

COST OF CAPITAL STUDY

YIELD CAPITALIZATION
2024 ASSESSMENT YEAR

APPENDIX C

WIRELESS

EQUITY RATE						10.25%	
CAPITAL ASSET PRICING MODEL							PAGE
	CAPM Ex Ante		7.15%				6
DIVIDEND GROWTH MODELS (Single Stage)							
	Value Line, based on Dividends Growth		10.00%				7
	Value Line, based on Earnings Growth		10.25%				8
	Value Line, based on Return on Equity		11.00%				9
	FCFE GROWTH MODEL (Multi Stage)		9.25%				10
				RANGE	7.145% - 11%		
DEBT RATE						5.80%	11
SECURED DEBT (LEASE) RATE						5.00%	11
MARKET CAPITAL STRUCTURE							
	Equity	60%	x	10.25%	=	6.15%	3
	Debt	40%	x	5.80%	=	2.32%	3
	Marginal Tax Rate	24%	=	(1-.24)	x	2.32%	3
						<u>1.76%</u>	
WEIGHTED AVERAGE COST OF CAPITAL						7.9%	

rounded

SUPPORT FOR GUIDELINE COMPANIES

WASHINGTON STATE DEPARTMENT OF REVENUE

2024 ASSESSMENT YEAR

WIRELESS

Capital Structure at Book Value

Company	Ticker	Beta	Fin'l Strength	Operting Margin	Trailing P/E Ratio	Div'd Yield	Common Stock	%	Preferred Stock	%	Long Term Debt	%	Total Debt & Equity
AT&T Inc	T	0.80	B++	15.5%	6.7	6.72%	113,685,318,000	47.3%	-	0.0%	126,701,000,000	52.7%	240,386,318,000
Verizon	VZ	0.65	A+	14.9%	7.7	7.28%	100,478,013,900	42.8%	-	0.0%	134,441,000,000	57.2%	234,919,013,900
US Cellular	USM	0.70	B+	18.5%	-	0.00%	4,598,500,000	61.3%	-	0.0%	2,903,000,000	38.7%	7,501,500,000
T-Mobile	TMUS	0.75	A	35.4%	21.9	1.62%	64,878,247,500	45.7%	-	0.0%	76,953,000,000	54.3%	141,831,247,500
Mean		0.73	A	21%	9.1	3.91%	70,910,019,850	49.3%		0.0%	85,249,500,000	50.7%	
Weighted Mean							283,640,079,400	45.4%	-	0.00%	340,998,000,000	54.6%	624,638,079,400
Median		0.73			7.2	4.17%		46.5%		0.0%		53.5%	
Std Dev		0.06				3.64%		8.2%		0.0%		8.2%	
Coeff Var		0.09				93.25%		16.7%		0.0%		16.2%	
Max		0.80				7.28%		61.3%		0.0%		57.2%	
Min		0.65				0.00%		42.8%		0.0%		38.7%	
Harmonic Mean		0.72						48.37%				49.56%	

Say **0.70**

**SUPPORT FOR CAPITAL STRUCTURE
MARKET VALUE**

WASHINGTON STATE DEPARTMENT OF REVENUE

2024 ASSESSMENT YEAR

WIRELESS

Capital Structure at Market Value

Company	Ticker	Stock Price	Common Shares	Common Stock	%	Preferred Stock	%	Debt	%	Total Debt & Equity
AT&T Inc	T	16.51	7,150,020,000	118,046,830,200	46.9%	-	0.0%	133,401,000,000	53.1%	251,447,830,200
Verizon	VZ	37.07	4,204,101,000	155,846,024,070	51.7%	-	0.0%	145,610,000,000	48.3%	301,456,024,070
US Cellular	USM	41.54	85,000,000	3,530,900,000	58.5%	-	0.0%	2,502,000,000	41.5%	6,032,900,000
T-Mobile	TMUS	160.33	1,156,475,000	185,417,636,750	72.5%	-	0.0%	70,416,000,000	27.5%	255,833,636,750
			Mean		57.4%		0.0%		42.6%	
			Weighted Mean	462,841,391,020	56.8%	-	0.00%	351,929,000,000	43.2%	814,770,391,020
			Median		55.1%		0.0%		44.9%	
			Harmonic Mean		55.9%		0.0%		40.0%	
			Std Dev		11.1%		0.0%		11.1%	
			Coeff Var		19.4%		0.0%		26.1%	
			Max		72.5%		0.0%		53.1%	
			Min		46.9%		0.0%		27.5%	

Source:

Stock Price: Yahoo

Market Value Debt: Bond Analysis

Say

60%

0%

40%

SUPPORT FOR MARKET MULTIPLES

WASHINGTON STATE DEPARTMENT OF REVENUE

2024 ASSESSMENT YEAR

WIRELESS

Company	Ticker	Stock Price	Revenues	Multiple	Cash Flow	Multiple	Earnings	Multiple	Book Value	Multiple
AT&T Inc	T	16.51	17.05	1.0	5.25	3.1	2.45	6.7	15.90	1.0
Verizon	VZ	37.07	32.15	1.2	9.00	4.1	4.80	7.7	23.90	1.6
US Cellular	USM	41.54	45.90	0.91	8.70	4.8	0.46	90.3	54.10	0.8
T-Mobile	TMUS	160.33	67.90	2.4	18.80	8.5	7.65	21.0	56.10	2.86
Mean				1.3		5.1		31.4		1.6
Median				1.1		4.4		14.3		1.3
Harmonic Mean				1.2		4.5		11.9		1.2
Max				2.4		8.5		90.3		2.9
Min				0.91		3.14		6.74		0.77
Std Dev				0.7		2.4		39.8		0.9
Coefficient of Variation				0.5		0.5		1.3		0.6
Harmonic Mean				1.2		4.5		11.9		1.2
Percentile .25				1.0		3.9		7.5		1.0
Percentile .75				1.5		5.7		38.3		1.9
Say				1.00		4.50		12.00		1.20

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT

CAPITAL ASSET PRICING MODEL

WASHINGTON STATE DEPARTMENT OF REVENUE

2024 ASSESSMENT YEAR

WIRELESS

Ex Ante

$$K_e = R_f + B (R_p)$$

Ke = Cost of Equity			7.15%
			to page 1
Rm =	rate of return	8.48%	
Rf =	risk free rate	4.03%	
Rp =	risk premium	4.45%	
B =	Beta	0.70	
Rp = Risk Premium			4.45%
			to above
Shannon Pratt and Roger Grabowski		3.5 - 6%	
	Cost of Capital, Applications and Examples, Third Edition, 2008, Page 113		
Dr. Aswath Damodaran		4.60%	chart page 15
	http://pages.stern.nyu.edu/~adamodar/2023 Implied Premium	4.45%	adjusted for Rf
Rf = Risk Free Rate			4.03%
Value Line Investment Survey, Selected Yields January 12, 2024, page 829			
	as of 12-29-23		
	US Treasury Securities year end data		
	5 year	3.84%	
	10 year	3.88%	
	30 year	4.03%	
	30 year Zero	4.00%	
Federal Reserve Statistical Release (http://www.federalreserve.gov/Releases/H15/Current/)			
	As of 12-31-21		
	Treasury Constant Maturities		
	5 year	3.84%	
	10 year	3.88%	
	20 year	4.20%	
	30 year	4.03%	
	20 year TIPS	1.82%	2.38%
	30 year TIPS	1.90%	2.13%
			TIPS inflation indication
Inflation			2.13%
			to appraisal template
The Livingston Survey December 15, 2023, page 2, 8			
	Inflation median (measured by the Consumer Price Index) over next 10 y		2.26%
Gross Domestic Product (GDP)			3.93%
			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 2024-2034		Table 2.3, pg 49
	Average Percentage Change Year To Year	2024-2028	1.80%
	https://www.cbo.gov/system/files/2024-02/59710-	2029-2034	1.80%
Federal Reserve Bank of Philadelphia			
	The Livingston Survey, December 15, 2023, page 8		
	Average Real GDP Growth Rate for Next 10 Years		2.00%
	https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey		

ENTERPRISE VALUE MULTIPLES

WASHINGTON STATE DEPARTMENT OF REVENUE

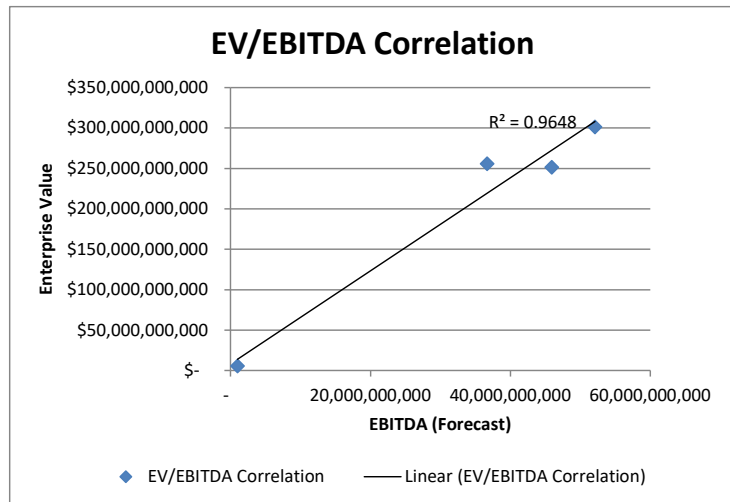
2024 ASSESSMENT YEAR

WIRELESS

Guideline Companies	Ticker	Enterprise Value	EBITDA		EV / EBITDA		One Year Cash Flow Rate Change VL	EBITDA	EV / EBITDA	Revenue	EV/Sales	Cash Flow	Debt Service	EV / CF
			historic	historic	forecast	forecast								
AT&T Inc	T	\$ 251,447,830,200	43,431,000,000	5.79	5.7%	45,912,771,429	5.48	124,687,500,000	2.02	39,543,750,000	7,737,258,000	5.32		
Verizon	VZ	\$ 301,456,024,070	51,774,000,000	5.82	0.6%	52,061,633,333	5.79	138,945,538,050	2.17	37,105,000,000	8,445,380,000	6.62		
US Cellular	USM	\$ 5,533,900,000	1,013,000,000	5.46	0.6%	1,018,821,839	5.43	3,956,750,000	1.40	743,750,000	145,116,000	6.23		
T-Mobile	TMUS	\$ 255,833,636,750	33,220,000,000	7.70	10.4%	36,665,691,489	6.98	83,034,905,000	3.08	23,240,000,000	4,084,128,000	9.36		
	Mean						5.92		2.17			6.88		
	Median						5.63		2.09			6.42		
	Max						6.98		3.08			9.36		
	Min						5.43		1.40			5.32		
	Std Dev						0.72		0.69			1.74		
	Coefficient of Variation						0.12		0.32			0.25		
	Harmonic Mean						5.86		2.00			6.59		
	Say						5.75		2.00			6.50		

5.50 put in income direct excluding IPP

6.50 put in income direct including IPP



Forecast EV/EBITDA By Rank

Guideline Companies	EV/EBITDA forecast	
US Cellular	5.43	5.45 Average
AT&T Inc	5.48	5.45 Median
Verizon	5.79	5.50 Say
T-Mobile	6.98	6.38 Average
		6.38 Median
		6.50 Say

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

WASHINGTON STATE DEPARTMENT OF REVENUE
2024 ASSESSMENT YEAR
WIRELESS

Based on Dividend Growth

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

Ke = Cost of Equity
D1 = Expected Dividends
P0 = Current Stock Price
GD = Sustainable Growth -- Dividend
assumption Sustainable growth can not exceed inflation plus real GDP

Company	Ticker	Stock Price (Po)	Expected Dividend (D1)	Dividend Yield (D1/Po)	Dividend Growth (GD) VL	Ke	Forecast Dividend Growth	Ke Forecast Growth	Sustainable Dividend Growth	Ke Sustainable Growth
AT&T Inc	T	16.51	1.11	6.72%	-6.50%				3.93%	10.65%
Verizon	VZ	37.07	2.70	7.28%	2.50%	9.78%	2.66%	9.95%	2.66%	9.95%
US Cellular	USM	41.54	0.00		0.00%				3.93%	
T-Mobile	TMUS	160.33	2.60	1.62%	0.00%				3.93%	
			Mean	5.21%		9.78%				10.30%
			Median	6.72%		9.78%				10.30%
			Harmonic Mean	3.32%		9.78%				10.29%
			Std Dev	3.12%						0.50%
			Coeff Var	59.89%		0.00%				4.86%
			Max	7.28%		9.78%				10.65%
			Min	1.62%		9.78%				9.95%

9.75%

10.25%

Say

10.00%

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

WASHINGTON STATE DEPARTMENT OF REVENUE
2024 ASSESSMENT YEAR
WIRELESS

Based on Earnings Growth

9.0%

$$K_e = (D_1 / P_0) + G$$

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

Company	Ticker	Stock Price (Po)	Expected Earnings (D1)	Yield (D1/Po)	Earnings Growth (G) VL	Ke	Forecast Earnings Growth	Ke Forecast Growth	Sustainable Earnings Growth	Ke Sustainable Growth
AT&T Inc	T	16.51	2.55	15.45%	1.50%	16.95%	1.56%	17.00%	1.56%	17.00%
Verizon	VZ	37.07	4.90	13.22%	1.50%	14.72%	1.56%	14.78%	1.56%	14.78%
US Cellular	USM	41.54	0.40	0.96%	4.00%	4.96%	4.42%	5.38%	3.93%	4.89%
T-Mobile	TMUS	160.33	9.25	5.77%	20.00%	25.77%	33.10%	38.87%	3.93%	9.70%
			Mean			15.60%				11.59%
			Median			15.83%				12.24%
			Harmonic Mean			10.89%				9.22%
			Std Dev			8.55%				5.41%
			Coeff Var			54.79%				46.68%
			Max			25.77%				17.00%
			Min			4.96%				4.89%

11.00%

10.00%

Say

10.25%

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SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT DIVIDEND GROWTH MODEL

WASHINGTON STATE DEPARTMENT OF REVENUE

2024 ASSESSMENT YEAR

WIRELESS

Based on Return on Equity

Ke = (D1 / Po) + 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 Dividend (D1)	Dividend Yield (D1/Po)	b (1-payout ratio)	ROE	Growth (G) (b*ROE)	Ke Dividends	Expected Earnings (E1)	Ke Earnings	
AT&T Inc	T	16.51	1.11	6.72%	61.0%	15.45%	9.422%	16.14%	2.55	24.87%	
Verizon	VZ	37.07	2.70	7.28%	45.0%	13.22%	5.948%	13.23%	4.90	19.17%	
US Cellular	USM	41.54	0.00		100.0%	0.96%	0.963%		0.40		
T-Mobile	TMUS	160.33	2.60	1.62%	72.0%	5.77%	4.154%	5.78%	9.25	9.92%	
								Mean	11.72%		17.99%
								Median	13.23%		19.17%
								Harmonic Mean	9.66%		15.53%
								Std Dev	5.35%		7.54%
								Coeff Var	45.64%		41.93%
								Max	16.14%		24.87%
								Min	5.78%		9.92%
									10.00%		15.50%

Say **11.00%**
to page 1

SUPPORT FOR DEBT RATING AND DEBT YIELD RATE

WASHINGTON STATE DEPARTMENT OF REVENUE

2024 ASSESSMENT YEAR

WIRELESS

Company	Ticker	Mergent's Ratings	S&P Ratings	WAYTM	S&P YTM (avg)	Mergent's Ratings	S&P Ratings	Mergent's	S&P	
AT&T Inc	T		BBB	5.49%	5.47%	11	11	Aaa1	AAA+	1
Verizon	VZ		BBB+	6.01%	5.24%	10	10	Aaa2	AAA	2
US Cellular	USM		BB	6.70%	6.33%	14	14	Aaa3	AAA-	3
T-Mobile	TMUS		BBB-	5.26%	4.99%	12	12	Aa1	AA+	4
Overall Average Debt Rating			BBB	5.87%	5.51%	11.8	11.8	Aa2	AA	5
					5.31%			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

All issues 20+ year maturities

Guideline Companies, All Ratings

5.77% **5.80%**

bond analysis page 12

Mergent's Bond Record January 2024, page 101

Corporate	Aaa	Aa	A	Baa
October	5.61%	5.97%	6.18%	6.63%
November	5.61%	5.57%	5.78%	6.19%
December	4.74%	5.05%	5.25%	5.64%
4th Qtr Average	5.32%	5.53%	5.74%	6.15%
2023 Average	4.81%	5.13%	5.48%	5.97%
Public Utilities	Aaa	Aa	A	Baa
October		6.19%	6.34%	6.61%
November		5.82%	5.96%	6.20%
December		5.27%	5.42%	5.68%
4th Qtr Average		5.76%	5.91%	6.16%
2023 Average		5.43%	5.64%	5.93%
Industrials	Aaa	Aa	A	Baa
October	5.61%	5.76%	6.02%	6.64%
November	5.20%	5.32%	5.59%	6.18%
December	4.74%	4.82%	5.07%	5.60%
4th Qtr Average	5.18%	5.30%	5.56%	6.14%
2023 Average	4.81%	4.84%	5.31%	6.01%

Debt Yield Rate	5.80%
Cost of Secured Debt (Operating Lease) Rate	5.00%

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DATA INPUT

WASHINGTON STATE DEPARTMENT OF REVENUE

2024 ASSESSMENT YEAR

WIRELESS

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

Guideline Companies		Stock Price 12/29/2023	Current Year													
			Beta levered	Revenues Per Share	Cash Flow Per Share	Earnings Per Share	Dividends Per Share	Book Value	Common Shares	Long-Term Debt	Capital Spending per share	Trailing P/E Ratio	Average Annual Dividend Yield	Operating Margin	Income Tax Rate	% Return on Shareholders' Equity
Name	Ticker	Yahoo	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL
AT&T Inc	T	\$16.51	0.80	\$ 17.05	\$ 5.25	\$ 2.45	\$ 1.11	\$ 15.90	7,150,020	\$ 126,701,000,000	\$ 2.50	6.70	6.80	15.5%	23.0%	16.5%
Verizon	VZ	\$37.07	0.65	\$ 32.15	\$ 9.00	\$ 4.80	\$ 2.64	\$ 23.90	4,204,101	\$ 134,441,000,000	\$ 4.45	7.70	7.10	14.9%	24.0%	20.0%
US Cellular	USM	\$41.54	0.70	\$ 45.90	\$ 8.70	\$ 0.46	\$ -	\$ 54.10	85,000	\$ 2,903,000,000	\$ 7.50	-	n/a	18.5%	24.0%	1.0%
T-Mobile	TMUS	\$160.33	0.75	\$ 67.90	\$ 18.80	\$ 7.65	\$ 0.65	\$ 56.10	1,156,475	\$ 76,953,000,000	\$ 8.50	21.90	1.70	35.4%	24.0%	14.0%

Value Line 12-9-22

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

12.9%

Note:

Value Line figures are all values in US dollars.

Data entered on this page will flow to the app

Guideline Companies		Stock Price 12/29/2023	Projected (Next Year)				Projected (Next Year)									
			Operating Margin	Income Tax Rate	% Return on Shareholders' Equity	Revenues Per Share	Cash Flow Per Share	Earnings Per Share	Dividends	Bk Value	Common Shares	Capital Spending per share	% Return on Shareholders' Equity	% Retained to Common Equity	All Dividends to Net Profits	Market to Book
Name	Ticker	Yahoo	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL
AT&T Inc	T	\$16.51	15.5%	23.0%	16.5%	\$ 17.50	\$ 5.55	\$ 2.55	\$ 1.11	16.65	7,125,000	3.35	17.0%	10.5%	39.0%	96.4%
Verizon	VZ	\$37.07	14.9%	24.0%	20.0%	\$ 33.05	\$ 9.05	\$ 4.90	\$ 2.70	24.00	4,100,000	4.15	21.0%	21.0%	55.0%	98.0%
US Cellular	USM	\$41.54	18.5%	24.0%	1.0%	\$ 46.55	\$ 8.75	\$ 0.40	\$ -	55.30	85,000	8.00	50.0%	50.0%	0.0%	80.7%
T-Mobile	TMUS	\$160.33	35.4%	24.0%	14.0%	\$ 71.80	\$20.75	\$ 9.25	\$ 2.60	62.50	1,120,000	11.60	15.0%	10.5%	28.0%	93.9%

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Forecast % Change

Guideline Companies		Stock Price 12/29/2023	Dividends	Earnings	Cash Flow	Revenue	Income	Balance Sheet				
			2024-2028	2024-2028	2024-2028	2024-2028	Operating Income	Current Assets	PP & E Gross	Current Liabilities	Long Term Debt	Intangibles (excl. Goodwill)
Name	Ticker	Yahoo	VL	VL	VL	VL	M*	M*	M*	M*	M*	M*
AT&T Inc	T	\$16.51	-6.50	1.50	1.00	-2.00	\$ 24,654,000,000	\$ 36,458,000,000	\$ 360,796,000,000	\$ 51,127,000,000	\$ 145,422,000,000	\$ 133,621,000,000
Verizon	VZ	\$37.07	2.50	1.50	0.00	2.50	\$ 28,718,000,000	\$ 36,814,000,000	\$ 344,834,000,000	\$ 53,223,000,000	\$ 137,701,000,000	\$ 188,182,000,000
US Cellular	USM	\$41.54	0.00	4.00	2.00	2.00	\$ 154,000,000	\$ 1,400,000,000	\$ 10,475,000,000	\$ 901,000,000	\$ 3,044,000,000	\$ 4,693,000,000
T-Mobile	TMUS	\$160.33	0.00	20.00	8.50	6.00	\$ 14,241,000,000	\$ 19,015,000,000	\$ 129,318,000,000	\$20,928,000,000	\$ 71,399,000,000	\$ 103,607,000,000

Data entered on this page will flow to the app

Guideline Companies		Stock Price 12/29/2023	Cash Flow		Fair Value	Carrying Value	Current Maturity	ROE	All Div'ds to Net Prof	Cash Flow	EPS
			Depreciation & Amortization	Share Repurchase	Debt - Fair Value	Debt - Carrying Value	Operating Lease Expense	5 yr	5 yr	5 yr	5 yr
Name	Ticker	Yahoo	M*	M*	10-K	10-k	10-K	VL	VL	VL	VL
AT&T Inc	T	\$16.51	\$ 18,777,000,000	\$ 194,000,000	\$ 133,401,000,000	\$138,329,000,000	\$ 5,577,000,000	16.5%	35%	\$ 6.60	\$ 3.25
Verizon	VZ	\$37.07	\$ 17,624,000,000	\$ -	\$ 145,610,000,000	\$148,583,000,000	\$ 5,432,000,000	23.0%	49%	\$ 9.25	\$ 5.65
US Cellular	USM	\$41.54	\$ 656,000,000		\$ 2,502,000,000	\$ 3,099,000,000	\$ 203,000,000	3.5%		\$ 10.70	\$ 2.00
T-Mobile	TMUS	\$160.33	\$ 12,818,000,000	\$ 13,074,000,000	\$ 70,416,000,000	\$ 75,018,000,000	\$ 6,161,000,000	14.5%	27%	\$ 26.15	\$ 13.10

SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

WASHINGTON STATE DEPARTMENT OF REVENUE

2024 ASSESSMENT YEAR

WIRELESS

Company	Ticker	Stock Price	2023		2024		2023		2024	
			Actual Earnings Ratio (EPS/P)	Projected Earnings Ratio (PEPS/P)	Cash Flow Ratio (CF/P)	Projected Cash Flow Ratio (PCF/P)				
AT&T Inc	T	16.51	2.45	14.84%	2.55	15.45%	5.25	31.80%	5.55	33.62%
Verizon	VZ	37.07	4.80	12.95%	4.90	13.22%	9.00	24.28%	9.05	24.41%
US Cellular	USM	41.54	0.46	1.11%	0.40	0.96%	8.70	20.94%	8.75	21.06%
T-Mobile	TMUS	160.33	7.65	4.77%	9.25	5.77%	18.80	11.73%	20.75	12.94%
		Mean		8.42%		8.85%		22.19%		23.01%
		Median		8.86%		9.49%		22.61%		22.74%
		Max		14.84%		15.45%		31.80%		33.62%
		Min		1.11%		0.96%		11.73%		12.94%
		stdev		6.54%		6.69%		8.32%		8.56%
		cov		77.76%		75.60%		37.51%		37.18%
		harmean		3.18%		2.96%		19.45%		20.47%
		Say		8.75%		8.75%		26.25%		27.75%

Source:
 Actual earnings: Value Line
 Estimated Earnings: Value Line
 Actual Cash Flow: Value Line
 Estimated Cash Flow: Value Line

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	Smoothed Growth	Implied Premium	Analyst Growth Estimate	Implied Premium (FCFE)	Implied Premium	ERP/Riskfree Rate
1960	5.34%	3.41%	58.11	3.10	1.98		8.60%	2.91%	2.66%	2.76%	0.10%	2.45%			2.92%		1.24
1961	4.71%	2.85%	71.55	3.37	2.04		8.79%	5.21%	2.13%	2.35%	0.22%	2.41%			2.92%		1.24
1962	5.81%	3.40%	63.1	3.67	2.15		12.75%	9.00%	2.73%	3.85%	1.12%	4.05%			3.56%		0.92
1963	5.51%	3.13%	75.02	4.13	2.35		15.23%	10.08%	3.12%	4.14%	1.02%	4.96%			3.38%		0.82
1964	5.62%	3.05%	84.75	4.76	2.58		11.20%	9.42%	3.54%	4.21%	0.67%	5.13%			3.31%		0.79
1965	5.73%	3.06%	92.43	5.30	2.83		2.23%	1.96%	4.76%	4.64%	-0.12%	4.19%			3.68%		0.79
1966	6.74%	3.59%	80.33	5.41	2.88		0.85%	3.37%	4.21%	5.70%	1.49%	5.25%			3.20%		0.56
1967	5.66%	3.09%	96.47	5.46	2.98		4.81%	2.09%	5.21%	6.16%	0.95%	5.32%			3.00%		0.49
1968	5.51%	2.93%	103.86	5.72	3.04		6.66%	6.49%	6.58%	7.88%	1.30%	7.55%			3.74%		0.47
1969	6.63%	3.52%	92.06	6.10	3.24		-9.72%	-1.61%	6.53%	6.50%	-0.03%	4.78%			3.41%		0.52
1970	5.98%	3.46%	92.15	5.51	3.19		1.15%	-0.74%	4.39%	5.89%	1.50%	4.57%			3.09%		0.52
1971	5.46%	3.10%	102.09	5.57	3.16		10.76%	0.71%	3.84%	6.41%	2.57%	5.21%			2.72%		0.42
1972	5.23%	2.70%	118.05	6.17	3.19		28.93%	13.24%	6.93%	6.90%	-0.03%	8.30%			4.30%		0.62
1973	8.16%	3.70%	97.55	7.96	3.61		17.48%	3.14%	8.00%	7.40%	-0.60%	6.42%			5.59%		0.76
1974	13.64%	5.43%	68.56	9.35	3.72		-17.54%	0.30%	5.80%	7.76%	1.96%	5.99%			4.13%		0.53
1975	8.55%	4.14%	90.19	7.71	3.73		26.39%	13.10%	5.08%	6.81%	1.73%	8.19%			4.55%		0.67
1976	9.07%	3.93%	107.46	9.75	4.22		11.53%	15.07%	5.12%	7.78%	2.66%	9.52%			5.92%		0.76
1977	11.43%	5.11%	95.1	10.87	4.86		7.07%	6.60%	7.18%	9.15%	1.97%	8.48%			5.72%		0.63
1978	12.11%	5.39%	96.11	11.64	5.18		25.01%	15.23%	10.38%	10.33%	-0.05%	11.70%			6.45%		0.62
1979	13.48%	5.53%	107.94	14.55	5.97		3.01%	7.81%	11.24%	12.43%	1.19%	11.01%			5.03%		0.40
1980	11.04%	4.74%	135.76	14.99	6.44		1.31%	6.08%	14.71%	13.98%	-0.73%	11.42%			5.73%		0.41
1981	12.39%	5.57%	122.55	15.18	6.83		-8.95%	1.58%	10.54%	10.47%	-0.07%	7.96%			4.90%		0.47
1982	9.83%	4.93%	140.64	13.82	6.93		-3.84%	2.76%	8.80%	11.80%	3.00%	9.09%			4.31%		0.37
1983	8.06%	4.32%	164.93	13.29	7.12		26.69%	9.85%	9.85%	11.51%	1.66%	11.02%			5.11%		0.44
1984	10.07%	4.68%	167.24	16.84	7.83		-6.91%	4.74%	7.72%	8.99%	1.27%	7.89%		6.75%	3.84%		0.43
1985	7.42%	3.88%	211.28	15.68	8.20		-7.93%	-0.15%	6.16%	7.22%	1.06%	5.54%		3.36%	3.58%		0.50
1986	5.96%	3.38%	242.17	14.43	8.19		11.10%	11.99%	5.47%	8.86%	3.39%	9.66%		4.18%	3.99%		0.45
1987	6.49%	3.71%	247.08	16.04	9.17		50.42%	11.49%	6.35%	9.14%	2.79%	9.76%		4.12%	3.77%		0.41
1988	8.20%	3.68%	277.72	24.12	10.22		0.83%	14.80%	8.37%	7.93%	-0.44%	9.58%		3.85%	3.51%		0.44
1989	6.80%	3.32%	353.4	24.32	11.73		-6.87%	5.26%	7.81%	8.07%	0.26%	7.39%		3.92%	3.89%		0.48
1990	6.58%	3.74%	330.22	22.65	12.35		-14.79%	5.03%	7.00%	6.70%	-0.30%	6.34%		3.27%	3.48%		0.52
1991	4.58%	3.11%	417.09	19.30	12.97		8.13%	-2.59%	5.30%	6.68%	1.38%	4.67%		2.83%	3.55%		0.53
1992	4.16%	2.90%	435.71	20.87	12.64		28.89%	0.41%	3.50%	5.79%	2.29%	4.73%		2.74%	3.17%		0.55
1993	4.25%	2.72%	466.45	26.90	12.69		18.03%	5.34%	5.00%	7.82%	2.82%	7.23%		3.06%	3.55%		0.45
1994	5.89%	2.91%	459.27	31.75	13.36		18.74%	6.00%	3.50%	5.57%	2.07%	5.65%		2.44%	3.29%		0.59
1995	5.74%	2.30%	615.93	37.70	14.17		7.77%	5.10%	5.00%	6.41%	1.41%	6.13%		2.11%	2.92%		0.50
1996	4.83%	2.01%	740.74	40.63	14.89		8.52%	4.25%	5.35%	5.74%	0.39%	5.45%		1.67%	2.73%		0.48
1997	4.08%	1.60%	970.43	44.09	15.52		0.41%	4.37%	4.33%	4.65%	0.32%	4.60%		1.38%	2.26%		0.49
1998	3.11%	1.32%	1229.23	44.27	16.20		16.74%	3.16%	5.37%	6.44%	1.07%	5.75%		1.20%	2.05%		0.32
1999	3.07%	1.14%	1469.25	51.68	16.71		8.61%	-2.65%	5.73%	5.11%	-0.62%	3.71%		1.65%	12.00%		0.56
2000	3.94%	1.23%	1320.28	56.13	16.27		-30.79%	-3.24%	1.80%	5.05%	3.25%	3.56%		1.73%	10.30%	2.91%	0.72
2001	3.85%	1.37%	1148.09	38.85	15.74	30.08	18.51%	2.15%	1.20%	3.81%	2.61%	3.57%		2.29%	8.00%	4.10%	1.08
2002	5.23%	1.83%	879.82	46.04	16.08	29.83	18.79%	11.19%	1.00%	4.25%	3.25%	5.35%		2.12%	11.00%	3.69%	0.87
2003	4.87%	1.61%	1111.91	54.69	17.88	31.58	23.75%	8.54%	2.18%	4.22%	2.04%	4.90%		2.02%	8.50%	3.65%	0.86
2004	5.58%	1.60%	1211.92	67.68	19.407	40.60	12.96%	15.32%	4.31%	4.39%	0.08%	6.16%		2.20%	8.00%	4.08%	0.93
2005	5.47%	1.79%	1248.29	76.45	22.38	61.17	14.74%	11.93%	4.88%	4.70%	-0.18%	5.93%		1.97%	12.50%	4.16%	0.89
2006	6.18%	1.77%	1418.3	87.72	25.05	73.16	-5.91%	10.70%	3.31%	5.03%	0.71%	5.03%		2.06%	5.00%	4.37%	1.09
2007	5.62%	1.89%	1468.36	82.54	27.73	95.36	-20.78%	1.15%	1.59%	2.21%	0.62%	2.11%		4.05%	4.00%	6.43%	2.91
2008	7.24%	3.11%	903.25	65.39	28.05	67.52	-8.78%	-20.46%	0.14%	3.84%	3.70%	0.28%		2.60%	7.20%	4.36%	1.14
2009	5.35%	2.00%	1115.10	59.65	22.31	37.43	40.25%	3.63%	0.13%	3.29%	3.16%	3.33%		2.24%	6.95%	5.20%	1.58
2010	6.65%	1.84%	1257.64	83.66	23.12	55.53	16.01%	12.54%	0.03%	1.88%	1.85%	2.75%		2.71%	7.18%	6.01%	3.20
2011	7.72%	2.07%	1257.60	97.05	26.02	71.28	5.58%	16.99%	0.05%	1.76%	1.71%	2.93%		2.47%	5.27%	5.78%	3.28
2012	7.18%	2.13%	1426.19	102.47	30.44	75.90	19.19%	0.07%	3.04%	2.97%	0.74%	5.01%		2.03%	4.28%	4.96%	1.63
2013	5.81%	1.96%	1848.36	107.45	36.28	88.13	5.17%	8.71%	0.05%	2.17%	2.12%	2.77%		2.24%	5.58%	5.48%	2.66
2014	5.49%	1.92%	2058.90	113.01	39.44	101.98	-5.92%	9.43%	0.21%	2.27%	2.06%	2.96%		2.46%	5.51%	6.12%	2.70
2015	5.20%	2.11%	2043.94	106.32	43.16	106.10	2.39%	4.33%	0.51%	2.45%	1.94%	2.64%		2.41%	5.54%	5.69%	2.32
2016	4.86%	2.01%	2238.83	108.86	45.03	108.67	14.77%	10.44%	1.39%	2.41%	1.02%	3.22%		2.36%	7.05%	5.08%	2.11
2017	4.67%	1.86%	2673.61	124.94	49.73	108.28	18.73%	7.80%	2.37%	2.68%	0.31%	3.24%		2.50%	4.12%	5.96%	2.22
2018	5.92%	2.14%	2506.85	148.34	53.61	136.65	9.44%	9.68%	1.55%	1.92%	0.37%	2.57%		3.96%	5.20%	5.06%	2.71
2019	5.03%	1.82%	3230.78	162.35	58.80	150.50	-14.92%	-3.57%	0.09%	0.93%	0.84%	0.74%		1.65%	5.42%	4.72%	5.08
2020	3.68%	1.51%	3756.07	138.12	56.70	127.78	47.67%	4.41%	0.06%	1.51%	1.45%	1.71%		1.72%	6.47%	4.24%	2.81
2021	4.33%	1.24%	4766.18	206.38	59.20	147.24	6.35%	15.44%	4.42%	3.88%	-0.54%	5.59%		2.16%	6.41%	5.94%	1.53
2022	5.72%	1.78%	3839.50	219.49	68.34	181.99	0.10%	1.98%	5.20%	3.88%	-1.32%	3.60%		1.97%	8.74%	4.60%	1.19
2023	4.61%	1.46%	4769.83	219.70	69.69	164.25											

* Earnings and dividends numbers each year reflect the estimated numbers as of the end of the year. These numbers get updated later in the year but I do not update the numbers in this spreadsheet, since I would not have had access to them at the end of the year.

2024 Multi Stage Earnings Growth Model

Wireless Industry

3.93% GDP

7.2 Median Trailing Industry P/E

35.0% Average Target Dividend Payout Ratio (All dividends to net profit)

15.5% Average Target ROE

AT&T
T

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		26.33%	73.67%	2.45		stock price =	-16.51
1	4.08%	44.28%	55.72%	2.55	1.42		1.42
2	6.86%	41.43%	58.57%	2.73	1.60		1.60
3	6.42%	38.93%	61.07%	2.90	1.77		1.77
4	6.03%	36.72%	63.28%	3.08	1.95		1.95
5	5.69%	34.44%	65.56%	3.25	2.13		2.13
6	5.34%	32.17%	67.83%	3.42	2.32		2.32
7	4.99%	29.90%	70.10%	3.59	2.52		2.52
8	4.63%	27.63%	72.37%	3.76	2.72		2.72
9	4.28%	25.35%	74.65%	3.92	2.93		2.93
10	3.93%	25.35%	74.65%	4.08	3.04	30.50	33.54
11+	3.93%	25.35%	74.65%	4.24	3.16		

Value Line Earnings Growth Rate $K_e = 16.17\%$

Verizon

VZ

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		13.44%	86.56%	4.80		stock price =	-37.07
1	2.08%	24.69%	75.31%	4.90	3.69		3.69
2	3.83%	23.78%	76.22%	5.09	3.88		3.88
3	3.69%	22.93%	77.07%	5.28	4.07		4.07
4	3.55%	22.15%	77.85%	5.46	4.25		4.25
5	3.43%	22.79%	77.21%	5.65	4.36		4.36
6	3.53%	23.43%	76.57%	5.85	4.48		4.48
7	3.63%	24.07%	75.93%	6.06	4.60		4.60
8	3.73%	24.71%	75.29%	6.29	4.73		4.73
9	3.83%	25.35%	74.65%	6.53	4.87		4.87
10	3.93%	25.35%	74.65%	6.79	5.07	50.78	55.84
11+	3.93%	25.35%	74.65%	7.05	5.26		

Value Line Earnings Growth Rate $K_e = 13.44\%$

US Cellular

USM

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		-0.84%	100.84%	0.46		stock price =	-41.54
1	-13.04%	6.45%	93.55%	0.40	0.37		0.37
2	100.00%	3.23%	96.77%	0.80	0.77		0.77
3	50.00%	2.15%	97.85%	1.20	1.17		1.17
4	33.33%	1.61%	98.39%	1.60	1.57		1.57
5	25.00%	1.34%	98.66%	2.00	1.97		1.97
6	20.79%	1.07%	98.93%	2.42	2.39		2.39
7	16.57%	0.80%	99.20%	2.82	2.79		2.79
8	12.36%	0.53%	99.47%	3.16	3.15		3.15
9	8.14%	25.35%	74.65%	3.42	2.55		2.55
10	3.93%	25.35%	74.65%	3.56	2.65	26.61	29.27
11+	3.93%	25.35%	74.65%	3.70	2.76		

Value Line Earnings Growth Rate $K_e = 1.20\%$

T-Mobile
TMUS

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		1.35%	98.65%	7.65		stock price =	-160.33
1	20.92%	0.67%	99.33%	9.25	9.19		9.19
2	10.41%	0.61%	99.39%	10.21	10.15		10.15
3	9.42%	0.56%	99.44%	11.18	11.11		11.11
4	8.61%	0.51%	99.49%	12.14	12.08		12.08
5	7.93%	0.46%	99.54%	13.10	13.04		13.04
6	7.13%	0.41%	99.59%	14.03	13.98		13.98
7	6.33%	0.36%	99.64%	14.92	14.87		14.87
8	5.53%	0.31%	99.69%	15.75	15.70		15.70
9	4.73%	25.35%	74.65%	16.49	12.31		12.31
10	3.93%	25.35%	74.65%	17.14	12.79	128.26	141.06
11+	3.93%	25.35%	74.65%	17.81	13.30		

Value Line Earnings Growth Rate

Ke = 6.15%

Average 9.24%
Median 9.79%