Krause Fund Research
Fall 2021

Real Estate

Crown Castle Int (NYSE: CCI)

Recommendation: Hold

November 16, 2021

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Current Price $180
Target Price $173-215.13

Company Overview

Crown Castle International Corp. is a REIT that engages in the provision of access to wireless infrastructure to internet and cell service providers through long-term lease agreements. CCI operates through its towers and fiber segments. The towers segment encompasses cell towers dispersed throughout the United States. The Fiber segment encompasses infrastructure used to support small-cell networks and fiber solutions.

Valuation Methods

DCF/EP	**$ 215.13**
DDM	**$ 173.05**
Relative P/FFO (EPS21)	**$ 262.23**

Stock Performance Highlights

52 Week Highest	**$ 204.62**
52 Week Lowest	**$ 146.15**
Beta Value	**0.85**

Key Statistics

Market Cap (M)	**77,870**
Share Outstanding	**434**
Dividend (Yield)	**2.94%**
EPS (2021E)	**$3.69**

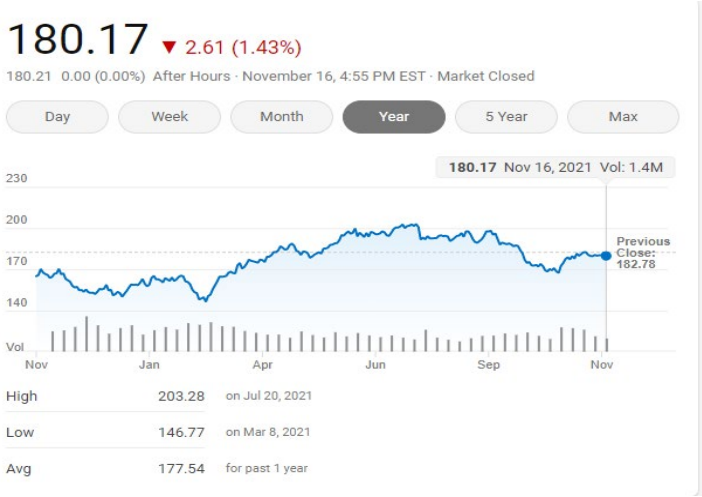
Financial Ratio

Current Ratio	**0.56**
Debt to Equity	**3.1**

CCI`s Strengths and Risks

- Jerome Powell said that he is a supporter of tapering in this year. If tapering is executed, it is starting signal of the downturn.
- 5G network is expected to be used widely in 2025. We expected that CCI revenue will be increased rapidly from 2025 due to the wide usage of 5G
- Infrastructure Bill is passed by the senate and congress. It means that the Crown Castle International market will be significantly expanded to rural areas and urban are
- Crown Castel International signed a contract for 15 years with the largest telecommunication companies such as T-mobiles, AT&T, and Verizon for the 5G.
- Crown Castle International`s business is focused on the United States. Conducting business in the United States has lower political risk compared to other nations.

One Year Stock Performance



Source: MircoSoft bing

Executive Summary

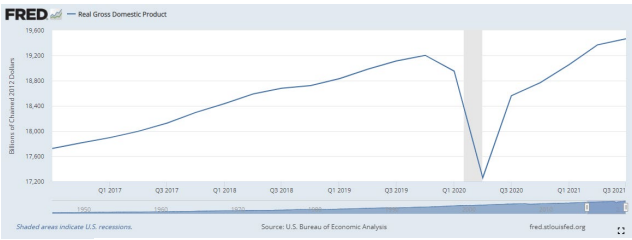
Crown Castle International has played a major role in the infrastructure of the REITs industry. Right now, the whole telecommunication industry is in industrial transition from 4G to 5G. 5G is a necessary technology for the IoT (Internet of Things). In addition, Crown Castle International has high-edge fiber technology which is essential for 5G. Given the fact that the infrastructure bill has passed, Crown Castle International has a lot of opportunities to expand its 5G network coverage.

Economic Analysis

Real GDP

GDP is a measure of the value of all goods and services produced by an economy in a given year. The Real GDP is an inflation-adjusted version of that measurement. While the performance of the real estate sector as a whole is not fully dependent on the performance of GDP, it is generally still a good metric for determining where the market is. While real estate is used to diversify against inflation, the slow market growth can still affect value and company growth.

U.S Real GDP grows by on average 3.05% per year. From 2019 to 2020, Real GDP contracted by (2.26%), this could be because of the issues lingering from the pandemic that include supply chain shortages and inflation in input costs. However, we believe that growth this year will rebound and hit 5% due to the economic recovery from the pandemic and the solving of those supply chain issues. This is a benefit for CCI because growing GDP means growing consumer expendable income and more demand for 5G services.



Source: FRED

Interest Rates

A desirable interest rate environment is anticipated to assist in growth as the cost of debt financing lowers. Many real estate investment trusts finance their holding through debt, which low-interest rates will affect industry operators' profit directly as mortgage rates transition in lockstep with interest rates. The effects of interest rates are expected to happen gradually as demand for cell towers and fiber segments are expected to rise slowly over time. Overall, REIT revenue is forecasted to rise at an annualized rate of 2.2% to $239.5 billion over the five years to 2026. Due to the economic effects of COVID-19, the Federal Reserve dropped interest rates to almost zero in 2020. With the severity of the pandemic and the effects it has on economic variables, we believe interest rates will remain low to attempt to balance the economy. The low interest rates within the environment will be favorable for REITs due to the advantages of cheap financing. Since most REIT's are financed with debt, the industry is sensitive to interest rates.

Inflation Rates

The inflation rate is anticipated to increase soon. The Federal Reserve uses monetary policy to control inflation, deflation, and disinflation. The Fed focuses on the core inflation rate, which excludes gas and food prices. An increase in prices across the United States pushed the October consumer price index up 0.9%, and the yearly inflation rate hit 6.2%, a 30-year high. Yet another rise in energy prices helped drive overall prices up. Natural gas rose 6.6%, and gasoline 6.1%. But other prices continued to push up, as well. Inflation rates are expected to increase and shake up the Real Estate Investment Trust Industry.

Industry Analysis

Industry Description

Crown Castle International (CCI) is considered a Real Estate Investment Trust (REIT), which are companies that own or finance real estate across property sectors. More specifically CCI engages in the communication tower infrastructure REIT Industry where it mainly focuses on the provision of access to wireless tower infrastructure via long-term contracts operating through two main segments towers and fibers which are then leased to companies such as Verizon Communications, AT&T, and T-Mobile.

Technological Impact

The growth comparison chart shows that the tower infrastructure REIT industry is in a declining stage due to a steady decline of growth since 2013. However, we believe that the communication infrastructure REIT industry is in the growth stage of its life cycle due to the continual innovation of technology implementations such as 5G . 5G has allowed communities to access information faster, more stable connectivity, and allows improved data access.

Government or regulatory changes

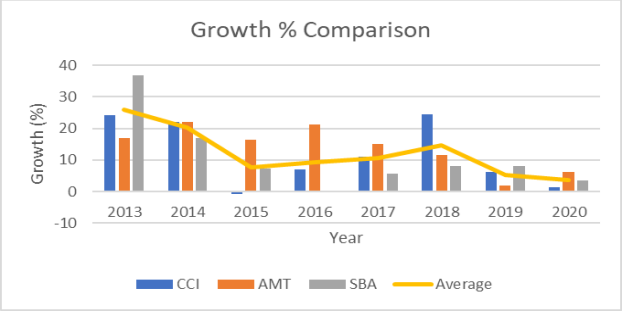
The covid epidemic has caused the industry to shrink. However, due to some recent growth and the Federal Reserve dropping interest rates to historically low levels, many investors are drawing their attention back into the industry. A low-interest rate environment will favor the industry and allow cheaper financing. The future is uncertain with REITs due to the likelihood of an unknown increase in the interest rate environment. Although there is an uncertain future behind REITs the industry has vastly inflated its operations.

Social and demographic changes

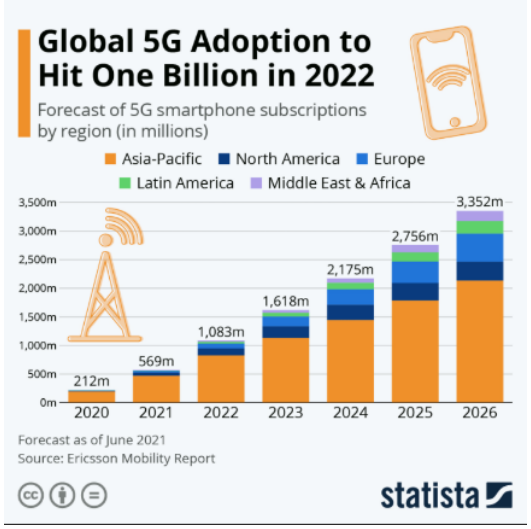
Vacancy rental rates have increased by the decline in homeownership. This refers to the demand for rentals being low while the demand for housing is high. As expendable income increases and unemployment levels decline, individuals are expected to be more likely to purchase homes. And the housing price index is expected to continue to grow since the low housing stock is pushing home prices even higher than before. When the demand for rental properties starts to decrease, the industry operators will likely suffer to gain rental revenue.

Economic changes

Covid-19 caused a numerous amount of people to be left unemployed. This series of unemployment caused the industry to shrink because of missed rent payments among commercial property tenants in 2020. Following this economic shock, the industry revenue is anticipated to increase by 3.5% in 2021 alone. The industry is expected to rebound within the near future and increase revenue at an annualized rate of $232.6 billion over the next five years. With a favorable outlook, the number of industry participants is expected to grow.



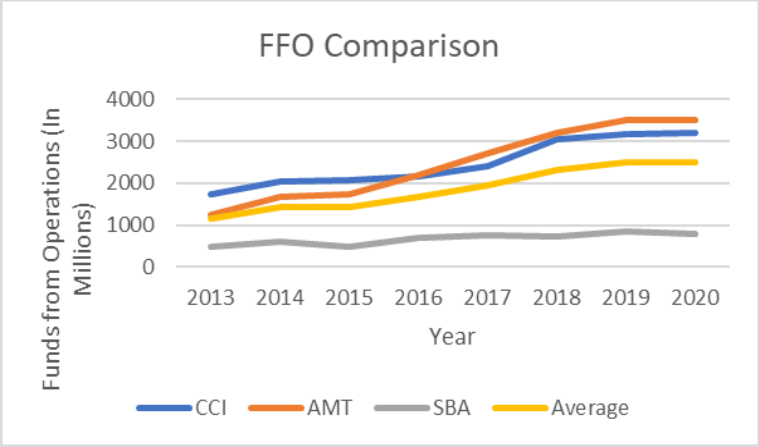
Source: Krause Fund



Competitive Analysis

Markets and Competition

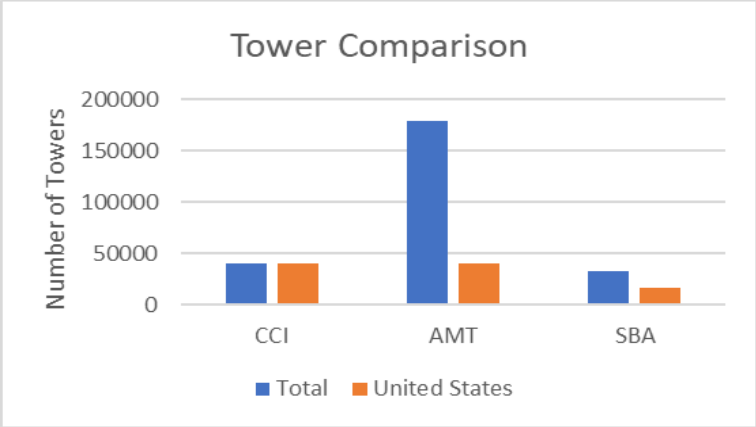
The competitive landscape for Crown Castle International in the public market include American Tower Corporation and SBA Communications A. These companies all operate in the communication tower infrastructure REIT industry. Each of these firms own, operate, and lease communication tower infrastructure to companies such as AT&T, T-Mobile, and Verizon Communications. CCI's FFO is slightly trailing AMT's FFO but with CCI's possible expansion into global markets and their implementation of 5G it is possible that CCI will rise above the competition.



Source: Krause Fund

Competitive Advantage and Peer Comparison

Crown Castle International uses new advancements such as 5G, edge computing, and CBRS to expand on its competitive advantage as well as its continual acquisitions of competitors within the infrastructure REIT industry. Crown Castle has acquired three main companies since Crown Castle became an REIT in 2014 and has doubled in size from acquiring Wilcon in 2017. Among its competitors Crown Castle International provides the highest dividend yield at 3.22% with an average of 1.94% within the industry. Crown Castle International can also see a potential growth factor if they decide to increase their international tower network as they currently only operate in the United States and Puerto Rico.



Source: Krause Fund

American Tower Corporation (AMT) provides multitenant communication towers throughout the world. AMT's main focus is on a multicontinental business model with 43.8% of its sales coming from countries other than the United States and Canada, although its current Asia-Pacific and Latin American markets are decreasing at a rate of -6.4% and -6.2% respectively in 2020 as well as its services sector declining -23.8% in 2020. AMT's business model is riskier than CCI due to its involvement in dealing with various governments and currency risks making CCI a more stable choice when choosing an REIT.

SBA Communications (SBA) primary generates its revenue from two categories site leasing and site development. With a focused market primary in North and South America. SBA Communications has seen a stagnant growth since 2015 with an average growth rate of approximately 5.34%

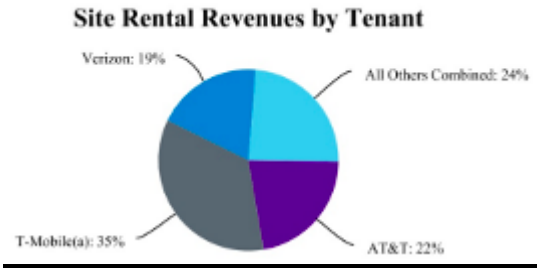
Company Analysis

Company Description

Crown Castle International Corp. is a real estate investment trust company headquartered in Houston, Texas. The company engages in the provision of access to wireless infrastructure via long-term contacts. It operates through the following segments: Towers and Fiber. The company provides access, including space or capacity, lease, license, sublease, and service agreements to communications infrastructure in the US (including Puerto Rico). Wireless carrier customers including T-Mobile, AT&T, Verizon are the company's largest tenants of Towers and Fiber segments. Crown Castle International has about 40,000 tower sites (the most in the US) and some 80,000 miles of fiber, primarily supporting small cells and fiber solutions geographically dispersed throughout the US. The company also selects and develops sites and installs tenant equipment or subsequent augmentations. In 2020, Crown Castle joined the Fortune 500 list for the first time. With a unique combination of towers, small cells, and fiber and a team of approximately 5,000 employees across nearly 100 offices nationwide, the company is setting the stage for tomorrow's most transformative technologies.

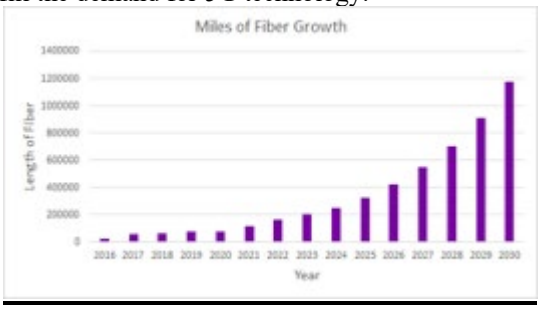
Revenue Analysis

Crown Castle International's total revenue consists predominantly of site rental revenue and services and other revenues. In 2020, 91% of total revenue consisted of site rental revenues. Site rental revenues from the Company's tenant contracts are recognized on a straight-line basis, which generally ranges from five to fifteen years for wireless tenants and three to twenty years for the company's fiber solutions tenants. Crown Castle's three largest tenants are T-Mobile, AT&T and Verizon Wireless. Collectively, these three tenants accounted for approximately 76% of our 2020 site rental revenues (including revenues previously derived from Sprint). Crown Castle also offers certain services primarily relating to their towers segment, which represented 9% of our total revenues for 2020. Services and other revenue consist primarily of site development services primarily relating to existing or new tenant equipment installations, including site acquisition, architectural and engineering, or zoning and permitting and tenant equipment installation or subsequent augmentations.



Source: 10K

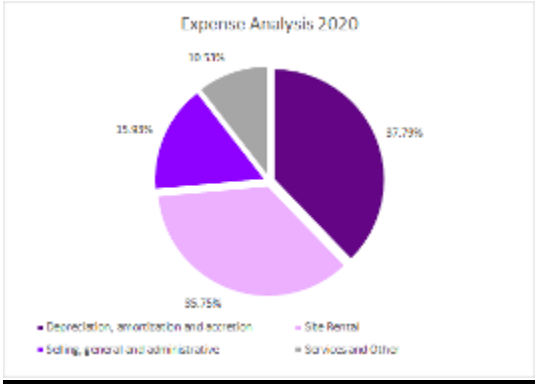
We expect Crown Castle's site rental revenue to increase by an average rate of 8.6% over the next five years. The consistent growth is supported by constant construction of fiber for small cell networks and more towers to fulfill the demand for 5G technology.



Source 10K

Expense Analysis

Crown Castle's main expenses include site rentals, services and other expenses, selling, general and administrative, and depreciation, amortization and accretion. Other expenses include interest expense, asset write-down charges, and acquisition and integration charges.



source: 10K

The primary operating expenses for Crown Castle involve site rentals and depreciation, amortization and accretion. Site Rentals are divided into two categories consisting of towers ground lease expenses and fiber access expenses (primarily leases of fiber assets and other access agreements to facilitate our communications infrastructure), property taxes, repairs and maintenance, employee compensation, or related benefit costs, and

utilities. Site rental expenses have progressively increased each year due to the vast expansion of cellular networks needed in areas across the country. We expect Crown Castle's site rental expenses to increase by about 36% over the next five years due to the rapid expansion of the 5G networks. Many of these fibers and towers are located in metropolitan areas, which leads us to infer that their site rentals will expand across the next five years into more rural and suburban areas. The other key operating expense is the depreciation of the cell towers that are rented throughout the United States. We expect to spend more capital expenditure in 2021 on our property and equipment leading to our highest depreciation expense historically within the past ten years. However, we expect the depreciation expense after 2021 to decrease the next nine years due to our forecasted increase in net revenue.

Margin and Profit Analysis

Crown Castle International had an acceptable year of growth in 2021. They have had their largest small cell commitment ever that includes a 15,000-node award from Verizon to support their 5G structures across the U.S for about a year now. In the 2021 quarterly report the company declared a quarterly cash dividend of $1.47 per common share, representing an increase of approximately 11% over the previous quarterly dividend of $1.33 per share. AFFO per share for third-quarter 2021 was $1.77, representing 13% growth when compared to $1.56 for third quarter 2020. During the quarter, Crown Castle paid common stock dividends of approximately $575 million in the aggregate, or $1.33 per common share, an increase of approximately 11% on a per share basis compared to the same period a year ago.

Valuation Analysis

Overview

We focused for 10 years on the revenues of CCI (Crown Castle International). Although the Fiber section is only 34% in 2020, we expected that fiber revenue will be 60% percent of site rental revenue which is 54% percent of total revenue. CCI`s fiber business segment includes small cell technology. Small cells are fiver-connected antennas that supply greater wireless coverage. If we connect these small cells with 5G, CCI can produce wider 5G network coverage. Given that industry is in transition from 4G to 5G, we believe that small cell technology will be essential technology.

We believe that CCI Tower Division also increased in the next 10 years as CCI invested capital to upgrade their tower service.

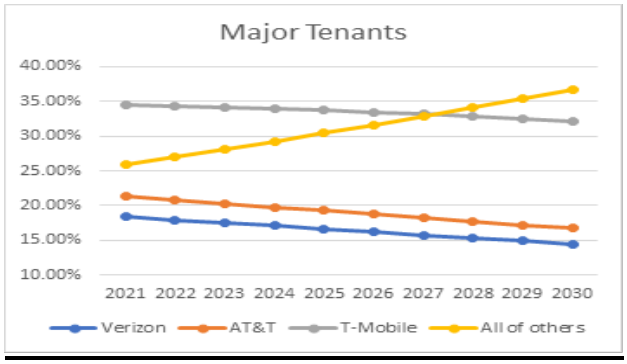
Based on this revenue assumption, we predicted the future financial statement and evaluate the intrinsic value of the company through Discounted Cash Flow, Economic Profit, Dividend Discount, and Relative models.

Revenue Decomposition

Crown Castle International revenue has consisted of site rental business and services & others. The site rental business is composed of fiber and tower segments. We believe that the fiber business will be the major business of CCI due to the industrial transition from 5G to 4G. The tremendous increasing demand for the 5G is also one of the variables which lead to an increase in CCI revenues.

In the tower business, T-Mobile, and Sprint`s merger is completed in 2020. Due to the merger, Crown Castel International`s revenue for tower business is expected to be growth. We expect tower operators to see a boost in revenues from new hardware installations as T-Mobile installs 600 MHz equipment on Sprint's towers and 2.5GHz equipment on T-Mobile towers (Snyder, 2020).

However, we assume that revenue from major tenants will of tower rental decrease after 10 years. This is because 5G`s main technology is fibers, not a tower business.



source: 10K of CCI

so Installing an antenna for the wide 5G coverage area will be finished in 2025. Based on this expectation, our revenue growth forecast has also decreased since 2026.

We forecast that the number of towers and Miles of fibers will increase. In the case of the tower, we expected that CCI would have 173 more towers. The main reason for the slow increase of towers is that tower business is no longer the main technology for the network business.

On the other hand, we forecasted miles of fiber will be 6 times bigger compared to 2020. The main reason I set up this assumption is due to IoT (Internet of things). IoT is installing the internet on the product. The most common example is autonomous driving. To perform IoT, faster internet is necessary because we have to send the information quickly to deal with all variables nearby the products. In addition, some products such as automobiles are used to move, which means that wider coverage is necessary. Thus, we forecasted that the miles of fiber will be 6 times.

Continuing value

Continuing value is one of the most important sectors for our valuation. Given that the beta of CCI is below 1, which means that the volatility of CCI is low. In addition, CCI is REITs (Real Estate Investment Trust) format and the telecommunication business has a high entrance. Due to those reasons, we assume that the US. T-bill 10yr interest rate stands for economic growth of CCI`s growth. T-Bill 10yr interest rate is 1.5%.

WACC (Weighted Average Cost of Capital)

Weight Average Cost of Capital is a crucial part of evaluating CCI`s value because WACC affects all our valuation models such as DCF (Discounted Cash Flow), EP (Economic Profit). The cost of Equity is 5.78% and the after-tax cost of debt is 3.12%. Market value weights of common stock are 73.44% and Market value weights of Debt are 26.56%. Through this ratio, we computed WACC. Our forecasting WACC is 5.07%

Cost of Equity

To calculate the cost of equity, we used the CPAM model: RF+ERP*BETA. The risk-free rate is 1.59% which is a 10-year Treasury bond interest rate. we geometric average over 10-year Treasury for Equity Risk Premium. Equity Risk Premium is 4.93. We used Beta which is in Bloomberg. The beta is 0.85. As a computation result, the cost of equity is 5.78%

Cost of Debt

Our cost of Debt came from the Pre-Tax Cost of Debt multiplied (1-marginal tax rate). The pre-Tax cost of debt is on Con CCI 30Y Bond. Marginal tax is calculated by calculating the average from 2011 to 2020. As a result, 3.12% after-tax-tax cost of debt was calculated

DCF and EP Model

We used a 10-year forecast period for DCP and EP modeling. Based on our calculations, FCF (Free Cash Flow) and EP have rapidly increased since 2024. Given that a lot of ability expected that investing for the infrastructure for 5G will be done by 2025, we assume that 2024 is the starting time of monetization.

Throughout the DCF, EP calculation, we find out the value of operating assets. After then we added non-operating assets and minus PV of operating lease. Both calculations show the same implied price as of today which is $215.13.

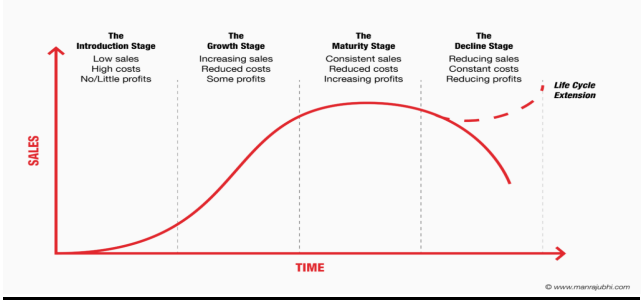
The implied price of today shows that the current CCI value is 16% lower than the intrinsic value. However, we recommend Hold for CCI. We believe that a 16% lower price compared to intrinsic value is happened due to the concerning tapering risks.

Dividend Discount Model

We assumed that continuing growth of EPS is 2%. In deciding 2% as a CV (Continuing Value) growth of EPS, two variables significantly affect our decision. First, IMF forecaster US inflation in 2026 as 2.6%. Due to Covid, the Federal Reserve did a large amount of quantitative easing. As of November 2, 2021, it reached 8.57 trillion dollars (about $26,000 per person in the US). We assume that this huge amount of debt will make feds continuously tight monetary policy until 2030. Consequently, we expected that the inflation rate also will be decreased to 2.0%.

Second, we predict that the growth of CCI would be like the Inflation rate. The biggest reason is that the 5G transition is done by 2025, which means that CCI`s volatility is decreased. CCI volatility is already below 1. More Decreasing beta in the future than present beta implies CCI`s continuous growth rate will be nearby the inflation rate. Due to these two assumptions, we decided our CV EPS as 2%.

We assume that CCI enters the maturity stage from 2030. In this sense, CCI shows the highest EPS in 2030E. Multiplying EPS 2030 and P/E Multiple (CV year). We calculate future prices. Using the cost of equity as the discount, we find the PV for 9 years EPS and PV of future stock value. The Sum of the whole present value is $173.05, which is 5% lower than the current price.

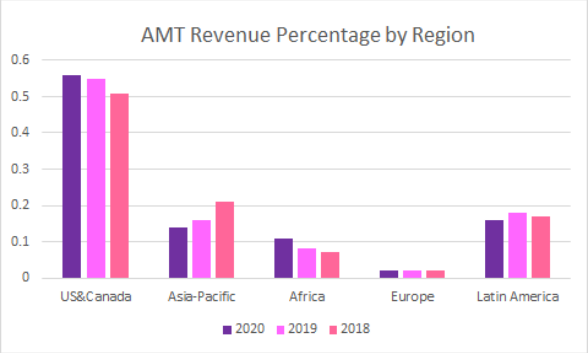


Source: Manraj Ubhi

Relative valuation Model

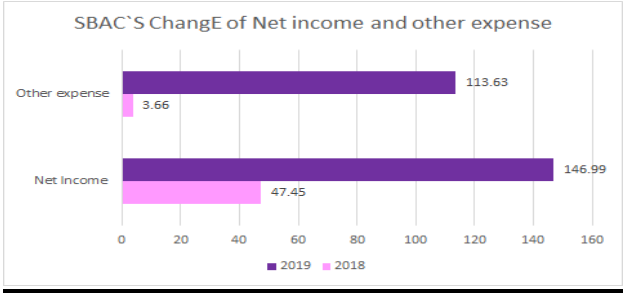
In our relative valuation model, we compared CCI to 3 major competitors SBA communication (SBAC), American Tower (AMT), and Uniti Group (UNIT). Due to the high P/E ratio of SBAC, we excluded SBAC for the P/E calculation. In addition, UNIT has too low a P/FFO ratio to calculate P/FFO, we excluded them in the P/FFO calculation.

We came to implied P/E 150.84 and P/E 161.49 FOR 2021 and 2022. 262.33 and 259.98 are P/FFO values for 2021,2022. Throughout the model, we concluded that the price multiple of CCI is lower than relatives. However, we are going to keep holding the opinion. AMT`s revenue is not limited to America; its revenue stream is diversified to a different region. We assume that diversification of revenue is the reason AMT has higher P/E ratios.



Source: AMT 10K

SBAC shows rapid net income growth which is driven by decreasing in other expenses. We believed that this rapid growth of net income increases the expectation of SBAC and lead to a higher price.



Source: FACTSET

To sum up, AMT and SBAC have their drivers for the high P/E ratios or P/FFO ratios. However, crown castle international does not have those drivers. Thus, we concluded that using the relative analysis is not proper due to the unique management strategies of each firm.

Sensitivity Analysis

Beta vs Rf-Rate

Our cost equity is based on the CPAM modeling. Beta and RF rates are crucial components in calculating the cost of Equity in CPAM modeling. In addition, the cost of equity affects all our valuation models such as DCF, EP, and DDM (Dividend Discount Model). Due to the significant effect of Beta and Rf-rate in valuation, we conduct the sensitivity analysis between Beta and RF-Rate. Price is fluctuated inversely by the Beta`s and RF-rate`s fluctuation. Given the formula of CPAM is RF+(ERP*BETA), this inverse relationship between RF-Rate and Beta is reasonable. Based on this assumption, we concluded that the present stock price of CCI is overrated due to the lower interest rate.

		Beta						
	215.13	0.55	0.65	0.75	0.85	0.95	1.05	1.1
	0.70%	444.44	366.71	311.01	269.15	236.56	210.46	199.27
	1%	393.87	330.82	284.24	248.42	220.03	196.98	187.01
	1.30%	353.11	300.95	261.41	230.41	205.47	184.97	176.03
Rf-Rate	1.59%	320.58	276.47	242.33	215.13	192.95	174.53	166.44
	1.90%	291.47	254.06	224.55	200.69	180.99	164.46	157.15
	2.20%	267.60	235.33	209.46	188.27	170.60	155.64	148.99
	2.50%	247.08	218.95	196.10	177.16	161.22	147.61	141.53

ROI VS ERM

We used ROI as the interest rate for our interest expense. Interest expense occupies a significant percentage in the expense portion. And ERM is one of the significant variables to WACC. To sum up, Both variables are core variables of CCI`s debt structure. Throughout the sensitive analysis between ROI and ERP, we find out that ERP and ROI negatively affect to implied stock price value. When 1% increased of ERP or ROI, implied stock price fluctuation at least 15% percentage.

		Equity Risk Premium						
	215.13	1.50%	2.50%	3.50%	4.50%	5.50%	6.50%	7.50%
	0.75%	576.58	393.31	295.49	234.69	193.27	163.25	140.52
	1.75%	576.60	393.32	295.50	234.70	193.28	163.26	140.53
	2.75%	576.62	393.34	295.51	234.71	193.29	163.28	140.54
ROI	3.75%	576.64	393.36	295.53	234.73	193.31	163.29	140.55
	4.75%	576.66	393.38	295.55	234.75	193.32	163.31	140.57
	5.75%	576.69	393.40	295.57	234.77	193.34	163.32	140.58
	6.75%	576.72	393.43	295.59	234.79	193.36	163.34	140.60

SGA VS Cost of site rental

The sensitivity analysis stands for how our implied stock price fluctuates by increasing or decreasing SGA and the Cost of Site rental. The analysis shows that implied price has an inverse relationship with SGA and the cost of site rental. However, the impact of SGA and the Cost of site rental on the implied price is minimum. The main reason is Gross profit margin ratio of CCI is above 20%.

Cost of Site Rental (2021) \ SGA (2021)	215.13	300	400	500	602	700	800	900
	900	216.97	216.77	216.56	216.35	216.15	215.95	215.74
	1100	216.56	216.36	216.15	215.94	215.74	215.54	215.34
	1300	216.15	215.95	215.74	215.54	215.34	215.13	214.93
	1500	215.74	215.54	215.34	215.13	214.93	214.72	214.52
	1700	215.34	215.13	214.93	214.72	214.52	214.31	214.11
	1900	214.93	214.72	214.52	214.31	214.11	213.90	213.70
	2100	214.52	214.31	214.11	213.90	213.70	213.50	213.29

WACC vs long-term debt (%)

The analysis of how WACC and long-term debt (%) affect implied stock price representation volatility of a stock to the Debt. The data show that the implied price of CCI inversely reacts to the variation of WACC and Long-Term Debt (%). We believe that this is rooted in our valuation method`s formula. Long-term Debt and WACC have a proportional relationship and WACC have a reverse relationship with the intrinsic value of EP and DCF.

Long-Term Debt (%) \ WACC	215.13	4.7%	4.8%	4.9%	5.0%	5.1%	5.2%	5.3%
	45.0%	247.6	239.3	231.6	224.3	217.5	211.0	204.8
	46.0%	246.4	238.2	230.5	223.2	216.3	209.8	203.7
	47.0%	245.2	237.0	229.3	222.0	215.2	208.7	202.5
	48.0%	244.0	235.8	228.1	220.9	214.0	207.5	201.4
	49.0%	242.8	234.6	226.9	219.7	212.9	206.4	200.3
	50.0%	241.6	233.4	225.8	218.5	211.7	205.3	199.2
	51.0%	240.4	232.3	224.6	217.4	210.6	204.1	198.0

Cost of equity vs growth rate of revenue

Cost of equity and growth rate of revenue is essential to point for our valuation. Increasing of revenue means that our NOPAT is likely to be increased but increasing of NOPLAT means that cost of equity will
Be higher. This is because investing is necessary to produce a high growth rate of revenue. Due to these reasons, we decided to do a sensitivity analysis between the cost of equity and the growth rate of revenue. Throughout the analysis, we find out that the cost of equity and growth rate of revenue has a proportional relationship with the implied stock price.

Growth Rate of Revenue (2021) \ Cost of Equity	215.13	-10.00%	-5.00%	0.00%	5.70%	10.70%	15.70%	20.70%
	-6%	145.1	151.3	157.5	164.4	170.3	176.2	182.1
	0%	160.0	166.9	173.6	181.2	187.8	194.3	200.8
	6%	174.9	182.4	189.8	198.1	205.3	212.4	219.5
	12%	189.8	198.0	206.0	215.0	222.8	230.5	238.2
	18%	204.7	213.5	222.2	231.9	240.3	248.6	256.9
	24%	219.6	229.0	238.3	248.8	257.8	266.7	275.6
	30%	234.5	244.6	254.5	265.6	275.3	284.8	294.3

CV NOPLAT vs Revenue of Site Rental

Revenue of site rental is the primary business of CCI. In addition, CV growth of No plat is the significant variable that affects our implied stock price. Both variables affect significantly the company`s future standpoint which implies that implied stock price also be fluctuated a lot by both variables. Thus, we conduct the sensitivity analysis and we find out that the CV growth of NOPLAT and Revenue of Site rental has a positive relationship with the implied stock price. Based on the analysis table, we want to highlight one fact that when CV growth of NOPLAT and Revenue of site rental exceed the specific hurdle rate, the implied stock price fluctuates a lot. We believe that this phenomenon is rooted in the variables that affect to revenue of site rental and CV growth of NOPLAT: inflation rate, Cost of goods sold. If CCI is expected to exceed the hurdle rate, we should consider selling the CCI.

Revenue of site rental (2021) \ CV Growth of NOPLAT	215.13	-4.00%	-2.00%	0.00%	2.00%	4.00%	6.00%	8.00%
	0	-40.7	-51.6	-71.2	-116.2	-328.8	376.5	117.8
	2000	16.9	14.8	11.1	2.6	-37.7	96.0	47.0
	4000	74.6	81.3	93.5	121.4	253.4	-184.5	-23.8
	6000	132.2	147.8	175.8	240.2	544.4	-464.9	-94.7
	8000	189.8	214.3	258.1	359.0	835.5	-745.4	-165.5
	10000	247.5	280.8	340.5	477.7	1126.5	-1025.9	-236.3
	12000	305.1	347.3	422.8	596.5	1417.6	-1306.4	-307.1

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This report was created by students enrolled in the Security Analysis (6F:112) class at the University of Iowa. The report was originally created to offer an internal investment recommendation for the University of Iowa Krause Fund and its advisory board. The report also provides potential employers and other interested parties an example of the students' skills, knowledge and abilities. Members of the Krause Fund are not registered investment advisors, brokers or officially licensed financial professionals. The investment advice contained in this report does not represent an offer or solicitation to buy or sell any of the securities mentioned. Unless otherwise noted, facts and figures included in this report are from publicly available sources. This report is not a complete compilation of data, and its accuracy is not guaranteed. From time to time, the University of Iowa, its faculty, staff, students, or the Krause Fund may hold a financial interest in the companies mentioned in this report.

Crown Castle International

Revenue Decomposition

Site rental

Fiscal Years Ending Dec. 31	2018	2019	2020	2021E	2022E	2022E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Revenue	5370	5763	5840	6460.0	6861.1	7347.8	7872.8	8451.1	8701.9	8974.6	9257.6	9551.0	9856.1
Site Rental	4796	5093	5320	5958.4	6375.5	6885.5	7436.4	8031.3	8312.4	8603.3	8904.4	9216.1	9538.6
Growth Rate	30.72%	6.19%	4.46%	12.00%	7.00%	8.00%	8.00%	8.00%	3.50%	3.50%	3.50%	3.50%	3.50%
Service and other	574	670	520	502	486	462	436	420	390	371	353	335	317
Growth Rate	-16.33%	16.72%	-22.39%	-3.53%	-3.19%	-4.81%	-5.59%	-3.80%	-7.22%	-4.69%	-4.88%	-5.16%	-5.22%
Percentage of site rental Revenue by each business lines													
Towers	0.66	0.67	0.66	0.60	0.55	0.50	0.49	0.48	0.46	0.45	0.42	0.41	0.40
Fibers	0.34	0.33	0.34	0.40	0.45	0.50	0.51	0.52	0.54	0.55	0.58	0.59	0.60
Revenue of each buisness lines													
Towers	3165.4	3412.3	3511.2	3575.0	3506.5	3442.8	3643.8	3855.0	3823.7	3871.5	3739.9	3778.6	3815.5
Growth prior to last year	9.21%	7.80%	2.90%	4.00%	4.14%	3.53%	5.26%	4.61%	4.07%	4.27%	4.32%	4.34%	4.32%
Fibers	1630.6	1680.7	1808.8	2383.4	2869.0	3442.8	3792.5	4176.3	4488.7	4731.8	5164.6	5437.5	5723.2
Growth prior to last year	111.64%	3.07%	7.62%	20.00%	10.23%	5.35%	9.25%	9.25%	9.25%	7.24%	8.43%	8.13%	7.93%
Communication infrastructure													
Number of Tower	40000	40000	40,000	40058	40066	40075	40086	40099	40113	40129	40147	40160	40173
Growth prior to last year	0.00%	0.00%	0.00%	0.14%	0.02%	0.02%	0.03%	0.03%	0.04%	0.04%	0.05%	0.03%	0.03%
Miles of Fibers	65000	80000	80,000	111565	131331	157679	188125	233531	280952	339820	411781	500902	606190
Growth prior to last year	8.33%	23.08%	0.00%	39.46%	17.72%	20.06%	19.31%	24.14%	20.31%	20.95%	21.18%	21.64%	21.02%
Revenue Per Towers	$0.079	$0.085	$0.088	$0.089	$0.088	$0.086	$0.091	$0.096	$0.095	$0.096	$0.093	$0.094	$0.095
Growth prior to last year	9.21%	7.80%	2.90%	6.35%	5.48%	5.60%	6.22%	5.73%	5.38%	5.79%	5.70%	5.74%	5.76%
Revenue Per miles	$0.025	$0.021	$0.023	$0.021	$0.022	$0.022	$0.020	$0.018	$0.016	$0.014	$0.013	$0.011	$0.009
Growth prior to last year	95.36%	-16.26%	7.62%	10.41%	16.97%	22.82%	8.31%	13.23%	14.35%	15.14%	14.77%	13.16%	14.13%
Revenue per Tenants													
% of total revenue by the major tenants	73%	75%	76%	74%	73%	72%	71%	70%	68%	67%	66%	65%	63%
Sprint	671.44	713.02	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
% of Total	14%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Verizon	863.3	916.7	1010.8	1041.1	1072.4	1104.5	1137.7	1171.8	1206.9	1243.2	1280.5	1318.9	1358.4
% of Total	18%	18%	19.00%	18.38%	17.94%	17.51%	17.07%	16.63%	16.19%	15.75%	15.31%	14.87%	14.43%
AT&T	1055.1	1120.5	1170.4	1205.5	1241.7	1278.9	1317.3	1356.8	1397.5	1439.4	1482.6	1527.1	1572.9
% of Total	22%	22%	22.00%	21.28%	20.78%	20.27%	19.76%	19.25%	18.74%	18.23%	17.72%	17.22%	16.71%
T-Mobile	911.2	1069.5	1862.0	1955.1	2052.9	2155.5	2263.3	2376.4	2495.3	2620.0	2751.0	2888.6	3033.0
% of Total	19%	21%	35.00%	34.51%	34.35%	34.16%	33.96%	33.72%	33.47%	33.19%	32.89%	32.56%	32.22%
All of others	1294.9	1273.3	1330.0	1463.0	1609.3	1770.2	1947.3	2142.0	2356.2	2591.8	2851.0	3136.1	3449.7
% of Total	27%	25%	25.00%	25.83%	26.93%	28.06%	29.21%	30.40%	31.60%	32.83%	34.08%	35.35%	36.64%

Crown Castle International

Income Statement

Fiscal Years Ending Dec. 31	2018	2019	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Site rental	4796	5093	5320	5958	6375	6886	7436	8031	8312	8603	8904	9216	9539
Service and other	574	670	520	502	486	462	436	420	390	371	353	335	317
Net revenue	5370	5763	5840	6460	6861	7348	7873	8451	8702	8975	9258	9551	9856
Operating expenses													
Costs of operation													
Site rental	1410	1462	1521	1500.1	1614.7	1765.7	1919.2	2074.5	2143.0	2215.4	2288.3	2363.3	2448.6
Service and other	434	524	448	362.2	387.8	407.7	416.4	417.5	423.5	424.1	424.5	423.6	413.5
Selling, general and administrative	563	614	678	602.4	645.4	696.3	758.6	831.2	867.5	899.3	929.6	954.8	978.9
Asset write-down charges	26	19	74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acquistion and integration costs	27	13	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Depreciation, amortization and accretion	1527	1572	1608	1731.8	1682.5	1661.6	1643.2	1626.8	1612.3	1599.5	1588.1	1578.1	1569.2
Total operating expenses	3987	4204	4339	4197	4330	4531	4737	4950	5046	5138	5231	5320	5410
Other operating(income) expense (see note 15)	----	----	(362)	---	---	---	---	---	---	---	---	---	---
Operating Income (loss)	1383	1559	1863	2263.5	2530.7	2816.5	3135.5	3501.2	3655.6	3836.3	4027.0	4231.3	4445.9
Interest expense and amortization of deferred financing costs	-642	-683	-689	-567	-565	-565	-565	-564	-564	-564	-565	-566	-525
Gain (losses) on retirement of long-term obligations	-106	-2	-95	0	0	0	0	0	0	0	0	0	0
Interest income	5	6	2	7	2	18	42	20	28	32	35	36	50
Other income (expense)	1	1	-5	0	0	0	0	0	0	0	0	0	0
Income (loss) before income taxes	641	881	1076	1703.3	1967.0	2270.2	2612.7	2957.1	3120.4	3304.8	3497.4	3701.1	3971.2
Benefit (provision) for income taxes	-19	-21	-20	-68.9	-79.6	-91.8	-105.7	-119.6	-126.2	-133.7	-141.5	-149.7	-160.7
Net income (loss) attributable to CCIC stockholders	622	860	1056	1634.4	1887.4	2178.4	2507.0	2837.5	2994.1	3171.1	3355.9	3551.3	3810.6
Dividends/distributions on preferred stock	-113	-113	-57	-72	-76	-89	-103	-111	-115	-124	-128	-125	-122
Net income (loss) attributable to CCIC common stockholders	509	747	999	1562.6	1811.0	2088.9	2404.4	2726.4	2878.8	3047.6	3228.1	3426.4	3688.1
Dividend Per Share	4.28	4.58	4.93	3.62	4.17	4.81	5.54	6.27	6.62	7.01	7.42	7.86	8.43
Total Shares Outstanding	413	416	423	423.81	424.62	424.84	424.66	424.49	424.32	424.16	424.00	423.84	423.69
Average Common Shares Outstanding	397	415	420	423	424	425	425	425	424	424	424	424	424
Net income (loss) attributable to CCIC common stockholders, per common share:	1.35	1.8	2.36	3.86	4.45	5.13	5.90	6.68	7.05	7.47	7.91	8.38	8.99

Crown Castle International

Balance Sheet

Fiscal Years Ending Dec. 31	2018	2019	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Assets													
Current Assets:													
Cash & cash equivalents	277	196	232	53	610	1411	677	945	1068	1165	1200	1668	666
Restricted cash	131	137	144	148	153	157	162	167	172	177	182	188	194
Receivables, net	501	596	431	591	628	672	720	773	796	821	847	874	902
Prepaid expenses	172	107	95	271	280	290	321	341	350	363	374	386	398
Deferred income tax assets	-	-	-										
Other current assets	148	168	202	235	220	235	251	276	289	296	301	311	322
Total current assets	1229	1204	1104	1299	1891	2766	2132	2503	2676	2824	2905	3427	2482
Deferred site rental receivables, net	1366	1424	1408	1999	2125	2242	2362	2500	2521	2559	2627	2738	2865
Gross PPE	22242	24334	25965	27265	28765	30265	31765	33265	34765	36265	37765	39265	40765
Accumulated depreciation	8566	9668	10803	12535	14217	15879	17522	19149	20761	22361	23949	25527	27096
Property & equipment, net	13676	14666	15162	14730	14548	14386	14243	14116	14004	13904	13816	13738	13669
Operating lease right of use	0	6133	6464	6280	6202	6133	6072	6018	5970	5928	5890	5857	5827
Goodwill	10078	10078	10078	10078	10078	10078	10078	10078	10078	10078	10078	10078	10078
Site rental contracts & customer relationships, net	5209	4764	4365	4241	4188	4142	4100	4064	4032	4003	3978	3955	3935
Other intangible assets, net	307	72	68	75	82	90	98	108	118	130	143	156	172
Deferred income tax assets	-	-	-										
Long-term prepaid rent, deferred financing costs & other assets, net	920	116	119	143	171	198	230	265	304	347	394	446	512
Total assets	**32785**	**38457**	**38768**	38844	39285	40035	39316	39653	39703	39772	39830	40396	39540
Liabilities And Equity													
Current liabilities:													
Accounts payable	313	334	230	298	338	363	390	422	439	455	464	471	477
Accrued interest	148	169	199	189	200	215	230	247	254	262	270	279	288
Deferred revenues	498	657	704	628	638	637	646	649	657	665	663	670	663
Other accrued liabilites	351	361	378	391	397	400	401	405	411	415	407	405	405
Current maturities of debt & other obligations	107	100	129	415	154	3608	2941	525					
Current portion of operating lease liabilties	0	299	329	332	351	377	403	433	446	460	474	489	505
Total current liabilities	1417	1920	1969	2253	2078	5599	5010	2681	2207	2257	2278	2314	2338
Total debt & other obligations	16682	18121	19280	18905	18844	18820	18836	18813	18786	18787	18819	18874	17492
Less: current maturities & short-term debt & other current obligations	107	100	129	415	154	3608	2941	525					
Debt & other long-term obligations	16575	18021	19151	18490	18690	15212	15895	18288					
Operating lease liabilities	-	5511	5808	6011	6165	6602	5511	5493	5221	4936	4629	4776	4928
Deferred income tax liabilities	-	-	-										
Below-market tenant lease, deferred ground lease payable & other liabilities	-	-	-										
Other long-term liabilites	2759	2516	2379	2438	2499	2562	2626	2692	2759	2828	2899	2971	3045
Total liabilities	20751	27968	29307	29193	29432	29976	29042	29154	28973	28808	28625	28934	27803
Redeemable preferred stock	0	0	0										
Common stock & Additional paid-in capital	17771	17859	17937	18098	18259	18419	18580	18741	18902	19062	19223	19384	19545
Accumulated other comprehensive income (loss)	-5	-5	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
Total Crown Castle International Corp. stockholders' equity (deficit)	12034	10489	9461	9622	9783	9847	9847	9847	9847	9847	9847	9847	9847
Retained Earnings	-5732	-7365	-8472	-8442	-8402	-8356	-8303	-8238	-8167	-8094	-8014	-7918	-7804
Noncontrolling interest from discontinued operations	0	0	0	0	0	0	0	0	0	0	0	0	0
Total equity	**12034**	**10489**	**9461**	**9651**	**9853**	**10059**	**10273**	**10499**	**10730**	**10964**	**11206**	**11462**	**11737**
Total Liabilities and equity	32785	38457	38768	38844	39285	40035	39316	39653	39703	39772	39830	40396	39540

Crown Castle International

Historical Cash Flow Statement

Fiscal Years Ending Dec. 31	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash Flow										
Cash From Operating Activities										
Net Income - CF	171.46	200.9	93.9	346.3	525.3	357	445	622	860	1,056.00
Depreciation And Amortization - CF	552.95	622.6	774.2	985.8	1,036.20	1,108.60	1,242.00	1,527.00	1,572.00	1,608.00
Deferred Income Taxes - CF	4.626	-110.4	180.3	-21.9	-60.6	8.6	15	2	2	3
Write-Downs	22.285	15.5	14.9	14.2	33.5	34.5	17	26	19	74
Stock Based Compensation	32.61	41.9	39	51.5	60.8	79.3	92	103	117	138
Discontinued Operations (Operating)	—	—	—	65.9	—	0	—	—	—	—
Other Non-Cash Items	102.943	132.6	40.1	84.9	-59.2	57.4	2	108	0	100
Change in Accounts Payable	-7.497	34.5	28.7	12.3	-5.3	10.6	-34	37	19	-77
Change in Accounts Receivable	-17.407	-98.6	-60.2	-77.1	12.7	-58.7	61	-105	-96	166
Change in Prepaid Expenses	-242.446	-261.1	-227.9	-209.5	-112.2	-55.3	-16	—	—	—
Change in Accrued Expenses	0.201	—	—	1.4	0	30	35	16	21	31
Change in Deferred/Unearned Revenue -ST	19.606	98.7	242.5	397.4	325.9	196	175	271	—	—
Change in Other Assets	—	—	—	—	—	—	—	-114	-71	15
Change In Other Liabilites	4.119	—	—	—	—	—	—	—	254	-65
Total Cash Flows From Operations	643.45	772.6	1,237.70	1,666.10	1,796.70	1,782.30	2,043.00	2,500.00	2,698.00	3,055.00
Accrued Interest	—	-13.5	13	—	—	—	—	—	—	—
Amortization Of Financing Costs - CF	—	109.4	99.2	80.9	37.1	14.3	9	7	1	6
Cash From Investing Activities										
Capital Expenditures	-347.942	-441.4	-567.8	-758.5	-908.9	-873.9	-1,228.00	-1,739.00	-2,057.00	-1,624.00
Acquisition of Business	-37.551	-3,759.50	-4,960.40	-461.7	-1,102.20	-556.9	-9,260.00	-42	-17	-107
Other Investing Activities	-14.372	1.3	7.3	-22.7	51.3	20.5	-5	-12	-7	-10
Discontinued Operations (Investing)	—	—	—	-26.2	—	113.2	—	—	—	—
Total Cash Flows From Investing	**-399.865**	**-4,199.60**	**-5,521.00**	**-1,242.90**	**-856.2**	**-1,297.10**	**-10,493.00**	**-1,793.00**	**-2,081.00**	**-1,741.00**
Cash from Financing Activities										
Dividends Paid	-19.487	0	0	-624.3	-1,116.40	-1,239.20	-1,509.00	-1,782.00	-1,912.00	-2,105.00
Increase In Long-Term Borrowings	283	5,250.00	1,618.40	845.8	1,000.00	5,201.00	3,093.00	2,742.00	1,894.00	3,733.00
Decrease In Long-Term Borrowings	-189	-2,059.50	-864.3	-953.3	-1,172.20	-4,140.60	-119	-2,451.00	-98	-2,595.00
Increase (Decrease) Long-Term Borrowings - Net	—	—	—	—	—	—	—	—	155	130
Issuance of Common Stock	1.557	0.3	2,980.60	0	0	1,325.90	4,221.00	841	—	—
Repurchase of Common Stock	-303.414	—	—	-21.9	-29.7	-24.9	-23	-34	-44	-76
Effect of Exchange Rates On Cash		1.5	2.2	-8	-1.9	-0.1	1	-1	0	0
Debt Financing/Issuance Costs	-35.345	-78.6	-30	-15.9	-19.6	-41.5	-29	-31	-24	-38
Other Financing Activities	—	-36	-99.5	—	—	—	—	—	—	—
Cash Paid For Taxes	—	3.4	15.6	—	—	—	—	—	—	19
Cash Paid For Interest	—	504.5	477.4	—	—	—	—	—	—	653
Inc/Dec Restricted Cash	1.979	-288.8	386	30	16.5	-7.9	—	—	—	—
Net Change In Cash	—	361.2	-218	-39.8	-1,101.20	388.9	-258	-26	-75	43
Preferred Dividends Paid	—	-2.5	0	-44.4	-44	-44	-30	-113	-113	-85
Cash and Cash Equivalents (End of Period)	—	441.4	223.4	175.6	178.8	567.6	440	413	338	381
Cash and Cash Equivalents (Beg of Period)	—	80.1	441.4	223.4	175.6	178.8	697	440	413	338
Increase In Preferred Stock	-15.002	0	950.9	—	—	—	1,608.00	—	—	—
Increase In Line of Credit (Unsecured)	—	1,253.00	976	1,019.00	1,790.00	3,440.00	2,820.00	1,820.00	2,110.00	2,430.00
Decrease In Line of Credit (Unsecured)	—	-251	-1,855.00	-698	-1,360.00	-4,565.00	-1,840.00	-1,725.00	-2,660.00	-2,665.00
Total Cash Flows From Financing	**-275.712**	**3,786.80**	**4,063.10**	**-463**	**-935.5**	**-96.3**	**8,192.00**	**-733**	**-692**	**-1,271.00**
Reference Items										
Cash Paid For Taxes	—	—	—	18.8	28.8	13.8	16	17	16	19
Funds From Operations	651.3	—	866	1,288.10	1,533.10	1,429.50	1,643.00	2,009.00	2,284.00	2,600.00
Cash Paid For Interest	—	—	—	491.1	490	470.7	547	619	661	653
FFO Per Share	—	—	2.89	3.87	4.59	4.19	4.29	4.84	5.47	6.12
FFO Per Share Diluted	—	—	2.89	3.87	4.59	4.19	4.29	4.84	5.47	6.12
Funds Available For Distribution	641.5	—	1,097.30	1,324.10	1,436.60	1,609.90	1,860.00	2,228.00	2,371.00	2,878.00
FAD Per Share	2.24	—	3.67	3.97	4.3	4.72	4.85	5.37	5.68	6.78
FAD Per Share Diluted	2.24	—	3.67	3.97	4.3	4.72	4.85	5.37	5.68	6.78
FFO Net Income	145.1	—	93.9	346.3	525.3	357	445	625	860	1,056.00
FFO Non-Controlling/Minority Interests	0.3	—	-3.9	—	—	—	—	—	—	—
FFO Preferred Dividends	-19.5	—	0	-44	-44	-44	-30	-113	-112	-85
FFO Depr & Amort-Consolidated Properties	503.4	—	761.1	971.6	1,018.30	1,082.10	1,211.00	1,472.00	1,517.00	1,555.00
FFO Basic Shares for FFO Calculation	285.9	—	299.3	333.3	334.1	340.9	382	415	416	423
FFO Diluted Shares for FFO Calculation	285.9	—	299.3	333.3	334.1	340.9	383	415	418	425

Crown Castle International

Forecasted Cash Flow Statement

Fiscal Years Ending Dec. 31	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Net Income	1563	1811	2089	2404	2726	2879	3048	3228	3426	3688
Operating Activities										
Depreciation and Amortization	1732	1682	1662	1643	1627	1612	1600	1588	1578	1569
Restricted Cash	-4	-4	-5	-5	-5	-5	-5	-5	-5	-6
Receivables, net	-160	-37	-45	-48	-53	-23	-25	-26	-27	-28
Prepaid expenses,deferred site rental receivables and other current assets,net	-800	-122	-141	-167	-183	-43	-58	-83	-133	-150
Long-term prepaid rent and other assets,net	-31	-35	-36	-40	-45	-50	-54	-60	-66	-81
Account Payable	68	39	25	27	32	18	16	8	7	6
Accrued Interest	-10	12	14	15	17	7	8	8	9	9
Deferred Revenues	-76	10	0	8	4	8	8	-1	6	-7
Other long-term Liabilites	13	6	3	1	5	5	5	-9	-2	0
Net cash provided from operating activites	**2295**	**3363**	**3566**	**3839**	**4125**	**4409**	**4541**	**4649**	**4793**	**5001**
Investing Activites										
Capital expenditure	-1300	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500
Operating lease right of use assets	184	78	69	61	54	48	42	38	33	29
Other intangible assets, net	124	53	47	41	37	32	29	25	22	20
Current portion of operating lease liabilities	3	19	26	26	30	13	14	14	15	16
operating lease liabilites	203	154	437	-1091	-18	-272	-285	-307	147	153
long-term liabilities	59	61	62	64	66	67	69	71	72	74
Net cash provided from investing activites	**-726**	**-1136**	**-859**	**-2399**	**-1332**	**-1612**	**-1631**	**-1659**	**-1210**	**-1208**
Financing Activites										
Debt and other long-term obligation	-375	-61	-24	16	-24	-27	1	32	55	-1382
Dividend distribution	-1533	-1770	-2043	-2351	-2661	-2808	-2974	-3148	-3331	-3574
common stock issuance	161	161	161	161	161	161	161	161	161	161
Net cash provided from financing activites	-1748	-1670	-1906	-2174	-2524	-2675	-2812	-2955	-3115	-4795
Reconciled cash balance	-179	556	801	-734	269	122	98	35	468	-1002
Beg cash balance	232	53	610	1411	677	945	1068	1165	1200	1668
End cash balance	53	610	1411	677	945	1068	1165	1200	1668	666

Crown Castle International

Common Size Income Statement

Fiscal Years Ending Dec. 31	2018	2019	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Net revenue													
Site rental	89.3%	88.4%	91.1%	**92.2%**	**92.9%**	**93.7%**	**94.5%**	**95.0%**	**95.5%**	**95.9%**	**96.2%**	**96.5%**	**96.8%**
Service and other	10.69%	11.63%	8.90%	**7.77%**	**7.08%**	**6.29%**	**5.54%**	**4.97%**	**4.48%**	**4.14%**	**3.81%**	**3.51%**	**3.22%**
Net revenue	100.00%	100.00%	100.00%	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Operating expenses													
Costs of operation													
Site rental	26.26%	25.37%	26.04%	**25.18%**	**25.33%**	**25.64%**	**25.81%**	**25.83%**	**25.78%**	**25.75%**	**25.70%**	**25.64%**	**25.67%**
Service and other	8.08%	9.09%	7.67%	**8.95%**	**9.32%**	**9.48%**	**9.36%**	**9.20%**	**9.14%**	**8.99%**	**8.93%**	**9.01%**	**9.01%**
Selling, general and administrative	10.48%	10.65%	11.61%	**9.33%**	**9.41%**	**9.48%**	**9.64%**	**9.83%**	**9.97%**	**10.02%**	**10.04%**	**10.00%**	**9.93%**
Asset write-down charges	0.48%	0.33%	1.27%	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Acquistion and integration costs	0.50%	0.23%	0.17%	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Depreciation, amortization and accretion	28.44%	27.28%	27.53%	**26.81%**	**24.52%**	**22.61%**	**20.87%**	**19.25%**	**18.53%**	**17.82%**	**17.15%**	**16.52%**	**15.92%**
Total operating expenses	74.25%	72.95%	74.30%	**64.96%**	**63.12%**	**61.67%**	**60.17%**	**58.57%**	**57.99%**	**57.25%**	**56.50%**	**55.70%**	**54.89%**
Other opertating(income) expenese(see not 15)	-	-	6.20%										
Operating Incom(loss)	25.75%	27.05%	31.90%	**35.04%**	**36.88%**	**38.33%**	**39.83%**	**41.43%**	**42.01%**	**42.75%**	**43.50%**	**44.30%**	**45.11%**
Interest expense and amortization of deferred finnacing costs	-11.96%	-11.85%	-11.80%	-8.78%	-8.24%	-7.68%	-7.18%	-6.68%	-6.48%	-6.28%	-6.10%	-5.93%	-5.32%
Gain (losses) on retirement of long-term obligations	-1.97%	-0.03%	-1.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Interest income	0.09%	0.10%	0.03%	0.11%	0.02%	0.25%	0.54%	0.24%	0.33%	0.36%	0.38%	0.38%	0.51%
Other income (expense)	0.02%	0.02%	-0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Income (loss) before income taxes	11.94%	15.29%	18.42%	26.37%	28.67%	30.90%	33.19%	34.99%	35.86%	36.82%	37.78%	38.75%	40.29%
Benefit (provision) for income taxes	-0.35%	-0.36%	-0.34%	-1.07%	-1.16%	-1.25%	-1.34%	-1.42%	-1.45%	-1.49%	-1.53%	-1.57%	-1.63%
Net income (loss) attributable to CCIC stockholders	11.58%	14.92%	18.08%	25.30%	27.51%	29.65%	31.84%	33.57%	34.41%	35.33%	36.25%	37.18%	38.66%
Dividends/distributions on preferred stock	-2.10%	-1.96%	-0.98%	-1.11%	-1.11%	-1.22%	-1.30%	-1.31%	-1.33%	-1.38%	-1.38%	-1.31%	-1.24%
Net income (loss) attributable to CCIC common stockholders	9.48%	12.96%	17.11%	24.19%	26.39%	28.43%	30.54%	32.26%	33.08%	33.96%	34.87%	35.87%	37.42%

Crown Castle International

Common Size Balance Sheet

Fiscal Years Ending Dec. 31	2018	2019	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Assets													
Current Assets:													
Cash & cash equivalents	5.16%	3.40%	3.97%	0.83%	8.89%	19.20%	8.60%	11.19%	12.27%	57.35%	59.08%	82.10%	32.78%
Restricted cash	2.44%	2.38%	2.47%	2.30%	2.23%	2.14%	2.06%	1.98%	1.98%	1.97%	1.97%	1.97%	1.96%
Receivables, net	9.33%	10.34%	7.38%	9.15%	9.15%	9.15%	9.15%	9.15%	9.15%	9.15%	9.15%	9.15%	9.15%
Prepaid expenses	3.20%	1.86%	1.63%	4.20%	4.09%	3.95%	4.08%	4.04%	4.02%	4.05%	4.04%	4.04%	4.04%
Deferred income tax assets													
Other current assets	2.76%	2.92%	3.46%	3.63%	3.21%	3.19%	3.19%	3.27%	3.33%	3.30%	3.25%	3.26%	3.27%
Total current assets	22.89%	20.89%	18.90%	20.10%	27.56%	37.64%	27.08%	29.62%	30.75%	31.46%	31.38%	35.88%	25.18%
Deferred site rental receivables, net	25.44%	24.71%	24.11%	30.94%	30.98%	30.52%	30.00%	29.58%	28.97%	28.51%	28.38%	28.67%	29.07%
Gross PPE	414.19%	422.25%	444.61%	422.06%	419.25%	411.89%	403.48%	393.62%	399.51%	404.08%	407.94%	411.11%	413.60%
Accumulated depreciation	159.52%	167.76%	184.98%	194.04%	207.22%	216.10%	222.56%	226.58%	238.58%	249.16%	258.69%	267.27%	274.92%
Property & equipment, net	254.67%	254.49%	259.62%	228.02%	212.03%	195.79%	180.91%	167.03%	160.93%	154.93%	149.24%	143.84%	138.69%
Operating lease right of use	0.00%	106.42%	110.68%	97.21%	90.40%	83.47%	77.13%	71.21%	68.61%	66.05%	63.63%	61.32%	59.13%
Goodwill	187.67%	174.87%	172.57%	156.01%	146.89%	137.16%	128.01%	119.25%	115.81%	112.29%	108.86%	105.52%	102.25%
Site rental contracts & customer relationships, net	97.00%	82.67%	74.74%	65.64%	61.04%	56.37%	52.08%	48.09%	46.33%	44.60%	42.97%	41.41%	39.93%
Other intangible assets, net	5.72%	1.25%	1.16%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%
Deferred income tax assets													
Long-term prepaid rent, deferred financing costs & other assets, net	17.13%	2.01%	2.04%	20.42%	19.14%	16.15%	15.89%	15.38%	14.75%	14.12%	13.52%	13.22%	14.74%
Total assets	610.52%	667.31%	663.84%	601.30%	572.58%	544.86%	499.38%	469.20%	456.26%	443.17%	430.24%	422.95%	401.17%
Liabilities And Equity													
Current liabilities:													
Accounts payable	5.83%	5.80%	3.94%	4.62%	4.92%	4.94%	4.95%	4.99%	5.05%	5.07%	5.01%	4.93%	4.84%
Accrued interest	2.76%	2.93%	3.41%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%
Deferred revenues	9.27%	11.40%	12.05%	9.72%	9.87%	9.87%	9.99%	10.05%	10.17%	10.29%	10.27%	10.37%	10.27%
Other accrued liabilites	6.54%	6.26%	6.47%	6.06%	6.15%	6.19%	6.21%	6.28%	6.36%	6.43%	6.29%	6.27%	6.27%
Current maturities of debt & other obligations	1.99%	1.74%	2.21%	5.04%	5.39%	3.10%	3.07%	3.07%	3.08%	3.13%	3.18%	3.30%	0.00%
Current portion of operating lease liabilties	0.00%	5.19%	5.09%	5.14%	5.11%	5.13%	5.12%	5.12%	5.12%	5.12%	5.12%	5.12%	5.12%
Total current liabilities	26.39%	33.32%	33.72%	34.88%	30.28%	76.20%	63.64%	31.72%	25.36%	25.15%	24.61%	24.22%	23.72%
Total debt & other obligations	310.65%	314.44%	330.14%	349.40%	350.45%	337.82%	333.18%	334.18%	334.37%	336.57%	333.12%	335.37%	337.46%
Less: current maturities & short-term debt & other current obligations	1.99%	1.74%	2.21%	6.42%	2.24%	49.10%	37.36%	6.21%	0.00%	0.00%	0.00%	0.00%	0.00%
Debt & other long-term obligations	308.66%	312.70%	327.93%	344.10%	344.79%	334.35%	329.76%	330.73%	330.92%	333.24%	329.72%	331.82%	333.74%
Operating lease liabilities	89.86%	89.85%	99.45%	93.05%	89.85%	89.85%	89.85%	89.85%	89.85%	89.85%	89.85%	89.85%	89.85%
Deferred income tax liabilities	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Below-market tenant lease, deferred ground lease payable & other liabilities	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other long-term liabilites	51.38%	43.66%	40.74%	37.75%	36.43%	34.87%	33.35%	31.85%	31.70%	31.51%	31.31%	31.11%	30.90%
Total liabilities	386.42%	485.30%	501.83%	451.90%	428.97%	407.95%	368.90%	344.97%	332.95%	321.00%	309.20%	302.94%	282.09%
Redeemable preferred stock	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Common stock & Additional paid-in capital	330.93%	309.89%	307.14%	280.15%	266.12%	250.68%	236.00%	221.76%	217.21%	212.40%	207.65%	202.95%	198.30%
Accumulated other comprehensive income (loss)	-0.09%	-0.09%	-0.07%	-0.06%	-0.06%	-0.05%	-0.05%	-0.05%	-0.05%	-0.04%	-0.04%	-0.04%	-0.04%
Total Crown Castle International Corp. stockholders' equity (deficit)	224.10%	182.01%	162.00%	148.94%	142.58%	134.01%	125.07%	116.52%	113.16%	109.72%	106.37%	103.10%	99.91%
Noncontrolling interest from discontinued operations	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total equity	224.10%	182.01%	162.00%	149.40%	143.60%	136.90%	130.49%	124.23%	123.31%	122.17%	121.04%	120.01%	119.08%
Total Liabilities and equity	610.52%	667.31%	663.84%	601.30%	572.58%	544.86%	499.38%	469.20%	456.26%	443.17%	430.24%	422.95%	401.17%

Crown Castle International

Value Driver Estimation

Fiscal Years Ending Dec. 31	2018	2019	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
NOPLAT:													
Operating revenues	5370	5763	5840	6460	6861	7348	7873	8451	8702	8975	9258	9551	9856
Site rental	1410	1462	1521	1500	1615	1766	1919	2074	2143	2215	2288	2363	2449
Service and other	434	524	448	362	388	408	416	418	423	424	425	424	414
Selling, general and administrative	563	614	678	602	645	696	759	831	868	899	930	955	979
Asset write-down charges	26	19	74	0	0	0	0	0	0	0	0	0	0
Acquistion and integration costs	27	13	10	0	0	0	0	0	0	0	0	0	0
Depreciation, amortization and accretion	1527	1572	1608	1732	1682	1662	1643	1627	1612	1600	1588	1578	1569
Implied interest on Op leases	233.9	236.6	192.7	196	193	191	189	188	186	185	184	183	182
EBITA	1616.9	1795.6	1693.7	2459.3	2724.1	3007.8	3324.8	3688.9	3841.8	4021.2	4210.7	4413.9	4627.7
Federal Taxes	5.0	6.0	6.0										
Foreign Taxes	7.0	8.0	6.0										
State Taxes	5.0	5.0	5.0										
Pretax income	641.0	881.0	1076.0	**1703**	**1967**	**2270**	**2613**	**2957**	**3120**	**3305**	**3497**	**3701**	**3971**
Marginal Tax rate	2.65%	2.16%	1.58%	**4.05%**	**4.05%**	**4.05%**	**4.05%**	**4.05%**	**4.05%**	**4.05%**	**4.05%**	**4.05%**	**4.05%**
Provision for income taxes	19.0	21.0	20.0	69	80	92	106	120	126	134	141	150	161
Operating Lease interest	6.2	5.1	3.0	7.9	7.8	7.7	7.7	7.6	7.5	7.5	7.4	7.4	7.4
ADD Non-Oper Expenses													
Asset Write Down Charges	0.7	0.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acquisitions and integration Costs	0.7	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest Expense and Amortization of deferred financing costs	17.0	14.8	10.9	22.9	22.9	22.8	22.9	22.8	22.8	22.8	22.8	22.9	21.2
Losses on L-T Obligation	2.8	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Expense	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Less: Non-operating Income													
Other Income	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest Income	0.1	0.1	0.0	0.3	0.1	0.7	1.7	0.8	1.1	1.3	1.4	1.5	2.0
Total Adjusted Taxes	46.3	41.5	36.9	99.5	110.2	121.7	134.5	149.2	155.4	162.7	170.4	178.6	187.2
Change in Deferred Taxes	2.0	2.0	3.0	-									
NOPLAT	1572.6	1756.1	1659.8	2359.8	2613.9	2886.1	3190.3	3539.6	3686.3	3858.5	4040.3	4235.3	4440.4
Invested Capital (IC):													
Normal Cash	277	196	232	53	610	1411	677	945	1068	1165	1200	1668	666
AR	501	596	431	591	628	672	720	773	796	821	847	874	902
Prepaid Expenses	172	107	95	271	280	290	321	341	350	363	374	386	398
Other Opearting CA`s	148	168	202	235	220	235	251	276	289	296	301	311	322
OP current Asset	1098	1067	960	1150	1738	2608	1970	2336	2504	2646	2722	3239	2288
AP	313	334	230	298	338	363	390	422	439	455	464	471	477
Accured Expenses	499	530	577	580	598	614	631	652	665	677	677	684	693
Deferred Rev	498	657	704	628	638	637	646	649	657	665	663	670	663
OP CURRENT LIABILITIES	**1310**	**1521**	**1511**	**1506**	**1573**	**1614**	**1666**	**1723**	**1761**	**1798**	**1804**	**1824**	**1833**
OP WC	**-212**	**-454**	**-551**	**-356**	**165**	**994**	**304**	**613**	**742**	**849**	**918**	**1414**	**455**
Net PPE	**13,676**	**14,666**	**15,162**	**14,730**	**14,548**	**14,386**	**14,243**	**14,116**	**14,004**	**13,904**	**13,816**	**13,738**	**13,669**
Deferred site rental receivables	1366	1424	1408	1998.7269	2125.3829	2242.4702	2361.8731	2500.0311	2521.2881	2558.7261	2626.9312	2738.2557	2864.7532
Other ingtangibles, net	307	72	68	75	82	90	98	108	118	130	143	156	172
Present value of operating lease	0	6133	6464	6280	6202	6133	6072	6018	5970	5928	5890	5857	5827
Long term prepaid rent	920	116	119	143.30161	170.72269	198.30226	229.80308	265.13908	304.24333	347.20661	394.14719	446.25953	512.01634
Other long term operating assets	**2,593**	**7,745**	**8,059**	**8,497**	**8,580**	**8,664**	**8,762**	**8,891**	**8,914**	**8,964**	**9,054**	**9,198**	**9,376**
Other Long Term Operating Liabilities	-	-	-	-	-	-	-	-	-	-	-	-	-
Invested Capital (IC):	16977	22073	22789	23014	23464	24242	23539	23886	23965	24064	24182	24797	24012
Free Cash Flow (FCF):													
NOPLAT	1572.6	1756.1	1659.8	2359.8	2613.9	2886.1	3190.3	3539.6	3686.3	3858.5	4040.3	4235.3	4440.4
Change in IC	814.1	5096.0	716.0	225.1	449.8	777.9	-702.9	347.0	78.6	99.5	118.1	614.4	-784.8
FCF	**759**	**-3340**	**944**	**2135**	**2164**	**2108**	**3893**	**3193**	**3608**	**3759**	**3922**	**3621**	**5225**
Return on Invested Capital (ROIC):													
NOPLAT	1572.6	1756.1	1659.8	2359.8	2613.9	2886.1	3190.3	3539.6	3686.3	3858.5	4040.3	4235.3	4440.4
Beginning IC	16162.9	16977.0	22073.0	22789.0	23014.1	23463.9	24241.8	23538.9	23885.9	23964.5	24064.0	24182.2	24796.5
ROIC	**9.73%**	**10.34%**	**7.52%**	**10.36%**	**11.36%**	**12.30%**	**13.16%**	**15.04%**	**15.43%**	**16.10%**	**16.79%**	**17.51%**	**17.91%**
Economic Profit (EP):													
Beginning IC	16162.9	16977.0	22073.0	22789.0	23014.1	23463.9	24241.8	23538.9	23885.9	23964.5	24064.0	24182.2	24796.5
x (ROIC - WACC)	4.66%	5.27%	2.45%	5.28%	6.28%	7.23%	8.09%	9.96%	10.36%	11.03%	11.72%	12.44%	12.83%
EP	752.6	894.8	539.9	1203.6	1446.3	1695.7	1960.4	2345.3	2474.5	2642.7	2819.4	3008.4	3182.4
FFO													
Net Income	509	747	999	1563	1811	2089	2404	2726	2879	3048	3228	3426	3688
Depreciation & Amortization	1527	1572	1608	1732	1682	1662	1643	1627	1612	1600	1588	1578	1569
Losses on property Sales	0	0	0	0	0	0	0	0	0	0	0	0	0
less: Gains on sales of property	0	0	0	0	0	0	0	0	0	0	0	0	0
Less interest Income	5	6	2	6.96	2	18	42	20	28	32	35	36	50
FFO	2031	2313	2605	3287	3492	3732	4005	4333	4463	4615	4781	4968	5207
FFO/Per share	5.1	5.6	6.2	7.8	8.2	8.8	9.4	10.2	10.5	10.9	11.3	11.7	12.3

Crown Castle International

Weighted Average Cost of Capital (WACC) Estimation

Cost of Equity:		*ASSUMPTIONS:*
Risk-Free Rate	1.59%	*10-year Treasury bond*
Beta	0.85	*5-year weekly beta*
Equity Risk Premium	4.93%	*Damodaran's Equity Risk Premium*
Cost of Equity	**5.78%**	
Cost of Debt:		
Risk-Free Rate	1.59%	*10-yers treasury bond*
Implied Default Premium	1.66%	
Pre-Tax Cost of Debt	3.25%	*YTM on latest CCI 30Y Bond Issuance*
Marginal Tax Rate	4%	
After-Tax Cost of Debt	**3.12%**	

Market Value of Common Equity:		**MV Weights**
Total Shares Outstanding	423000000	
Current Stock Price	$187.00	
MV of Equity	**79,101,000,000.00**	73.44%
Market Value of Debt:		
Short-Term Debt	807000000	
Current Portion of LTD	129000000	
Long-Term Debt	27338000000	
PV of Operating Leases	329000000	
MV of Total Debt	**28,603,000,000.00**	26.56%
Market Value of the Firm	**107,704,000,000.00**	100.00%
	Estimated WACC	**5.07%**

Crown Castle International

Discounted Cash Flow (DCF) and Economic Profit (EP) Valuation Models

Key Inputs:

CV Growth of NOPLAT	1.50%
CV Year ROIC	17.91%
WACC	5.07%
Cost of Equity	5.78%

Fiscal Years Ending Dec. 31	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E CV
DCF Model:										
Free Cash Flow (FCF)	2134.8	2164.1	2108.2	3893.2	3192.6	3607.7	3759.0	3922.2	3621.0	5225.3
Continuing Value (CV)										113850
PV of FCF	2031.7	1960.2	1817.3	3194.0	2492.8	2680.8	2658.4	2639.9	2319.4	72927.7
Value of Operating Assets:	94722.2									
ADD: Non-Operating Adjustment										
Add: Restricted Cash	**148.3**									
Less PV of Operating lease	**-6464.0**									
Value of Equity	88406.5									
Shares Outstanding	419.5									
Intrinsic Value of Last FYE	$ 210.74									
Implied Price as of Today	$ 215.13									
EP Model:										
Economic Profit (EP)	1203.6	1446.3	1695.7	1960.4	2345.3	2474.5	2642.7	2819.4	3008.4	3182.4
Continuing Value (CV)										89053.6
PV of EP	1145.5	1310.0	1461.7	1608.3	1831.2	1838.7	1868.9	1897.6	1927.1	57044.1
Total PV of EP	71933.2									
Invested Capital (last FYE)	22789.0									
Value of Operating Assets:	94722.2									
Non-Operating Adjustments										
Add: Restricted Cash	**148.3**									
Less PV of Operating lease	**-6464.0**									
Value of Equity	88406.5									
Shares Outstanding	419.5									
Intrinsic Value of Last FYE	$ 210.74									
Implied Price as of Today	$ 215.13									

Crown Castle International

Dividend Discount Model (DDM) or Fundamental P/E Valuation Model

Fiscal Years Ending Dec. 31	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
EPS	$ 3.69	$ 4.27	$ 4.92	$ 5.66	$ 6.42	$ 6.78	$ 7.18	$ 7.61	$ 8.08	$ 8.70
Key Assumptions										
CV growth of EPS	2.00%									
CV Year ROE	32.18%									
Cost of Equity	5.78%									
Future Cash Flows										
P/E Multiple (CV Year)										24.8
EPS (CV Year)										$ 8.70
Future Stock Price										$ 215.93
Dividends Per Share	3.62	4.17	4.81	5.54	6.27	6.62	7.01	7.42	7.86	
Discounted Cash Flows	3.42	3.73	4.06	4.42	4.73	4.72	4.73	4.73	4.74	$ 130.22
Intrinsic Value as of Last FYE	$ 169.52									
Implied Price as of Today	$ 173.05									

Crown Castle International

Relative Valuation Models

Ticker	Company	Price	EPS 2021E	EPS 2022E	P/E 21	P/E 22	FFO/S 2021E	FFO/S 2021E	P/FFO	P/FFO
SBAC	SBA Communications	$347.90	$2.96	$3.87	117.53	89.90	10.58	11.50	32.88	30.25
AMT	American Tower	$282.54	$5.61	$5.47	50.36	51.65	9.57	10.36	29.52	27.27
UNIT	Uniti Group	$14.45	$0.52	$0.69	27.79	20.94	1.57	1.67	9.20	8.65
				Average	39.08	36.30	10.08	10.93	31.20	28.76
CCI	Crown Castle International	$187.00	$3.86	$4.45	48.4	42.0	8.4	9.0	22.24	20.69

Implied Relative Value:

P/E (EPS21)	**$ 150.84**
P/E (EPS22)	**$ 161.49**
P/FFO (FFO/S 2021)	**$ 262.33**
P/FFO (FFO/S 2022)	**$ 259.98**

Crown Castle International

Effects of ESOP Exercise and Share Repurchases on Common Stock Account and Number of Shares Outstanding

Number of Options Outstanding (shares):	2,400,000
Average Time to Maturity (years):	2.40
Expected Annual Number of Options Exercised:	1,000,000
Current Average Strike Price:	$ 160.78
Cost of Equity:	5.78%
Current Stock Price:	$187.00

Fiscal Years Ending Dec. 31	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Increase in Shares Outstanding:	1,000,000	1,000,000	400,000	0	0	0	0	0	0	0
Average Strike Price:	$ 160.78	$ 160.78	$ 160.78	$ 160.78	$ 160.78	$ 160.78	$ 160.78	$ 160.78	$ 160.78	$ 160.78
Increase in Common Stock Account:	**160,780,000**	**160,780,000**	**64,312,000**	-	-	-	-	-	-	-
Share Repurchases ($)	36,000,000	36,000,000	36,000,000	36,000,000	36,000,000	36,000,000	36,000,000	36,000,000	36,000,000	36,000,000
Expected Price of Repurchased Shares:	$ 187.00	$ 192.20	$ 197.54	$ 203.03	$ 208.68	$ 214.48	$ 220.44	$ 226.57	$ 232.87	$ 239.34
Number of Shares Repurchased:	**192,513**	**187,306**	**182,240**	**177,311**	**172,515**	**167,849**	**163,309**	**158,891**	**154,594**	**150,412**
Shares Outstanding (beginning of the year)	423,000,000	423,807,487	424,620,180	424,837,940	424,660,630	424,488,115	424,320,266	424,156,958	423,998,066	423,843,472
Plus: Shares Issued Through ESOP	1,000,000	1,000,000	400,000	0	0	0	0	0	0	0
Less: Shares Repurchased in Treasury	192,513	187,306	182,240	177,311	172,515	167,849	163,309	158,891	154,594	150,412
Shares Outstanding (end of the year)	**423,807,487**	**424,620,180**	**424,837,940**	**424,660,630**	**424,488,115**	**424,320,266**	**424,156,958**	**423,998,066**	**423,843,472**	**423,693,060**

Crown Castle International

Present Value of Operating Lease Obligations

Fiscal Years Ending Dec. 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Year 1	298.4	301.3	428.8	565.6	569.3	564.1	573.7	635.3	640	534	546
Year 2	302.9	305.3	430.3	573.1	574.7	571.3	577.6	632.8	631	528	543
Year 3	305.6	307.3	434.2	578.6	578.8	575.6	581.6	622.6	628	524	538
Year 4	306.2	308.8	437.7	582.2	580.2	579.4	579.2	618	623	520	532
Year 5	306.9	311.2	440.6	583.8	581	580.9	579.6	609.8	619	517	518
Thereafter	290	3907.9	5761.4	7546.1	8067.1	7669	7741.7	7941.2	8054	6357	5842
Total Minimum Payments	1810.0	5441.8	7933.0	10429.4	10951.1	10540.3	10633.4	11059.7	11195.0	8980.0	8519.0
Less: Cumulative Interest	278.3	1880.5	2797.5	3655.5	3974.7	3733.0	3781.1	3862.9	3914.5	3051.9	2763.0
PV of Minimum Payments	**1531.7**	**3561.3**	**5135.5**	**6773.9**	**6976.4**	**6807.3**	**6852.3**	**7196.8**	**7280.5**	**5928.1**	**5756**
Implied Interest in Year 1 Payment		**49.8**	**115.7**	**166.9**	**220.2**	**226.7**	**221.2**	**222.7**	**233.9**	**236.6**	**192.7**
Pre-Tax Cost of Debt	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%
Years Implied by Year 6 Payment	1.0	12.6	13.1	12.9	13.9	13.2	13.4	13.0	13.0	12.3	11.3
Expected Obligation in Year 6 & Beyond	290	311.2	440.6	583.8	581	580.9	579.6	609.8	619	517	518
Present Value of Lease Payments											
PV of Year 1	284.2	286.9	408.4	538.7	542.2	537.3	546.4	605.1	609.5	508.6	520
PV of Year 2	274.7	276.9	390.3	519.8	521.3	518.2	523.9	573.9	572.3	478.9	492.5
PV of Year 3	264	265.4	375.1	499.8	500	497.2	502.4	537.8	542.5	452.7	464.7
PV of Year 4	251.9	254.1	360.1	479	477.4	476.7	476.5	508.4	512.5	427.8	437.7
PV of Year 5	240.5	243.9	345.2	457.4	455.2	455.1	454.1	477.8	485	405.1	405.9
PV of 6 & beyond	216.4	2234.1	3256.4	4279.2	4480.3	4322.8	4349	4493.8	4558.7	3655	3435.2
Capitalized PV of Payments	1531.7	3561.3	5135.5	6773.9	6976.4	6807.3	6852.3	7196.8	7280.5	5928.1	5756

Crown Castle International

Key Management Ratios

Fiscal Years Ending Dec. 31	2018	2019	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Liquidity Ratios:													
Current Ratio (Current Assets/Current Liabilities)	0.867	0.627	0.561	0.576	0.910	0.494	0.426	0.934	1.212	1.251	1.275	1.481	1.061
Quick Ratio (Current Assets - (Inventories + Prepayments) / Current Liabilities)	0.742	0.729	0.743	0.650	0.631	0.617	0.602	0.586	0.580	0.573	0.565	0.557	0.549
Cash Ratio ((Cash + Marketable Securities)/ Current Liabilities)	0.195	0.102	0.118	0.024	0.293	0.252	0.135	0.353	0.484	0.516	0.527	0.721	0.285
Net Working Capital Ratio (Net Working Capital / Total Assets)	-0.006	-0.019	-0.022	-0.025	-0.005	-0.071	-0.073	-0.004	0.012	0.014	0.016	0.028	0.004
Asset-Management Ratios:													
Asset Turnover (Net Sales / Average Total Assets)	0.165	0.162	0.151	0.166	0.176	0.185	0.198	0.214	0.219	0.226	0.233	0.238	0.247
Operating Ratio (COGS + Operating Expense / Total Revenue)	0.742	0.729	0.743	0.650	0.631	0.617	0.602	0.586	0.580	0.573	0.565	0.557	0.549
Accounts Recievable Turnover (Accounts Recievable/(Net Sales/365))	34.053	37.748	26.938	33.403	33.403	33.403	33.403	33.403	33.403	33.403	33.403	33.403	33.403
Financial Leverage Ratios:													
Debt to Equity Ratio (Total Liabilities/Total Shareholders Equity)	1.724	2.666	3.098	3.025	2.987	2.980	2.827	2.777	2.700	2.627	2.555	2.524	2.369
Debt to Assets Ratio (Total Liabilities/Total Assets)	0.633	0.727	0.756	0.752	0.749	0.749	0.739	0.735	0.730	0.724	0.719	0.716	0.703
Debt to Capital Ratio (Debt/(Debt+Shareholders Equity))	0.581	0.633	0.671	0.662	0.657	0.652	0.647	0.642	0.636	0.631	0.627	0.622	0.598
Profitability Ratios:													
Return on Equity (NI/Beg TSE)	44.62%	54.94%	61.73%	66.93%	69.64%	73.04%	76.63%	80.50%	81.10%	81.85%	82.62%	83.33%	83.98%
Price to Funds from Operations (P/FFO)	9.15%	7.70%	7.28%	5.56%	5.24%	4.87%	4.51%	4.19%	4.06%	3.92%	3.78%	3.65%	3.48%
Gross Profit Margin ((Net Sales - COGS) / Net Sales)	25.75%	27.05%	25.70%	35.04%	36.88%	38.33%	39.83%	41.43%	42.01%	42.75%	43.50%	44.30%	45.11%
Funds from Operations to Shares Outstanding (FFO/S)	5.84	6.07	7.94	8.41	9.04	9.77	10.52	10.86	11.25	11.66	12.10	12.70	
Payout Policy Ratios:													
Dividend Payout Ratio (Dividend/EPS)	347.28%	255.06%	208.75%	98.20%	97.85%	97.84%	97.78%	97.59%	97.53%	97.58%	97.49%	97.20%	96.89%
Total Payout Ratio ((Divs. + Repurchases)/NI)	317.04%	254.44%	208.90%	93.79%	93.79%	93.79%	93.79%	93.79%	93.79%	93.79%	93.79%	93.79%	93.79%
EPS (Profit/outstanding shares of common stock)	123.24%	179.57%	236.17%	368.71%	426.49%	491.70%	566.20%	642.29%	678.45%	718.50%	761.36%	808.42%	870.47%

Crown Castle International

Valuation of Options Granted under ESOP

Current Stock Price	$187.00
Risk Free Rate	1.59%
Current Dividend Yield	3.13%
Annualized St. Dev. of Stock Returns	20.00%

Range of Outstanding Options	Number of Shares	Average Exercise Price	Average Remaining Life (yrs)	B-S Option Price	Value of Options Granted
Range 1	2,400,000	160.78	2.40	$ 30.90	$ 74,161,831
Range 2					
Range 3					
Range 4					
Range 5					
Range 6					$ -
Range 7					$ -
Range 8					$ -
Range 9					$ -
Total	2,400,000	$ 160.78	2.40	$ 40.37	**$ 74,161,831**