9.5	6	9.4	4.7	
2027	7.46%	10.2	7	9.8	4.4	
2028	6.79%	10.9	8	10.3	4.1	
2029	6.12%	11.6	9	10.7	3.8	
2030	5.44%	12.2	10	11.2	3.6	
2031	4.77%	12.8	11	11.8	3.3	
2520	4.10%	4,366,332,034.1	500	64,586,027,039.8	0.0	
				Total NPV	100.0	

Norfolk Southern Corp.
Implied Constant Growth - Norfolk SouthernCorp
2022

Share Price		\$	245.08
Dividend Per Share		\$	4.96
Share Repurchase		\$	13.43
Expected Long-Term Growth Rate:			4.10%
Indexed Equity Value at Year 0:	[1] = P0		100
Equity Payout Yield at Year 1:	[2] = D1/P0		7.51%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]		12.19%
Implied Constant Long-Term Growth:	[4] = [3] - [2]		4.68%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 12.19%
		-100			
2021	40.81%	7.5	1	7.5	6.7
2022	-4.57%	7.2	2	7.9	6.2
2023	7.65%	7.7	3	8.2	5.8
2024	7.65%	8.3	4	8.6	5.4
2025	7.65%	8.9	5	9.0	5.1
2026	7.65%	9.6	6	9.4	4.7
2027	7.06%	10.3	7	9.9	4.4
2028	6.47%	11.0	8	10.3	4.1
2029	5.88%	11.6	9	10.8	3.8
2030	5.28%	12.2	10	11.3	3.6
2031	4.69%	12.8	11	11.9	3.3
2520	4.10%	4,370,018,565.2	500	61,988,439,916.9	0.0
				Total NPV	100.0

CSX Corp.
Implied Constant Growth - CSX
2022

Share Price		\$30.87
Dividend Per Share		\$ 0.40
Share Repurchase		\$ 2.25
Expected Long-Term Growth Rate:		4.10%
Indexed Equity Value at Year 0:	[1] = P0	100
Equity Payout Yield at Year 1:	[2] = D1/P0	8.59%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]	12.90%
Implied Constant Long-Term Growth:	[4] = [3] - [2]	4.30%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 12.90%
		-100			
2021	51.93%	8.6	1	8.6	7.6
2022	-9.09%	7.8	2	9.0	7.0
2023	7.59%	8.4	3	9.3	6.5
2024	7.59%	9.0	4	9.8	6.0
2025	7.59%	9.7	5	10.2	5.5
2026	7.59%	10.5	6	10.6	5.1
2027	7.01%	11.2	7	11.1	4.7
2028	6.43%	11.9	8	11.5	4.4
2029	5.85%	12.6	9	12.0	4.0
2030	5.26%	13.3	10	12.6	3.7
2031	4.68%	13.9	11	13.1	3.4
2520	4.10%	4,748,900,827.9	500	11,601,987,721.9	0.0
				Total NPV	100.0

Canadian National
Implied Constant Growth - Canadian National
2022

Share Price	\$ 118.88
Dividend Per Share	\$ 2.32
Share Repurchase	\$ 5.04

Expected Long-Term Growth Rate: 4.10%

Indexed Equity Value at Year 0:	[1] = P0	100
Equity Payout Yield at Year 1:	[2] = D1/P0	6.19%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]	11.46%
Implied Constant Long-Term Growth:	[4] = [3] - [2]	5.27%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 11.46%
		-100			
2021	28.79%	6.2	1	6.2	5.6
2022	5.88%	6.6	2	6.5	5.2
2023	7.70%	7.1	3	6.9	5.0
2024	7.70%	7.6	4	7.2	4.7
2025	7.70%	8.2	5	7.6	4.4
2026	7.70%	8.8	6	8.0	4.2
2027	7.03%	9.4	7	8.4	3.9
2028	6.36%	10.0	8	8.9	3.7
2029	5.69%	10.6	9	9.3	3.5
2030	5.02%	11.1	10	9.8	3.3
2031	4.35%	11.6	11	10.3	3.1
2520	4.10%	3,972,737,012.5	500	835,750,298,653.4	0.0
				Total NPV	100.0

Canadian Pacific
Implied Constant Growth - Canadian Pacific
2022

Share Price		\$	75.41
Dividend Per Share		\$	0.68
Share Repurchase		\$	-
Expected Long-Term Growth Rate:			4.10%
Indexed Equity Value at Year 0:	[1] = P0		100
Equity Payout Yield at Year 1:	[2] = D1/P0		4.36%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]		11.10%
Implied Constant Long-Term Growth:	[4] = [3] - [2]		6.74%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 11.10%
		-100			
2021	-8.00%	4.4	1	4.4	3.9
2022	26.09%	5.5	2	4.7	3.8
2023	10.35%	6.1	3	5.0	3.6
2024	10.35%	6.7	4	5.3	3.5
2025	10.35%	7.4	5	5.7	3.3
2026	10.35%	8.2	6	6.0	3.2
2027	9.31%	8.9	7	6.4	3.1
2028	8.27%	9.6	8	6.9	3.0
2029	7.22%	10.3	9	7.3	2.8
2030	6.18%	11.0	10	7.8	2.7
2031	5.51%	11.6	11	8.4	2.6
2520	4.10%	3,957,498,586.7	500.0	584,399,538,334,733.0	0.0
				Total NPV	100.0