



Real Estate

Crown Castle International (NYSE: CCI)

Recommendation: HOLD

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Analysts

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Current Price \$167.05

Target Price \$179-\$183

Company Overview

Crown Castle International (CCI) invests in wireless communications infrastructure and leases access to tenants who in-turn provide wireless services to customers of their own. Crown Castle's asset portfolio is composed of cellular towers, both 4G LTE and shorter range small cell towers that support much of their sub-ground fiber line network. Crown Castle's infrastructure portfolio includes approximately 40,000 cell towers and 80,000 route miles of fiber supporting nearly 70,000 constructed and planned small cell towers. Crown Castle also derives a portion of its revenue from their services segment which includes installation of tenant hardware on the infrastructure.

Stock Performance Highlights

| | |
|----------------------|----------|
| 52 week High | \$168.23 |
| 52 week Low | \$114.21 |
| Beta Value | 0.29 |
| Average Daily Volume | 3.48 m |

Share Highlights

| | |
|-----------------------|------------|
| Market Capitalization | \$69.618 b |
| Shares Outstanding | 416.75 m |
| Book Value per share | \$25.21 |
| EPS (Q4 2019) | \$1.38 |
| P/E Ratio | 29.36 |
| P/FFO (FY 2019) | 25.0 |
| Dividend Yield | 2.87% |
| Dividend Payout Ratio | 84.80% |

Company Performance Highlights

| | |
|--------------|----------|
| ROA | 2.79% |
| ROE | 7.80% |
| Sales | \$5.76 b |
| Gross margin | 38.7% |

Financial Ratios

| | |
|----------------|-------|
| Current Ratio | 0.63 |
| Debt to Equity | 1.39% |

CCI Exhibits Growth Potential in an Uncertain Industry

We recommend a **hold** rating for Crown Castle International due to the uncertainty surrounding the COVID-19 pandemic and its effects on the rollout of 5G. While we believe the company's expected return will be on par with that of the industry regardless of whether 5G is introduced, we don't believe there is a large enough upside to issue a **buy** rating at this time.

Thesis Drivers

5G wireless as a growth vehicle: Crown Castle seeks to grow their cash flow through acquisitions, construction of new assets, and rental revenue escalations. We anticipate the deployment of 5G will promote high growth in the short-term, given the company's current position in the 5G space.

Protection from volatility: While the COVID-19 pandemic is causing unprecedented economic volatility, Crown Castle's business provides them insulation relative to their peers in the real estate industry, as well as other publicly traded entities. We expect our revenue, growth, and dividend estimates to remain on target.

Risk to Thesis

Uncertainty regarding the length of the pandemic, as well as the effects on consumer behavior in the short-term, may shift demand for the company's infrastructure. If the COVID-19 pandemic results in a prolonged recession, there is a possibility that demand for 5G, a significant growth driver for Crown Castle, may be delayed.

One Year Stock Performance



Source: Factset

Impact of COVID-19 on Analysis and Valuation

The current impact of COVID-19 on global, national, state, and local economies cannot be understated. Our base case analysis and valuation operates under the assumption that COVID-19 will continue to cause significant economic damage and volatility in the near-term, but the economy will recover from it in the medium term. It is worth noting that the nature of Crown Castle's business provides them insulation from the economic consequences relative to their peers in the Real Estate industry as well as the broader universe of publicly traded companies.

We expect Crown Castle's revenues and growth to remain on targets. So long as the effects of COVID-19 on the economy and consumer behavior remain a short-term factor, demand for Crown Castle's infrastructure should not see significant deviation from expectations. If COVID-19 creates a prolonged recession, there is the possibility that demand for 5G infrastructure, a significant growth vehicle for Crown Castle, may be delayed.

Crown Castle stands to benefit from a long-term shift with people performing more work from home. If significant percentages of the workforce shift to working from home, Crown Castle could expect to see increased revenue from local internet service providers as demand for home internet access and higher home internet speeds increases. More specific impacts on analysis and valuation will be discussed in further detail throughout this report.

Economic Analysis

US Real Gross Domestic Product (GDP)

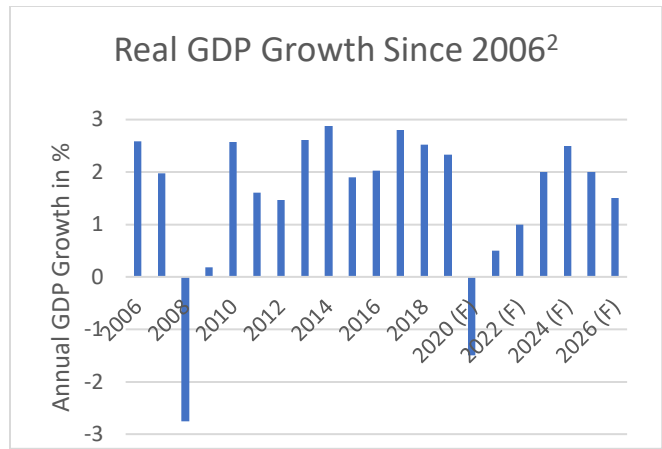
Real GDP is an inflation-adjusted measure of economic output within the United States.¹ GDP is reported as the value of goods and services produced, but not necessarily provided or sold, during the period.

The real GDP of the US economy is more than \$19T and is recognized as a barometer of the global economy.¹ Real GDP growth is calculated by comparing annual or quarterly data to previous years or quarters.

To determine our real GDP growth forecasts, we analyzed trends over historical periods and applied the current prevailing theories from global economists: COVID-19 will apply downward pressure on near-term economic growth, but growth will return once the virus is defeated.

Historic US GDP growth is between 2-3%. During recessionary periods, GDP decreases and can contract, just as some economists are forecasting for the near-term as a result of COVID-19.

As illustrated in the table below, Real GDP growth between 2006 and 2019 was steady and typically between 2% and 3%. Growth in 2008 was negative, and turned slightly positive by 2009 before returning to steady growth.



We predict real GDP to contract during the 2020 fiscal year, primarily driven by sharp declines and negative growth beginning in Q1 and remaining for much of the year. While recent reports have indicated plans to phase the economy back incrementally, we expect economic growth to still be weighed down by the virus. By Q4 2020, we predict the world will be able to shake off the economic impact of the virus and approach positive economic growth. Our annual real GDP growth forecasts from 2020 to 2026 are -1.5%, 0.5%, 1.0%, 2.0%, 2.5%, 2.0%, and 1.5%.

Inflation

Inflation is a quantitative measure of the rate at which the cost of a certain group of goods and/or services increases over time.³ Changes in inflation result in price changes for consumers and cost changes for producers. All real estate professionals and owners keep a particularly close eye on inflation. Many real estate rental contracts have specific provisions related to inflation. Some contracts have fixed rental increases to offset predicted inflation; others have rental rates tied directly to inflation.

The Personal Consumption Expenditures Price Index (PCE) shows changes in the prices of goods and services purchased by US consumers.⁴ Changes in this index explain changes in costs and revenues experienced by certain industries.

Monetary policy enacted by central banks is the key tool used to control and fight inflation when necessary. In September, the FOMC gave annual targets for the PCE price index of 1.9%, 2.0%, and 2.0% for 2020-2022. Their long-run target for inflation is also 2.0%.⁵ We concur with the FOMC and have an inflation target of 2.0% for our forecast.

Federal Funds Rate

The Federal Funds rate is the interest rate at which depository institutions trade federal funds with each other overnight.⁶

The current Fed Funds target rate is 0.00% to 0.25%. In September, the FOMC gave their annual targets for the fed funds rate, but the Fed took swift action in response to COVID-19 and arrived at the current rate after two emergency rate cuts in quick succession. We expect the Fed Funds rate to stay low while COVID-19 is impacting the economy, but predict it to increase similar to GDP after the virus is defeated. We predict a rate of 1.0% by 2023 and an increase to 1.5% by 2026.

The Fed Funds rate has a direct impact on interest rates for virtually every financial debt contract in the US. Decreases in the Fed Funds rate decrease yields on outstanding bonds. While many lenders, such as banks see their margins fall along with decreases in the Fed Funds rate, commercial real estate businesses can borrow at lower rates to increase their asset portfolio.

Crown Castle has taken advantage of the current low interest rate environment and offered \$750M of 3.30% ten-year senior notes along with \$500M of 4.15% thirty-year senior notes. Crown Castle intends to use the proceeds to refinance outstanding debt.⁷ It is possible that Crown Castle will continue to issue corporate bonds to refinance existing debt at a lower effective interest rate. This possibility was not forecasted as its effects are impossible to predict with any certainty. Such an action could result in an increased value of equity if Crown Castle is able to decrease their average cost of debt.

Unemployment Rate

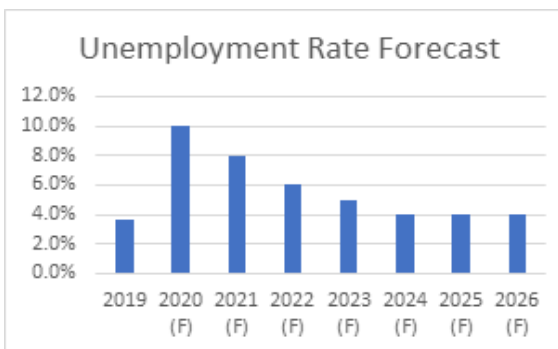
The unemployment rate is the percentage of people ages 16 and older who are actively seeking, but have not obtained employment.⁸ The unemployment rate is used as another important barometer of economic health. Employment statistics are released on the first Friday of every month. In addition to the unemployment rate, other metrics such as payroll numbers and hourly earnings are included in the data release. In general, a healthy economy should experience steady and low unemployment levels. The number of unemployed workers has a large effect on the economy as it impacts the capacity of individuals to pay their mortgages, rent, and purchase goods with disposable income.

In recent weeks, unemployment has surged as more businesses press the pause button because of COVID-19. The unemployment rate has risen from 3.5% in February to 4.4% in March.⁸ From the week ending March 22 to the week ending April 12 alone, more than 22M Americans have filed for unemployment insurance after being laid-off from their jobs.⁹

The speed with which the unemployment rate is increasing has some economists making bold predictions about how high it could go. Even after stimulus measures by the federal government and a slew of aggressive actions taken by the Fed to ease fears, many Americans continue to find themselves unemployed or at risk of losing their job.

While COVID-19 may push the near-term unemployment rate as high as 20%, we predict it will move inversely with our real GDP and forecast. We predict a long-term unemployment rate of 4.0% once the economy is fully back in gear.

We do not expect rising unemployment to cause significant change to Crown Castle's operations. As the 5G network continues to deploy, providers must continue their investment to meet future demand, not current demand. If unemployment remains high for several years, providers may see decreased demand as customers slow their device upgrade cycles to save money. While this is a possibility, it is not factored into our base case.



Industry Analysis

Overview

Real Estate Investment Trusts (REITs) are companies that own, operate, or finance income-producing real estate. REITs provide investors with a unique method of diversification, giving them a chance to own valuable real estate and access dividend-based compensation. Historically, the REIT industry has demonstrated a low- to-moderate correlation with other sectors of the market, as well as other assets.¹⁰

The REIT industry consists of three main classifications: equity REITs, mortgage REITs, and hybrid REITs. Equity REITs comprise approximately 72.1% of the overall REIT market, owning more than \$2 trillion of real estate assets which include retail centers, apartment buildings, office buildings, and other commercial properties.¹¹ Mortgage REITs finance properties by extending credit through the acquisition of mortgage-backed securities.¹² Given the large portion of the industry composed of equity REITs, mortgage REITs and hybrid REITs only accounted for 6.0% and 4.8% of industry revenue in 2019¹¹. Technology REITs are classified as equity REITs and therefore are included within the majority of the industry's segmentation.

Government Regulation

The Technology REIT industry is regulated by both the Federal Communications Commission (FCC) and the Federal Aviation Commission (FAA), which control tower usage for wireless communication, radio, and television broadcasting.¹³ Such regulations control the positioning, construction, and modification characteristics for both new and existing towers. The FCC requires all infrastructure to be registered with them and for licensees to comply with FAA rules.¹³ Although we don't foresee changes being made to these policies, doing so would significantly drive up costs for companies within the industry in order to make the necessary modifications.

In 2016, the FCC revised regulations related to the development and deployment of small cells needed to rollout the 5G network.¹⁴ This resulted in lower costs for infrastructure builders and providers and increased the speed with which the 5G network can be deployed.

Revenue Generation

Most REITs generate revenue using the same business model. The company leases its property, usually under a long-term contract, in exchange for rent payments from the lessee.¹⁵ These contracts

are usually under a triple net lease where the tenant pays for all maintenance, insurance, and taxes associated with the property.¹⁵ Revenue levels largely reflect the supply and demand within the area, as well as the health of the overall economy.¹³ Occupancy rates are usually the most important indicator when determining the ability to raise rents.

Porter's Five Forces Analysis

Competition in the Industry: *High*

Competition within the REIT industry is high as firms look to maximize investor return. The basis for competition in the industry is the investment performance of REITs relative to their peers, as well as alternative investment firms with similar risk profiles.¹² For firms in the equity REIT industry, competition is driven by the ability to raise rents, maintain assets in attractive locations, and provide higher quality services to their tenants.¹²

Barriers to Entry: *Moderate*

Market share concentration is low with the five largest companies accounting for nearly 10% of industry revenue.¹² Although this is the case now, we expect the industry to become more concentrated in the future. The number of publicly traded REITs has decreased from 2006 following the burst of the real estate bubble. Additionally, large institutions and private equity funds have been steadily acquiring REITs since the end of the Great Recession.¹² Our predictions regarding concentration are also driven by the barriers to entry surrounding the industry. Commercial real estate requires substantial amounts of up-front equity, even on high-leverage deals.¹² Given the uncertainty surrounding the pandemic, we believe lenders will continue to have strict lending requirements, making it harder for smaller firms to make acquisitions and enter the industry.

Power of Suppliers: *Moderate*

Given the diversity of the tech REIT supply chain, suppliers have low bargaining power. This is beneficial for companies within the industry as high rates of supplier diversity have historically led to higher returns.¹³

Crown Castle currently utilizes six main suppliers. These provide the company with access to raw materials needed for construction and maintenance, as well as services for construction of new assets. Given recent news regarding an operational slowdown for one of Crown Castle's suppliers, SeaChange, we anticipate a potential disruption for Crown Castle's marketing and advertising; however, we don't believe this will have any significant long-term effect on revenues for the foreseeable future.¹⁴

Power of Customers: *High*

Customers have a substantial influence on REIT firms. The volume and competition within the industry give customers higher bargaining power. Customers looking to lease real estate typically have a plethora of options when it comes to choosing a specific location and property type. Consequently, REITs must

constantly seek out new property investments in order to meet consumer demand and gain leverage on a potential deal.

The infrastructure REIT industry is unique in that it mainly deals with one type of customer. For domestic companies, large cell carriers, such as Verizon, T-Mobile, and AT&T make up most of their customer base. These companies hold high amounts of bargaining power given that they account for a large amount of the industry's revenues. Conversely, infrastructure REITs hold some leverage in that they own roughly 50-80% of investment-grade cell towers in the U.S.¹⁵ Due to this market power, the industry is the only real estate sector that can be classified as true price makers rather than price takers.¹⁶

The recent merger of Sprint and T-Mobile increases risk of revenue concentration. In 2019, Sprint and T-Mobile accounted for roughly 35% of leasing revenues between Crown Castle (CCI), SBA Communications (SBAC), and American Tower (AMT).¹⁷ We believe this number will drop in the long-term as we predict a decrease in the newly consolidated company's lease renewal rate. We do however predict that the combined entity will increase spending in the near-term to gain market share on their competitors. We also see the merger as a potential risk to the industry as higher tenant concentration will increase the REIT's exposure to the credit quality of the remaining tenants.¹⁷ Although this is noteworthy, we don't see this as a major threat to Crown Castle. This is discussed further in our company analysis.

Threat of Substitutes: *Low*

We believe there is a low threat of substitutes within the infrastructure/tech REIT industry. Although firms are constantly seeking to grow through acquisitions, we believe the industry is unique in terms of the type of real estate it leases, which puts it at less of a risk for new substitutes. Additionally, only six firms operate within the industry. This allows a cushion for other companies to enter without causing major harm to the businesses already operating within the infrastructure REIT industry.

Key Industry Metrics and Comparison

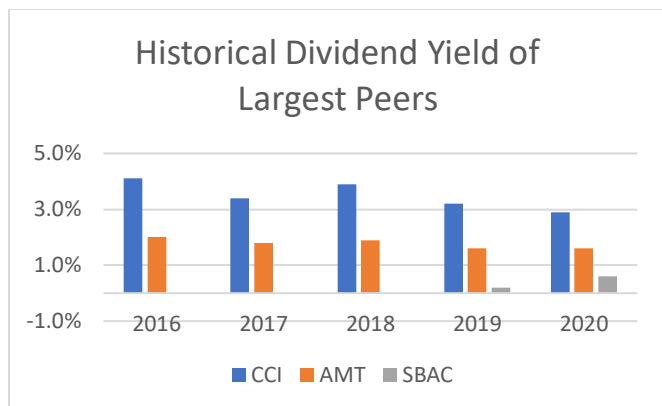
Price to Funds From Operation (P/FFO)

Price to FFO is calculated by adding amortization and depreciation to net income and then deducting the gains on the sale of properties. In analyzing the value of a REIT, net income is an inferior measure because it includes depreciation. To compare the metric across the industry, we looked at peer companies similar in terms of market capitalization. In FY19, Crown Castle's P/FFO was 25x, while American Tower and SBA communications were 29.1x and 28.4x, respectively.¹⁸ A higher P/FFO implies that the company has been returning consistent capital price appreciation, as well as steady dividend yields to investors. With respect to P/FFO, we expect Crown Castle to continue trading in line with its peers.¹⁹

Dividend Yield

The consistent dividend yields of REITs are what make them attractive to investors. To qualify as a REIT, the SEC requires

companies to pay 90% of its taxable income in the form of dividends.²⁰ This, along with consistent streams of rent paid by tenants, produces stable yields that are seen throughout the REIT industry.²¹ The graph below depicts a comparison of the two peer companies mentioned previously, AMT and SBAC. All three companies have experienced some variation in their dividend yield, but overall have seen steady returns.²⁰ This trend can be seen across most of the entire REIT industry.



Source: Factset

Company Analysis

Overview

Crown Castle invests in wireless communications infrastructure and leases out access to that infrastructure to tenants who provide wireless services to customers of their own. The overwhelming majority of Crown Castle’s infrastructure assets are composed of cellular towers, both 4G LTE and “small cell” towers that support much of their sub-ground fiber line network. Crown Castle also derives a portion of its revenue from their “services” segment which often includes installation of tenant hardware on the infrastructure.

Crown Castle’s current assets include approximately 40,000 cell towers, and 80,000 route miles of fiber supporting nearly 70,000 existing and to-be-built small cell nodes.¹³

Corporate Strategy

Crown Castle seeks to grow their cash flow by acquiring or constructing additional infrastructure assets, increasing rental revenues through escalations, and by adding additional tenants. Additional tenants can take the form of existing customers renting out rights-of-use on additional infrastructure, or completely new customers leasing from Crown Castle for the first time.

Crown Castle derives nearly three-quarters of their revenue from four tenants: Verizon, AT&T, T-Mobile, and Sprint.¹³ The remaining quarter is constituted by many local and regional internet service providers.

Crown Castle has taken purposeful steps to become a leading provider of 5G infrastructure in the United States. In March of 2020, Crown Castle was elected to the Board of Governors for 5G Americas. 5G Americas is the leading trade association in the US

centered around 5G and LTE technology. In explaining 5G Americas’ decision to elect Crown Castle to its board, President Chris Pearson stated, “For 25 years, Crown Castle has been developing tower, small cell, and fiber solutions to meet the highest service standards while advocating for innovative wireless solutions... With a unique combination of towers, small cells, fiber, and a team of approximately 5,000 employees across nearly 100 offices in the United States, Crown Castle is setting the stage for tomorrow’s most transformative technologies ...Crown Castle’s towers, small cells, and fiber are an integral part of the connected 5G ecosystem.”²³

Life Cycle

Based on Crown Castle’s operating results and stated corporate goals, we have concluded the company is in the growth stage of its life cycle. Because dividend yields are a key metric of real estate companies and REITs in particular, dividend growth can be analyzed to determine management’s expected growth. After dividends-per-share growth of 7% from 2018 to 2019, Crown Castle aims for additional 7% growth in the near-term.²⁴

Crown Castle is positioning itself as a power player in the 5G space, which will have a significant impact on the global economy.

In recent years, Crown Castle has seen significant revenue growth in both their towers and fiber/small cell segments. Crown Castle has added a considerable amount of assets through acquisition, which have been efficiently integrated into their existing network.

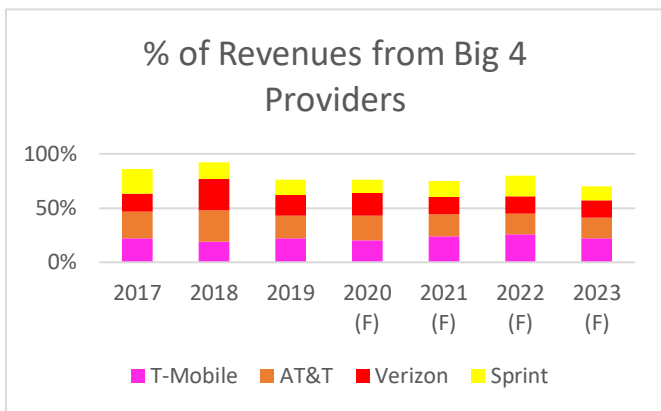
Financial Summary

Overview

Crown Castle’s operating results in recent years have shown considerable growth and the successful execution of corporate strategies. From 2016-2019, total revenues have increased by 8.5%, 26.2%, and 7.3%. Revenue from their tower segment has increased steadily between 2% and 10% over that time. Their fiber/small cell segment has seen growth between 6% and 108% over that time, due to multiple acquisitions of assets during the 2017 fiscal year.¹³ Management forecasts organic growth of \$150M from tower rentals, \$75M from small cell revenues, and \$170M from fiber solutions revenue from 2019 to 2020.¹³

Tenant Concentration

The nature of Crown Castle’s operations give rise to concentration risk as a large portion of their revenues are derived from just four tenants: T-Mobile, AT&T, Verizon, and Sprint. A breakdown of revenues from each tenant since 2017 as well as our own forecasts through 2023 are as follows:



Wireless Tenant Contract Structure and Concentration Risk Hedges

To hedge their highly concentrated revenue from wireless tenants, Crown Castle enters into long-term contracts with said tenants. The typical wireless tenant leases infrastructure for an initial period of five to fifteen years with multiple renewal options of five to ten years each at tenant’s option. The lease also includes limited termination rights for the tenant, and contractual escalations of rental price and additional upfront payment if necessary.¹³

Discussion of Sprint/T-Mobile Merger

Our valuation and analysis assume that the proposed Sprint/T-Mobile merger will complete by Q2 2020. Crown Castle has identified several possible impacts of the transaction. The two companies have already disclosed non-renewal options with a 1% impact on 2020 revenues.¹³ T-Mobile and Sprint provided 7% and 6% of their respective 2019 revenues to Crown Castle from towers where both companies were operating. The remaining average term on rental contracts with both T-Mobile and Sprint are about six years.¹³

We forecast revenues from the combined Sprint/T-Mobile entity to decline in 2020 as the two companies integrate and slash renewals on non-needed towers. We also forecast revenues from the combined entity to increase in 2021 and 2022 as they ramp up their 5G networks before eventually leveling off in 2023.

Secured Future Cash Flows

Crown Castle benefits greatly from their long-term tenant contracts as it secures future cash flows. As of 2019, nearly \$24B of future revenues are represented by existing tenant contracts with a weighted-average remaining term of about five years.¹³

The primary risk of these secured revenues arises from possible negotiation by Sprint/T-Mobile to terminate existing contracts in exchange for more beneficial ones. It is likely that any future revenues from such contracts forfeited by Crown Castle will be replaced by equivalent or greater future revenues resulting from the possible negotiations.

Revenue Streams

Crown Castle has two product lines, as well as a services segment. Revenue from their towers and fiber lines come in the form of rental fees. They also derive a portion of their revenues from services relating to installation of hardware and software on existing infrastructure.

As discussed previously, the consistency of their operating revenues provides significant stability and visibility for future performance.

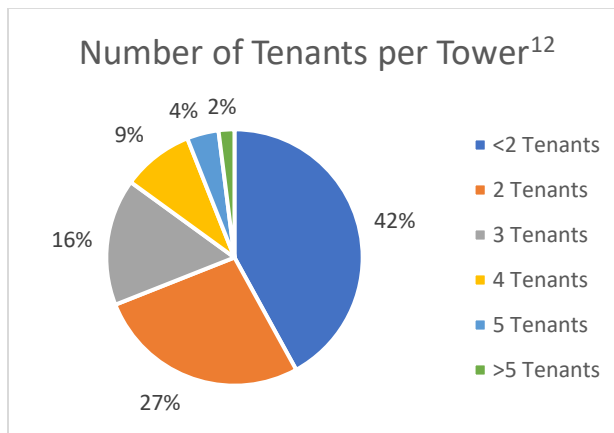
New and Existing Markets

Crown Castle operates within the United States and Puerto Rico. Despite “International” still being in the name, the company sold its international assets in 2014.

Crown Castle maintains a majority of its assets in major markets where demand for wireless services is greatest. Crown Castle maintains 56% and 71% of their towers within top 50 and top 100 “basic trading areas”.¹³ Their fiber assets are located primarily in major metro areas, including every major US market.¹²

New markets and tenants continue to develop as populations in suburban and rural areas increase, creating a demand in those areas. Crown Castle’s biggest opportunities for organic growth lies within existing tenants looking to increase their capacity and network reach.

This opportunity can best be interpreted by analyzing the number of tenants on Crown Castle’s existing towers.



Increasing the average number of tenants per tower will result in incremental profits as additional revenues will be greater than additional costs.

Head-to-head Company Analysis

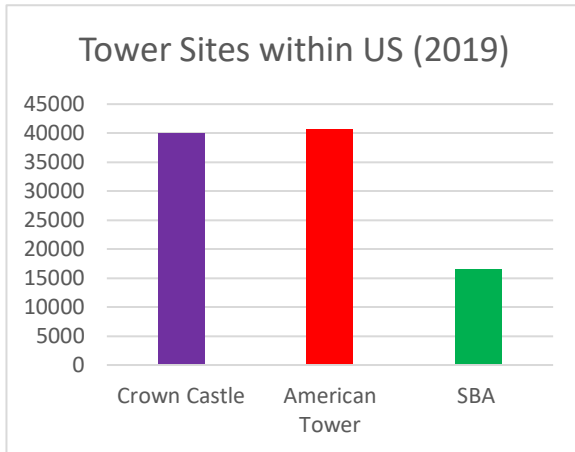
Overview

Crown Castle operates with two publicly traded competitors in the wireless infrastructure space: American Tower and SBA Communications. All three companies have different operating strategies. Crown Castle is the only one of the three without

significant operations outside of the United States. American Tower has operations in every continent except for Australia and Antarctica. Meanwhile, SBA operates in North America, South America, and Africa.

US Tower Segments

While American Tower has a significantly larger total inventory, they hold nearly an identical number of US towers as Crown Castle.



American Tower has 40,567 US towers while SBA has 16,401 US towers.^{25, 26}

Fiber Disparity

Of the three companies, Crown Castle is the only one with an implemented strategy for their fiber segment. SBA does not operate fiber assets. While American Tower has begun operating domestic fiber assets, they do not yet break out fiber revenues.

Crown Castle must continue to focus on their fiber segment to maintain their position as an industry leader. In the case of American Tower, their fiber assets appear to be side benefits from acquisitions aimed at growing their tower segment. As 5G continues to grow and the necessity of fiber and small cells increases, it is likely American Tower will allocate additional resources to their fiber segment, increasing competition for Crown Castle. Crown Castle should continue to leverage their existing relationships with their tenant base to grow the utilization of their fiber assets.

Valuation Analysis

Overview

Our target price range was determined by considering the results of discounted cash flow (DCF), economic profit (EP), dividend discount, and relative value models. These models were influenced by our assumptions for the overall economy, the real estate and communications infrastructure industries, and Crown Castle specifically. The impacts of many of our assumptions were tested for sensitivity and are further discussed within the “Sensitivity Analysis” section. We forecasted a seven-year horizon and assumed the company would enter a “steady state” in 2026.

DCF & EP Models

The DCF and EP models are the most complex, and we have determined them to be the most accurate calculations of value. By isolating specific value drivers and forecasting their changes over time, we arrived at a target price of \$181.39 per share.

Relative Valuation

Our relative valuation model examined price-to-earnings (P/E) and price-to-funds-from-operation (P/FFO) from Crown Castle’s competitors to arrive at a relative value. We did not include the value from this model in our target range because of the wide range of ratios and the small number of comparable firms. Using relative P/E valuation, we arrived at 2020 and 2021 implied prices of \$202.6/s and \$147.8/s. It is worth mentioning that the implied forward P/Es of American Tower and SBA vary significantly from 2020 to 2021 based on analyst estimates of earnings. We found implied valuation using P/FFO to be more accurate as the forward-looking ratios saw less variation, and the metric on its own is a better measure of real estate performance. Using relative P/FFO, we arrived at 2020 and 2021 implied prices of \$208.6/s and \$201.8/s.

Dividend Discount Model

Our dividend discount model determined Crown Castle’s implied stock price to be \$146/s, meaning the stock is currently slightly overvalued. We discounted expected dividends and a projected future stock price determined by using historical dividend payout ratios from FFO. This model’s accuracy is uncertain. Our forecasted dividends may vary from actual results as we assumed management’s guidance for dividend growth would not continue for more than two years.

Revenue Decomposition

Revenues served as the basis for much of our forecasts. We forecasted significant revenue growth in the earlier years of the time horizon corresponding with increasing industry spending to support rollout of the 5G network. We forecasted separate growth for their site rental and network services segments.

We forecasted revenues by growing revenues using predicted rates. Regrettably, Crown Castle is not particularly forthcoming with specific numbers in terms of their towers, fiber miles, and small cells. Within their own releases, the company gives approximate figures.

American Tower gives exact numbers for their towers and other assets, something that provides more clarity when making forecasts. Crown Castle also does not give specific guidance for the number of assets they plan to construct, but rather give rough guidance for capital expenditures.

Continuing Value (CV)

We estimated the CV growth rate equal to our long-term economic growth rate of 1.5%. This may be a conservative

estimate because in a steady-state, Crown Castle's revenue growth could be near inflation which may be higher than the rate of economic growth.

In an environment with increasing inflation, Crown Castle may have difficulty negotiating contracts with escalations notably greater than inflation.

Weighted Average Cost of Capital (WACC)

To estimate our WACC, we used a real estate industry beta, which is higher than Crown Castle's individual beta. In recent weeks, many REITs have seen above normal or below normal betas. Mortgage REITs have been the hardest hit as delinquencies rise. While many mortgage-holders are taking relief from the federal government, it is unclear what effect rising bankruptcies could have or if it will be backstopped by the government.

In the case of Crown Castle, their beta has decreased because of several of the factors noted previously. Demand for their infrastructure is relatively inelastic to economic conditions. Their tenants are unable to renegotiate their contracts simply of economic difficulties.

As previously stated, Crown Castle appears to be using the low rate environment to decrease their cost of debt by refinancing existing debt at lower rates. Continuing to do so could result in a lower interest expense which may increase the value of equity.

Sensitivity Analysis (Page 12)

We conducted sensitivity analysis on the DCF/EP price target by changing several variables that had significant effects on the value of the company. We tested 9 unique variables to determine possibilities for significant changes in value. We tested the risk-free rate twice because of the significant impact of interest expense on net income.

Beta vs Risk-Free Rate (Table 1)

Both of these variables have a large effect on the share price. Because REITs need to continuously draw from the debt and equity markets to fund growth, small changes in beta or the risk-free rate have large impacts on firm value. With interest rates at their current levels and the likelihood of them staying low at least in the near-to-medium term, beta appears to have a larger impact.

WACC vs CV Return on Invested Capital (ROIC) (Table 2)

Changes in WACC had noticeable impacts on share price. Changes in CV ROIC did not affect the price to the same degree. While ROIC grows significantly over the course of our forecast, we felt our estimates were in line with the growth life stage of the company.

Risk-Free Rate vs Equity Risk Premium (Table 3)

Both of these factors had large impacts on share price. Risk-free rate had a larger effect. With rapid fluctuations in equity prices and interest rates, it is very possible that one of these scenarios comes to pass.

Depreciation Rate vs Net Revenue Growth (2020) (Table 4)

As a REIT, depreciation has a significant effect on net income and thus the value of equity. We assumed a depreciation rate of - 8.38% for our forecast which was the average of the previous two year's rates. There is a chance that over time, depreciation will come down as construction methods become more efficient and sustainable. We tested this against our growth assumption for net revenues in 2020. Any change on 2020 revenues would have resulting changes on all future revenues.

Amortization Rate vs Effective Tax Rate (Table 5)

Amortization rate, while not a significant factor to our forecasts, could become more important in the event of acquisitions, which are very possible. We did not forecast acquisitions because doing so would have been extremely difficult to do with any degree of certainty. This table illustrates the effect of different amortization rates which would be magnified by increases in intangible assets from acquisitions. The effective tax rate will likely remain very low as a result of Crown Castle's REIT status. By paying out at least 90% of their pretax earnings as dividends, Crown Castle pays very little in income taxes.

Crown Castle's primary concern relating to their tax rate is regulatory risk. Almost immediately following the passage of the Tax Cuts and Jobs Act in 2017, many politicians vowed to repeal it. It is possible that REITs could be caught in the crossfire of any attempt to raise the corporate tax rate and their preferential tax treatment could be significantly decreased.

Works Cited

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Important Disclaimer

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 Corporation
Income Statement

| <i>Fiscal Years Ending Dec. 31</i> | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Net revenues | 2,032.73 | 2,432.68 | 2,865.75 | 3,538.76 | 3,663.85 | 3,921.00 | 4,255.00 | 5,370.00 | 5,763.00 | 6,037.75 | 6,386.21 | 6,755.03 | 7,137.94 | 7,479.46 | 7,770.72 | 7,991.61 |
| Site rental | 1,853.55 | 2,124.19 | 2,371.38 | 2,866.61 | 3,018.41 | 3,233.00 | 3,734.00 | 4,796.00 | 5,093.00 | 5,347.65 | 5,668.51 | 6,008.62 | 6,369.14 | 6,687.59 | 6,955.10 | 7,163.75 |
| Network services and other | 179.18 | 308.49 | 494.37 | 672.14 | 645.44 | 688.00 | 521.00 | 574.00 | 670.00 | 690.10 | 717.70 | 746.41 | 768.80 | 791.87 | 815.62 | 827.86 |
| Total operating expenses | (1,340.42) | (1,598.00) | (1,985.05) | (2,598.07) | (2,717.67) | (2,972.00) | (3,987.00) | (3,987.00) | (4,204.00) | (4,265.46) | (4,437.22) | (4,616.53) | (4,795.52) | (5,010.70) | (5,208.15) | (5,351.79) |
| Site rental | (481.40) | (539.24) | (686.87) | (906.15) | (963.87) | (1,024.00) | (1,144.00) | (1,410.00) | (1,462.00) | (1,496.45) | (1,586.23) | (1,681.41) | (1,782.29) | (1,871.41) | (1,946.26) | (2,004.65) |
| Network services and other | (106.99) | (189.75) | (304.14) | (400.45) | (357.56) | (417.00) | (399.00) | (434.00) | (524.00) | (539.72) | (561.31) | (583.76) | (601.27) | (619.31) | (637.89) | (647.46) |
| Net Operating Income | 1,444.34 | 1,703.69 | 1,874.73 | 2,232.15 | 2,342.43 | 2,480.00 | 2,712.00 | 3,526.00 | 3,777.00 | 4,001.58 | 4,238.67 | 4,489.86 | 4,754.38 | 4,988.74 | 5,186.57 | 5,339.50 |
| General and administrative | (173.49) | (212.57) | (213.52) | (257.30) | (310.92) | (371.00) | (426.00) | (563.00) | (614.00) | (626.92) | (671.01) | (710.29) | (747.24) | (785.11) | (815.42) | (838.02) |
| Asset write-down charges | (22.29) | (15.55) | (13.60) | (14.25) | (33.47) | (34.00) | (17.00) | (26.00) | (19.00) | (11.65) | (16.57) | (21.43) | (21.52) | (22.95) | (23.49) | (30.98) |
| Acquisition and integration costs | (3.31) | (18.30) | (25.57) | (34.15) | (15.68) | (17.00) | (61.00) | (27.00) | (13.00) | - | - | - | - | - | - | - |
| Depreciation, amortization and accretion | (552.95) | (622.59) | (741.34) | (985.78) | (1,036.18) | (1,109.00) | (1,241.00) | (1,527.00) | (1,572.00) | (1,590.72) | (1,602.10) | (1,619.64) | (1,643.20) | (1,711.92) | (1,785.09) | (1,830.68) |
| Operating income / loss | 692.30 | 834.68 | 880.70 | 940.68 | 946.18 | 949.00 | 967.00 | 1,383.00 | 1,559.00 | 1,772.29 | 1,948.99 | 2,138.50 | 2,342.42 | 2,468.77 | 2,562.57 | 2,639.82 |
| Nonoperating income / expense | (512.50) | (733.85) | (629.70) | (605.61) | (472.35) | (575.00) | (575.00) | (742.00) | (678.00) | (636.39) | (609.52) | (669.97) | (668.71) | (760.04) | (800.69) | (745.96) |
| Interest expense and amortization of deferred financing costs | (507.59) | (601.04) | (589.63) | (573.29) | (527.13) | (515.00) | (591.00) | (642.00) | (683.00) | (647.94) | (622.55) | (696.58) | (690.72) | (799.81) | (828.66) | (770.76) |
| Gains / losses on retirement of long-term obligations | - | (131.97) | (37.13) | (44.63) | (4.16) | (52.00) | (4.00) | (106.00) | (2.00) | - | - | - | - | - | - | - |
| Interest income | 0.67 | 4.56 | 0.96 | 0.32 | 1.91 | 1.00 | 19.00 | 5.00 | 6.00 | 4.21 | 5.28 | 18.40 | 13.33 | 30.69 | 18.53 | 15.09 |
| Other income / expense | (5.58) | (5.39) | (3.90) | 11.99 | 57.03 | (9.00) | 1.00 | 1.00 | 1.00 | 7.33 | 7.76 | 8.20 | 8.67 | 9.08 | 9.44 | 9.71 |
| Income / loss from continuing operations before income taxes | 179.81 | 100.83 | 251.00 | 335.07 | 473.83 | 374.00 | 471.00 | 641.00 | 881.00 | 1,135.90 | 1,339.47 | 1,468.53 | 1,673.71 | 1,708.73 | 1,761.88 | 1,893.86 |
| Benefit / (provision) for income taxes | (8.35) | 100.06 | (191.00) | 11.24 | 51.46 | (17.00) | (26.00) | (19.00) | (21.00) | (22.72) | (26.79) | (29.37) | (33.47) | (34.17) | (35.24) | (37.88) |
| Income / loss from continuing operations | 171.46 | 200.89 | 60.00 | 346.31 | 525.29 | 357.00 | 392.00 | 622.00 | 860.00 | 1,113.18 | 1,312.68 | 1,439.16 | 1,640.23 | 1,674.55 | 1,726.65 | 1,855.98 |
| Income / loss from discontinued operations, net of tax excluding net gain / loss from disposal of discontinued operations, net of tax | - | - | 33.90 | 52.46 | 99.00 | - | - | - | - | - | - | - | - | - | - | - |
| Net income / loss | 171.46 | 200.89 | 93.90 | 398.77 | 1,524.29 | 357.00 | 366.00 | 622.00 | 860.00 | 1,113.18 | 1,312.68 | 1,439.16 | 1,640.23 | 1,674.55 | 1,726.65 | 1,855.98 |
| Net income / loss attributable to the noncontrolling interest | (0.38) | (12.30) | (3.79) | (8.26) | (3.34) | - | - | - | - | - | - | - | - | - | - | - |
| Net income / loss attributable to CCIC stockholders | 171.08 | 188.58 | 90.11 | 390.51 | 1,520.99 | 357.00 | 366.00 | 622.00 | 860.00 | 1,113.18 | 1,312.68 | 1,439.16 | 1,640.23 | 1,674.55 | 1,726.65 | 1,855.98 |
| Dividends paid on preferred stock | (22.94) | (2.63) | (11.36) | (43.99) | (43.99) | (33.00) | (58.00) | (113.00) | (113.00) | (85.00) | - | - | - | - | - | - |
| Net income / loss attributable to CCIC common stockholders | 148.14 | 185.96 | 78.75 | 346.52 | 1,477.00 | 324.00 | 308.00 | 509.00 | 747.00 | 1,028.18 | 1,312.68 | 1,439.16 | 1,640.23 | 1,674.55 | 1,726.65 | 1,855.98 |
| Per share | | | | | | | | | | | | | | | | |
| Basic | 0.52 | 0.64 | 0.26 | 1.04 | 4.44 | 0.95 | 0.80 | 1.23 | 1.79 | 2.29 | 2.92 | 3.17 | 3.61 | 3.68 | 3.66 | 3.90 |
| Weighted average shares | | | | | | | | | | | | | | | | |
| Basic | 283.82 | 289.29 | 298.08 | 332.30 | 333.00 | 340.00 | 382.00 | 413.00 | 416.00 | 448.43 | 448.86 | 454.29 | 454.71 | 455.14 | 471.57 | 475.50 |
| Dividends declared on common stock | | | | | | 3.61 | 3.90 | 4.28 | 4.58 | 4.81 | 5.05 | 5.15 | 5.25 | 5.36 | 5.47 | 5.58 |

Crown Castle International Corporation
Historical Cash Flow Statement

| <i>Fiscal Years Ending Dec. 31</i> | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|--|----------------|------------------|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|
| Cash Flow | | | | | | | | | |
| Net cash provided by / used for operating activities | 643.5 | 772.6 | 1,171.1 | 1,600.2 | 1,794.0 | 1,787.0 | 2,032.0 | 2,500.0 | 2,698.0 |
| Net income / loss from continuing operations | 171.5 | 200.9 | 60.0 | 346.3 | 525.3 | 357.0 | 366.0 | 622.0 | 860.0 |
| Adjustments to reconcile net income / loss from continuing operations to net cash provided by / used for operating activities | 472.0 | 571.7 | 1,111.1 | 1,253.9 | 1,268.7 | 1,430.0 | 1,666.0 | 1,878.0 | 1,838.0 |
| Depreciation, amortization and accretion | 553.0 | 622.6 | 741.3 | 985.8 | 1,036.2 | 1,109.0 | 1,241.0 | 1,527.0 | 1,572.0 |
| Gains / losses on retirement of long-term obligations | - | 132.0 | 37.1 | 44.6 | 4.2 | 52.0 | 4.0 | 106.0 | 2.0 |
| Amortization of deferred financing costs and other non-cash interest | 102.9 | 109.3 | 99.2 | 80.9 | 37.1 | 14.0 | 14.0 | 7.0 | 1.0 |
| Stock-based compensation expense | 32.6 | 41.9 | 39.0 | 51.5 | 60.8 | 79.0 | 92.0 | 103.0 | 117.0 |
| Asset write-down charges | 22.3 | 15.5 | 13.6 | 14.2 | 33.5 | 34.0 | 17.0 | 26.0 | 19.0 |
| Deferred income tax benefit / provision | 4.6 | (110.4) | 174.3 | (21.9) | (60.6) | 9.0 | 15.0 | 2.0 | 2.0 |
| Income / expense from forward-starting interest rate swaps | - | - | - | - | - | - | - | - | - |
| Other non-cash adjustments, net | 4.1 | 0.6 | 3.0 | (25.7) | (63.4) | 13.0 | (2.0) | 2.0 | (2.0) |
| Gains / losses on settled swaps | - | - | - | - | (54.5) | 3.0 | - | - | - |
| Other non-cash adjustments, net excluding gains / losses on settled swaps | 4.1 | 0.6 | 3.0 | (25.7) | (8.9) | 10.0 | (2.0) | 2.0 | (2.0) |
| Changes in assets and liabilities, excluding the effects of acquisitions | (247.5) | (240.0) | 3.5 | 124.4 | 221.0 | 120.0 | 290.0 | 105.0 | 127.0 |
| Increase / decrease in liabilities | 12.3 | 119.7 | 284.3 | 411.0 | 320.6 | 237.0 | 235.0 | 324.0 | 294.0 |
| Decrease / increase in assets | (259.9) | (359.7) | (280.9) | (286.6) | (99.6) | (117.0) | 55.0 | (219.0) | (167.0) |
| Net cash provided by / used for investing activities | (399.9) | (4,199.6) | (5,459.3) | (1,216.7) | (1,959.7) | (1,429.0) | (10,482.0) | (1,793.0) | (2,081.0) |
| Payments for acquisitions of businesses, net of cash acquired | (37.6) | (3,759.5) | (4,931.8) | (461.7) | (1,102.2) | (557.0) | (9,260.0) | (42.0) | (17.0) |
| Capital expenditures | (347.9) | (441.4) | (534.8) | (758.5) | (908.9) | (874.0) | (874.0) | (1,739.0) | (2,057.0) |
| Receipts from foreign currency swaps | - | - | - | - | 54.5 | 8.0 | - | - | - |
| Other investing activities, net | (14.4) | 1.3 | 7.3 | 3.5 | (3.1) | (6.0) | (5.0) | (12.0) | (7.0) |
| Net cash provided by / used for financing activities | (275.7) | 3,786.8 | 4,063.1 | (463.0) | (935.5) | (89.0) | 8,192.0 | (733.0) | (692.0) |
| Proceeds from issuance of long-term debt | - | 5,250.0 | 1,618.4 | 845.8 | 1,000.0 | 5,201.0 | 3,093.0 | 2,742.0 | 1,894.0 |
| Purchases of preferred stock | (15.0) | - | - | - | - | - | - | - | - |
| Principal payments on debt and other long-term obligations | (35.3) | (80.8) | (101.3) | (116.4) | (102.9) | (96.0) | (119.0) | (105.0) | (86.0) |
| Purchases and redemptions of long-term debt | - | (1,978.7) | (763.0) | (836.9) | (1,069.3) | (4,045.0) | - | (2,346.0) | (12.0) |
| Borrowings under revolving credit facility | 283.0 | 1,253.0 | 976.0 | 1,019.0 | 1,790.0 | 3,440.0 | 2,820.0 | 1,820.0 | 2,110.0 |
| Payments under revolving credit facility | (189.0) | (251.0) | (1,855.0) | (698.0) | (1,360.0) | (4,565.0) | (1,840.0) | (1,725.0) | (2,660.0) |
| Net borrowings / repayments under commercial paper program | - | - | - | - | - | - | - | - | 155.0 |
| Payments for financing costs | - | (78.6) | (30.0) | (15.9) | (19.6) | (42.0) | (29.0) | (31.0) | (24.0) |
| Payments for forward-starting interest rate swap settlements | - | - | - | - | - | - | - | - | - |
| Net increase / decrease in restricted cash | 2.0 | (288.8) | 386.0 | 30.0 | 16.5 | - | - | - | - |
| Net proceeds from issuance of capital stock | 1.6 | 0.3 | 2,980.6 | - | - | 1,326.0 | 4,221.0 | 841.0 | - |
| Net proceeds from issuance of preferred stock | - | - | 950.9 | - | - | - | 1,608.0 | - | - |
| Purchases of capital stock | (303.4) | (36.0) | (99.5) | (21.9) | (29.7) | (25.0) | (23.0) | (34.0) | (44.0) |
| Dividends / distributions paid on common stock | - | - | - | (624.3) | (1,116.4) | (1,239.0) | (1,509.0) | (1,782.0) | (1,912.0) |
| Dividends paid on preferred stock | (19.5) | (2.5) | - | (44.4) | (44.0) | (44.0) | (30.0) | (113.0) | (113.0) |
| Net increase / decrease in cash and cash equivalents - continuing operations | (32.1) | 359.8 | (225.1) | (79.5) | (1,101.2) | 269.0 | (258.0) | (26.0) | (75.0) |
| Cash and cash equivalents at beginning of period | 112.5 | 80.1 | 441.4 | 223.4 | 175.6 | 315.0 | 697.0 | 440.0 | 413.0 |
| Cash and cash equivalents at end of period | 80.1 | 441.4 | 223.4 | 175.6 | 178.8 | 697.0 | 440.0 | 413.0 | 338.0 |

Crown Castle International Corporation
Forecasted Cash Flow Statement

| Fiscal Years Ending Dec. 31 | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Net Income | 1113.2 | 1312.7 | 1439.2 | 1640.2 | 1674.6 | 1726.6 | 1856.0 |
| Reconciliation of Non-Cash Ex. | | | | | | | |
| Depreciation and amortization | 1591 | 1602 | 1620 | 1643 | 1712 | 1785 | 1831 |
| Change in Accts. Receivables, net | -28 | -36 | -38 | -40 | -35 | -30 | -23 |
| Change in Prepaid expenses, deferred site rental receivables and other current assets, net | -136 | -24 | -25 | -26 | -23 | -20 | -15 |
| Change in Deferred Site Rental Receivables | -43 | -88 | -93 | -99 | -87 | -73 | -57 |
| Change in Accounts payable and other accrued liabilities | 83 | 55 | 58 | 60 | 54 | 46 | 35 |
| Change in Other LT Liabilities | 350 | 165 | 175 | 182 | 162 | 138 | 105 |
| Change in LT Prepaid Rent and Other Assets | -1000 | -64 | -68 | -71 | -63 | -54 | -41 |
| Change in Deferred revenues | -25 | 36 | 39 | 40 | 36 | 30 | 23 |
| Cash Provided by Operations | 1904 | 2959 | 3106 | 3330 | 3429 | 3549 | 3713 |
| Less | | | | | | | |
| Capital Expenditures | -1700 | -1785 | -1874 | -2437 | -2558 | -2303 | -2648 |
| Business Acquisitions | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Change in Current Portion of Op Lease Liability | 235 | -6 | -4 | -4 | -3 | 60 | 0 |
| Change in Operating Lease ROU Assets | -147 | -178 | -208 | -433 | -455 | -317 | -443 |
| Change in LT Operating Lease Liability | 165 | 170 | 175 | 181 | 186 | 192 | 197 |
| Cash Used for Investing Activities | -1446 | -1798 | -1910 | -2693 | -2830 | -2368 | -2893 |
| Plus | | | | | | | |
| Proceeds from Issuance of LT Debt | -610 | 522 | 538 | 554 | 571 | 1960 | 431 |
| Change in Current Portion of LT Debt | -100 | 1548 | -702 | 2497 | 236 | -3579 | 1637 |
| Payment of Dividends | -2241 | -2266 | -2340 | -2389 | -2439 | -2577 | -2651 |
| Repurchases of Common Stock | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Proceeds from CS Issuance | 2577 | 72 | 907 | 72 | 72 | 2744 | 656 |
| Changes in AOCI | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| Net cash provided (used) by financing activities | -373 | -124 | -1596 | 735 | -1560 | -1452 | 73 |
| + Cash at Beginning of the Year | 333 | 417 | 1455 | 1054 | 2426 | 1465 | 1193 |
| Cash at the End of the Year | 417 | 1455 | 1054 | 2426 | 1465 | 1193 | 2087 |

Crown Castle International Corporation
Common Size Income Statement

| <i>Fiscal Years Ending Dec. 31</i> | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Net revenues | 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% | 100.00% | 100.00% | 100.00% |
| Site rental | 91.19% | 87.32% | 82.75% | 81.01% | 82.38% | 82.45% | 87.76% | 89.31% | 88.37% | 88.57% | 88.76% | 88.95% | 89.23% | 89.41% | 89.50% | 89.64% |
| Network services and other | 8.81% | 12.68% | 17.25% | 18.99% | 17.62% | 17.55% | 12.24% | 10.69% | 11.63% | 11.43% | 11.24% | 11.05% | 10.77% | 10.59% | 10.50% | 10.36% |
| Total operating expenses | -65.94% | -65.69% | -69.27% | -73.42% | -74.18% | -75.80% | -93.70% | -74.25% | -72.95% | -70.65% | -69.48% | -68.34% | -67.18% | -66.99% | -67.02% | -66.97% |
| Site rental | -23.68% | -22.17% | -23.97% | -25.61% | -26.31% | -26.12% | -26.89% | -26.26% | -25.37% | -24.78% | -24.84% | -24.89% | -24.97% | -25.02% | -25.05% | -25.08% |
| Network services and other | -5.26% | -7.80% | -10.61% | -11.32% | -9.76% | -10.64% | -9.38% | -8.08% | -9.09% | -8.94% | -8.79% | -8.64% | -8.42% | -8.28% | -8.21% | -8.10% |
| General and administrative | -8.53% | -8.74% | -7.45% | -7.27% | -8.49% | -9.46% | -10.01% | -10.48% | -10.65% | -10.38% | -10.51% | -10.51% | -10.47% | -10.50% | -10.49% | -10.49% |
| Asset write-down charges | -1.10% | -0.64% | -0.47% | -0.40% | -0.91% | -0.87% | -0.40% | -0.48% | -0.33% | -0.19% | -0.26% | -0.32% | -0.30% | -0.31% | -0.30% | -0.39% |
| Acquisition and integration costs | -0.16% | -0.75% | -0.89% | -0.96% | -0.43% | -0.43% | -1.43% | -0.50% | -0.23% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Depreciation, amortization and accretion | -27.20% | -25.59% | -25.87% | -27.86% | -28.28% | -28.28% | -29.17% | -28.44% | -27.28% | -26.35% | -25.09% | -23.98% | -23.02% | -22.89% | -22.97% | -22.91% |
| Operating income / loss | 34.06% | 34.31% | 30.73% | 26.58% | 25.82% | 24.20% | 22.73% | 25.75% | 27.05% | 29.35% | 30.52% | 31.66% | 32.82% | 33.01% | 32.98% | 33.03% |
| Nonoperating income / expense | -25.21% | -30.17% | -21.97% | -17.11% | -12.89% | -14.66% | -13.51% | -13.82% | -11.76% | -10.54% | -9.54% | -9.92% | -9.37% | -10.16% | -10.30% | -9.33% |
| Interest expense and amortization of defeas | -24.97% | -24.71% | -20.58% | -16.20% | -14.39% | -13.13% | -13.89% | -11.96% | -11.85% | -10.73% | -9.75% | -10.31% | -9.68% | -10.69% | -10.66% | -9.64% |
| Gains / losses on retirement of long-term | 0.00% | -5.43% | -1.30% | -1.26% | -0.11% | -1.33% | -0.09% | -1.97% | -0.03% | - | - | - | - | - | - | - |
| Net gain / loss on interest rate swaps | - | - | - | - | - | 0.00% | - | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Interest income | 0.03% | 0.19% | 0.03% | 0.01% | 0.05% | 0.03% | 0.45% | 0.09% | 0.10% | 0.07% | 0.08% | 0.27% | 0.19% | 0.41% | 0.24% | 0.19% |
| Other income / expense | -0.27% | -0.22% | -0.14% | 0.34% | 1.56% | -0.23% | 0.02% | 0.02% | 0.02% | 0.12% | 0.12% | 0.12% | 0.12% | 0.12% | 0.12% | 0.12% |
| Income / loss from continuing operations before | 8.85% | 4.14% | 8.76% | 9.47% | 12.93% | 9.54% | 11.07% | 11.94% | 15.29% | 18.81% | 20.97% | 21.74% | 23.45% | 22.85% | 22.67% | 23.70% |
| Benefit / provision for income taxes | -0.41% | 4.11% | -6.66% | 0.32% | 1.40% | -0.43% | -0.61% | -0.35% | -0.36% | -0.38% | -0.42% | -0.43% | -0.47% | -0.46% | -0.45% | -0.47% |
| Income / loss from continuing operations | 8.43% | 8.26% | 2.09% | 9.79% | 14.34% | 9.10% | 9.21% | 11.58% | 14.92% | 18.44% | 20.55% | 21.30% | 22.98% | 22.39% | 22.22% | 23.22% |
| Income / loss from discontinued operations, | - | - | 1.18% | 1.48% | 27.27% | - | - | - | - | - | - | - | - | - | - | - |
| Net income / loss | 8.43% | 8.26% | 3.28% | 11.27% | 41.60% | 9.10% | 8.60% | 11.58% | 14.92% | 18.44% | 20.55% | 21.30% | 22.98% | 22.39% | 22.22% | 23.22% |
| Net income / loss attributable to the noncon | -0.02% | -0.51% | -0.13% | -0.23% | -0.09% | - | - | - | - | - | - | - | - | - | - | - |
| Net income / loss attributable to CCIC stock | 8.42% | 7.75% | 3.14% | 11.04% | 41.51% | 9.10% | 8.60% | 11.58% | 14.92% | 18.44% | 20.55% | 21.30% | 22.98% | 22.39% | 22.22% | 23.22% |
| Dividends on preferred stock | -1.13% | -0.11% | -0.40% | -1.24% | -1.20% | -0.84% | -1.36% | -2.10% | -1.96% | -1.41% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Net income / loss attributable to CCIC com | 7.29% | 7.64% | 2.75% | 9.79% | 40.31% | 8.26% | 7.24% | 9.48% | 12.96% | 17.03% | 20.55% | 21.30% | 22.98% | 22.39% | 22.22% | 23.22% |

Crown Castle International Corporation

Revenue Decomposition

| <i>Fiscal Years Ending Dec. 31</i> | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E |
|------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Net revenues | 1,879 | 2,033 | 2,433 | 2,866 | 3,539 | 3,664 | 3,921 | 4,356 | 5,423 | 5,773 | 6,038 | 6,386 | 6,755 | 7,138 | 7,479 | 7,771 | 7,992 |
| Site rental | 1,701 | 1,854 | 2,124 | 2,371 | 2,867 | 3,018 | 3,233 | 3,669 | 4,800 | 5,098 | 5,348 | 5,669 | 6,009 | 6,369 | 6,688 | 6,955 | 7,164 |
| Growth Rate | | 8.98% | 14.60% | 11.64% | 20.88% | 5.30% | 7.11% | 13.49% | 30.83% | 6.21% | 5% | 6% | 6% | 6% | 5% | 4% | 3% |
| Network services and other | 178 | 179 | 308 | 494 | 672 | 645 | 688 | 687 | 707 | 675 | 690 | 718 | 746 | 769 | 792 | 816 | 828 |
| Growth Rate | | 0.72% | 72.17% | 60.26% | 35.96% | -3.97% | 6.59% | -0.15% | 2.91% | -4.53% | 3% | 4% | 4% | 3% | 3% | 3% | 2% |
| Tower Revenue | | | | | 2,678 | 2,734 | 2,831 | 2,900 | 3,200 | 3,394 | 3,564 | 3,778 | 4,004 | 4,244 | 4,457 | 4,635 | 4,774 |
| Growth Rate | | | | | - | 2.10% | 3.54% | 2.45% | 10.34% | 6.06% | 5% | 6% | 6% | 6% | 5% | 4% | 3% |
| Fiber/Small Cell Revenue | | | | | 189 | 234 | 403 | 769 | 1,600 | 1,704 | 1,789 | 1,897 | 2,010 | 2,131 | 2,238 | 2,327 | 2,397 |
| Growth Rate | | | | | - | 24.21% | 71.78% | 91.01% | 108.06% | 6.50% | 5% | 6% | 6% | 6% | 5% | 4% | 3% |
| Revenue Per Tenant | | | | | | | | | | | | | | | | | |
| Sprint | 374 | 371 | 446 | 569 | 774 | 664 | 614 | 697 | 672 | 808 | 725 | 958 | 1,283 | 928 | 972 | 1,010 | 1,039 |
| % of Total | 22 | 20% | 21% | 24% | 27% | 22% | 19% | 19% | 14% | 14% | 12% | 15% | 19% | 13% | 13% | 13% | 13% |
| Verizon | 306 | 389 | 404 | 569 | 459 | 453 | 550 | 697 | 864 | 1,097 | 1,268 | 1,022 | 1,081 | 1,142 | 1,197 | 1,243 | 1,279 |
| % of Total | 18% | 21% | 19% | 24% | 16% | 10% | 17% | 19% | 18% | 19% | 21% | 16% | 16% | 16% | 16% | 16% | 16% |
| AT&T | 340 | 389 | 489 | 403 | 631 | 875 | 1,002 | 1,064 | 1,056 | 1,212 | 1,389 | 1,277 | 1,283 | 1,356 | 1,421 | 1,476 | 1,518 |
| % of Total | 20% | 21% | 23% | 17% | 20% | 29% | 31% | 29% | 22% | 21% | 23% | 20% | 19% | 19% | 19% | 19% | 19% |
| T-Mobile | 221 | 204 | 234 | 261 | 659 | 664 | 744 | 844 | 912 | 1,270 | 1,208 | 1,533 | 1,756 | 1,570 | 1,496 | 1,554 | 1,598 |
| % of Total | 13% | 11% | 11% | 11% | 23% | 22% | 23% | 23% | 19% | 22% | 20% | 24% | 26% | 22% | 20% | 20% | 20% |
| All Others | 459 | 500 | 552 | 664 | 344 | 362 | 323 | 367 | 1,296 | 1,386 | 1,449 | 1,597 | 1,351 | 2,141 | 2,393 | 2,487 | 2,557 |
| % of Total | 27% | 27% | 26% | 28% | 12% | 12% | 10% | 10% | 27% | 14% | 24% | 25% | 20% | 30% | 32% | 32% | 32% |
| Revenue Per Tower | | | | | | \$68,351 | \$70,768 | \$72,500 | \$80,000 | \$84,721 | \$88,870 | \$93,968 | \$99,359 | \$105,060 | \$110,041 | \$114,160 | \$117,296 |
| Revenue Per Mile of Fiber | | | | | | \$14,648 | \$15,192 | \$12,817 | \$24,615 | \$21,300 | \$22,089 | \$23,129 | \$24,221 | \$25,521 | \$26,637 | \$27,539 | \$28,198 |
| Number of Towers | | | | | | 40,000 | 40,000 | 40,000 | 40,000 | 40,061 | 40,100 | 40,200 | 40,300 | 40,400 | 40,500 | 40,600 | 40,700 |
| Miles of Fiber | | | | | | 16,000 | 26,500 | 60,000 | 65,000 | 80,000 | 81,000 | 82,000 | 83,000 | 83,500 | 84,000 | 84,500 | 85,000 |

*Sold International Towers in 2014

*Didn't Break Out Site Rental Pre-2015

Crown Castle International Corporation
Value Driver Estimation

| <i>Fiscal Years Ending Dec. 31</i> | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E |
|--|--------------|-----------------|-----------------|----------------|----------------|---------------|-----------------|----------------|----------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|
| NOPLAT: | 868 | 861 | 1204 | 1117 | 1156 | 1238 | 1254 | 1655 | 1845 | 1989 | 2171 | 2366 | 2578 | 2719 | 2829 | 2918 |
| Operating Revenues | 2033 | 2433 | 2866 | 3539 | 3664 | 3921 | 4255 | 5370 | 5763 | 6038 | 6386 | 6755 | 7138 | 7479 | 7771 | 7992 |
| Plus: | | | | | | | | | | | | | | | | |
| Implied Interest on Operating Leases | | 138 | 150 | 207 | 273 | 282 | 275 | 277 | 290 | 221 | 226 | 232 | 240 | 256 | 272 | 283 |
| Less: | | | | | | | | | | | | | | | | |
| COGS | 588 | 729 | 991 | 1307 | 1321 | 1441 | 1543 | 1844 | 1986 | 2036 | 2148 | 2265 | 2384 | 2491 | 2584 | 2652 |
| Site Rental | -481 | -539 | -687 | -906 | -964 | -1024 | -1144 | -1410 | -1462 | -1496 | -1586 | -1681 | -1782 | -1871 | -1946 | -2005 |
| Network Services and other | -107 | -190 | -304 | -400 | -358 | -417 | -399 | -434 | -524 | -540 | -561 | -584 | -601 | -619 | -638 | -647 |
| SGA | | 213 | 214 | 257 | 311 | 371 | 426 | 563 | 614 | 627 | 671 | 710 | 747 | 785 | 815 | 838 |
| Depreciation & Amortization | 553 | 623 | 741 | 986 | 1036 | 1109 | 1241 | 1527 | 1572 | 1591 | 1602 | 1620 | 1643 | 1712 | 1785 | 1831 |
| Other Operating Expenses | 26 | 34 | 39 | 48 | 49 | 51 | 78 | 53 | 32 | 12 | 17 | 21 | 22 | 23 | 23 | 31 |
| Asset Write-down Charges | -22 | -16 | -14 | -14 | -33 | -34 | -17 | -26 | -19 | -12 | -17 | -21 | -22 | -23 | -23 | -31 |
| Acquisition and Integration Costs | -3 | -18 | -26 | -34 | -16 | -17 | -61 | -27 | -13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBITA | 866 | 972 | 1030 | 1148 | 1219 | 1231 | 1242 | 1660 | 1849 | 1993 | 2175 | 2371 | 2582 | 2724 | 2834 | 2923 |
| Less: | | | | | | | | | | | | | | | | |
| Adjusted Taxes | 2 | 1 | 1 | 9 | 3 | 3 | 2 | 7 | 6 | 4 | 4 | 5 | 5 | 5 | 5 | 5 |
| Plus: | | | | | | | | | | | | | | | | |
| Change in Deferred Taxes | 5 | -110 | 174 | -22 | -61 | 9 | 15 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Marginal Tax Rate | 0.44% | -0.10% | 0.10% | -1.33% | -0.18% | 0.49% | 0.42% | 0.89% | 0.90% | 0.68% | 0.68% | 0.68% | 0.68% | 0.68% | 0.68% | 0.68% |
| Invested Capital (IC): | 10826 | 15861 | 20207 | 19574 | 19725 | 19982 | 24769 | 24825 | 22261 | 23383 | 23526 | 23831 | 24894 | 26049 | 27504 | 27926 |
| Working Capital | -23 | 597 | 345 | -65 | -91 | 112 | -500 | -579 | -974 | -759 | -875 | -925 | -978 | -1025 | -320 | -1095 |
| Total Current Assets | 514 | 1388 | 1258 | 906 | 981 | 1325 | 1134 | 1229 | 1204 | 1453 | 1464 | 1548 | 1636 | 1714 | 2525 | 1832 |
| Cash, cash equivalents, and restricted cash | 332 | 1017 | 799 | 335 | 310 | 692 | 435 | 408 | 333 | 417 | 369 | 390 | 412 | 432 | 1193 | 462 |
| Receivables, net | 77 | 193 | 250 | 313 | 313 | 374 | 398 | 501 | 596 | 624 | 660 | 699 | 738 | 774 | 804 | 826 |
| Prepaid expenses, deferred site rental receivables and other current assets, net | 104 | 178 | 209 | 258 | 358 | 259 | 301 | 320 | 275 | 411 | 434 | 459 | 485 | 509 | 529 | 544 |
| Prepaid expenses | 81 | 104 | 132 | 139 | 133 | 129 | 162 | 172 | 107 | 218 | 231 | 244 | 258 | 270 | 281 | 289 |
| Other current assets | 23 | 74 | 77 | 119 | 225 | 130 | 139 | 148 | 168 | 192 | 203 | 215 | 227 | 238 | 248 | 255 |
| Less Total Current Liabilities | 537 | 791 | 913 | 971 | 1072 | 1213 | 1634 | 1808 | 2178 | 2211 | 2339 | 2474 | 2614 | 2739 | 2846 | 2927 |
| Accounts payable and other accrued liabilities | 370 | 550 | 653 | 691 | 749 | 860 | 1177 | 1310 | 1521 | 1579 | 1670 | 1766 | 1867 | 1956 | 2032 | 2090 |
| Accounts payable | 32 | 116 | 145 | 162 | 160 | 189 | 249 | 313 | 334 | 352 | 372 | 394 | 416 | 436 | 453 | 466 |
| Accrued interest | 65 | 53 | 66 | 67 | 67 | 97 | 132 | 148 | 169 | 177 | 187 | 198 | 209 | 219 | 228 | 234 |
| Other accrued liabilities | 105 | 140 | 182 | 182 | 200 | 221 | 339 | 351 | 361 | 418 | 442 | 468 | 494 | 518 | 538 | 553 |
| Deferred revenues | 167 | 241 | 260 | 280 | 323 | 353 | 457 | 498 | 657 | 632 | 669 | 707 | 747 | 783 | 814 | 837 |
| Net PPE | 4,861 | 6,918 | 8,948 | 8,983 | 9,580 | 9,805 | 12,933 | 13,676 | 14,666 | 15,017 | 15,442 | 15,938 | 16,973 | 18,062 | 18,821 | 19,880 |
| Other Long-Term Operating Assets | 6586 | 9323 | 12321 | 12322 | 12184 | 12152 | 14890 | 14487 | 11085 | 11990 | 11991 | 12025 | 12286 | 12563 | 12692 | 12934 |
| Other Intangible Assets, Net | 2178 | 2942 | 4058 | 3682 | 3780 | 3650 | 5962 | 5516 | 4836 | 4594 | 4352 | 4111 | 3869 | 3627 | 3385 | 3143 |
| Long-term prepaid rent and other assets, Net | 250 | 629 | 682 | 797 | 776 | 820 | 879 | 920 | 116 | 1116 | 1181 | 1249 | 1320 | 1383 | 1437 | 1478 |
| PV of Operating Leases | 4158 | 5752 | 7580 | 7843 | 7628 | 7682 | 8049 | 8051 | 6133 | 6280 | 6457 | 6665 | 7098 | 7553 | 7870 | 8313 |
| Other Long-Term Operating Liabilities | 598 | 976 | 1406 | 1666 | 1949 | 2087 | 2554 | 2759 | 2516 | 2866 | 3031 | 3206 | 3388 | 3550 | 3688 | 3793 |
| Free Cash Flow (FCF): | | | | | | | | | | | | | | | | |
| NOPLAT | 868 | 861 | 1204 | 1117 | 1156 | 1238 | 1254 | 1655 | 1845 | 1989 | 2171 | 2366 | 2578 | 2719 | 2829 | 2918 |
| Change in IC | | 5035 | 4346 | -633 | 151 | 257 | 4786 | 56 | -2564 | 1122 | 143 | 305 | 1063 | 1156 | 1455 | 422 |
| FCF | | -4173.26 | -3142.19 | 1750.28 | 1004.60 | 980.34 | -3532.04 | 1598.86 | 4408.23 | 866.79 | 2027.67 | 2061.58 | 1515.00 | 1563.32 | 1374.22 | 2496.39 |
| Return on Invested Capital (ROIC): | | | | | | | | | | | | | | | | |
| NOPLAT | 868 | 861 | 1204 | 1117 | 1156 | 1238 | 1254 | 1655 | 1845 | 1989 | 2171 | 2366 | 2578 | 2719 | 2829 | 2918 |
| Beg. IC | | 10826 | 15861 | 20207 | 19574 | 19725 | 19982 | 24769 | 24825 | 22261 | 23383 | 23526 | 23831 | 24894 | 26049 | 27504 |
| ROIC | | 7.96% | 7.59% | 5.53% | 5.90% | 6.27% | 6.28% | 6.68% | 7.43% | 8.93% | 9.28% | 10.06% | 10.82% | 10.92% | 10.86% | 10.61% |
| Economic Profit (EP): | | | | | | | | | | | | | | | | |
| Beg. IC | | 10826 | 15861 | 20207 | 19574 | 19725 | 19982 | 24769 | 24825 | 22261 | 23383 | 23526 | 23831 | 24894 | 26049 | 27504 |
| x (ROIC - WACC) | | 0.03 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.04 | 0.04 | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 |
| EP | | 320.08 | 411.19 | 106.81 | 177.22 | 251.54 | 255.26 | 416.72 | 603.61 | 875.88 | 1001.95 | 1190.29 | 1386.45 | 1474.63 | 1526.76 | 1543.08 |

Crown Castle International Corporation
Discounted Cash Flow (DCF) and Economic Profit (EP) Valuation Models
Key Inputs:

| | |
|---------------------|--------|
| CV Growth of NOPLAT | 1.50% |
| CV Year ROIC | 10.61% |
| WACC | 5.00% |
| Cost of Equity | 5.45% |

| <i>Fiscal Years Ending Dec. 31</i> | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E CV |
|------------------------------------|-------|-------|-------|-------|-------|-------|----------|
|------------------------------------|-------|-------|-------|-------|-------|-------|----------|

DCF Model:

| | | | | | | | |
|-----------------------|-----|-------|-------|-------|-------|-------|--------|
| Free Cash Flow (FCF) | 867 | 2,028 | 2,062 | 1,515 | 1,563 | 1,374 | 2,496 |
| Continuing Value (CV) | | | | | | | 71,604 |
| PV of FCF | 826 | 1,839 | 1,781 | 1,246 | 1,225 | 1,026 | 53,435 |

| | |
|--------------------------------|--------|
| Value of Operating Assets: | 61,377 |
| Add: Non-Operating Adjustments | 37,253 |
| Add: Excess Cash | - |
| Add: Marketable Securities | - |
| Less: Value of Debt | 18,121 |
| Less: PV of Operating Leases | 5,511 |

| | |
|----------------------------------|---------------|
| Value of Equity | 74,998 |
| Shares Outstanding | 416.75 |
| Intrinsic Value of Last FYE | 179.96 |
| Implied Price as of Today | 181.39 |

EP Model:

| | | | | | | | |
|-----------------------|-----|-------|-------|-------|-------|-------|--------|
| Economic Profit (EP) | 876 | 1,002 | 1,190 | 1,386 | 1,475 | 1,527 | 1,543 |
| Continuing Value (CV) | | | | | | | 44,100 |
| PV of EP | 834 | 909 | 1,028 | 1,141 | 1,155 | 1,139 | 32,910 |

| | |
|--------------------------------|--------|
| Total PV of EP | 39,116 |
| Invested Capital (last FYE) | 22,261 |
| Value of Operating Assets: | 61,377 |
| Add: Non-Operating Adjustments | 37,253 |
| Add: Excess Cash | - |
| Add: Marketable Securities | - |
| Less: Value of Debt | 18,121 |
| Less: PV of Leases | 5,511 |

| | |
|----------------------------------|------------------|
| Value of Equity | 74,998 |
| Shares Outstanding | 416.75 |
| Intrinsic Value of Last FYE | \$ 179.96 |
| Implied Price as of Today | \$ 181.39 |

Crown Castle International Corporation

Relative Valuation Models

| Query | Ticker | Company | Price | EPS 2020E | EPS 2021E | P/E 20 | P/E 21 | FFO/S 2020E | FFO/S 2021E | P/FFO 2020E | P/FFO 2021E |
|---------|--------|--------------------|-----------|--------------|--------------|---------------|--------------|----------------|----------------|----------------|----------------|
| ican | AMT | American Tower | \$ 254.06 | \$4.45 | \$5.03 | 57.09 | 50.51 | 8.03 | 8.79 | 31.6 | 28.90 |
| Com | SBA | SBA Communications | \$ 314.83 | \$2.02 | \$2.88 | 155.86 | 109.32 | 8.46 | 9.48 | 37.2 | 33.21 |
| Average | | | | | | 106.47 | 50.51 | 8.25 | 9.14 | 34.4 | 31.06 |

| | | | | | | | | | | |
|-----|----------------------------|----------|--------|--------|------|------|------|------|-------|------|
| CCI | Crown Castle International | \$167.05 | \$2.38 | \$2.93 | 70.2 | 57.1 | 6.06 | 6.50 | 27.57 | 25.7 |
|-----|----------------------------|----------|--------|--------|------|------|------|------|-------|------|

Implied Relative Value:

| | |
|--------------------|--------------|
| P/E (EPS20) | 202.6 |
| P/E (EPS21) | 147.8 |
| P/FFO (FFO/S 2020) | 208.6 |
| P/FFO (FFO/S 2021) | 201.8 |

Crown Castle International Corporation

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

| <i>Fiscal Years Ending Dec. 31</i> | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E |
|------------------------------------|------------------|---------|---------|---------|---------|---------|---------|
| FFO per share | \$ 5.99 | \$ 6.47 | \$ 6.69 | \$ 7.17 | \$ 7.29 | \$ 7.29 | \$ 7.66 |
| Key Assumptions | | | | | | | |
| CV growth of EPS | 1.50% | | | | | | |
| CV Year ROE | 16.21% | | | | | | |
| Cost of Equity | 5.45% | | | | | | |
| Future Cash Flows | | | | | | | |
| P/FFO Multiple (CV Year) | | | | | | | 21.81 |
| FFO/S (CV Year) | | | | | | | 7.66 |
| Future Stock Price | | | | | | | 167.00 |
| Dividends Per Share | 4.81 | 5.05 | 5.15 | 5.25 | 5.36 | 5.47 | 5.58 |
| Discounted Cash Flows | 4.56 | 4.54 | 4.39 | 4.25 | 4.11 | 3.97 | 119.00 |
| Intrinsic Value as of Last FYE | \$ 144.82 | | | | | | |
| Implied Price as of Today | \$ 145.97 | | | | | | |

Crown Castle International Corporation
Weighted Average Cost of Capital (WACC) Estimation
Cost of Equity:

| | |
|-----------------------|--------------|
| Risk-Free Rate | 1.27% |
| Beta | 0.68 |
| Equity Risk Premium | 6.16% |
| Cost of Equity | 5.45% |

ASSUMPTIONS:

10-Year Treasury Bond
 Real Estate Industry Beta
 1928-2019 Geometric Average over the 10-Year Treasury Bond

Cost of Debt:

| | |
|-------------------------------|--------------|
| Risk-Free Rate | 1.27% |
| Implied Default Premium | 2.34% |
| Pre-Tax Cost of Debt | 3.60% |
| Marginal Tax Rate | 0.68% |
| After-Tax Cost of Debt | 3.58% |

30-Year Treasury

YTM on latest CCI 30Y Bond Issuance

Market Value of Common Equity:

| | |
|--------------------------|--------------------------|
| Total Shares Outstanding | 448,428,571.43 |
| Current Stock Price | \$167.05 |
| MV of Equity | 74,909,992,857.14 |

MV Weights

75.79%

Market Value of Debt:

| | |
|-------------------------|--------------------------|
| Short-Term Debt | - |
| Current Portion of LTD | 100,000,000.00 |
| Long-Term Debt | 18,021,000,000.00 |
| PV of Operating Leases | 5,810,000,000.00 |
| MV of Total Debt | 23,931,000,000.00 |

24.21%

Market Value of the Firm

98,840,992,857.14

100.00%

Estimated WACC

5.00%

Crown Castle International Corporation

Key Management Ratios

| <i>Fiscal Years Ending Dec. 31</i> | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E |
|---|--------|--------|--------|--------|--------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Liquidity Ratios: | | | | | | | | | | | | | | | | |
| Quick Ratio ((Cash+AR)/CL) | 1.02 | 0.98 | 1.39 | 0.70 | 0.73 | 1.11 | 0.64 | 0.64 | 0.48 | 0.49 | 0.56 | 0.56 | 0.55 | 0.37 | 0.77 | 0.68 |
| Current Ratio (CA/CL) | 1.49 | 1.28 | 1.18 | 1.38 | 1.15 | 1.38 | 0.88 | 0.87 | 0.63 | 0.69 | 0.68 | 0.71 | 0.64 | 0.45 | 0.97 | 0.80 |
| Cash Ratio (Cash/CL) | 0.83 | 0.82 | 1.06 | 0.36 | 0.36 | 0.72 | 0.34 | 0.29 | 0.17 | 0.20 | 0.39 | 0.34 | 0.42 | 0.24 | 0.46 | 0.48 |
| Asset-Management Ratios: | | | | | | | | | | | | | | | | |
| Total Asset Turnover (Total Assets/Sales) | 0.37 | 0.26 | 0.26 | 0.27 | 0.28 | 0.28 | 0.21 | 0.22 | 0.19 | 0.19 | 0.19 | 0.16 | 0.16 | 0.17 | 0.17 | 0.17 |
| Receivables Turnover (Sales/Average AR) | | 18.01 | 12.94 | 12.57 | 11.69 | 11.42 | 11.03 | 11.95 | 10.51 | 9.89 | 9.94 | 9.94 | 9.94 | 9.90 | 9.85 | 9.80 |
| Financial Leverage Ratios: | | | | | | | | | | | | | | | | |
| Debt to Assets | 0.65 | 0.72 | 0.56 | 0.56 | 0.55 | 0.54 | 0.50 | 0.51 | 0.47 | 0.44 | 0.47 | 0.46 | 0.50 | 0.51 | 0.47 | 0.49 |
| Debt to Equity | 2.88 | 3.93 | 1.67 | 1.77 | 1.71 | 1.61 | 1.31 | 1.39 | 1.73 | 1.46 | 1.76 | 1.75 | 2.15 | 2.39 | 1.86 | 2.06 |
| Profitability Ratios: | | | | | | | | | | | | | | | | |
| ROE (NI/Equity) | 6.21% | 6.30% | 1.13% | 5.14% | 20.83% | 4.29% | 2.50% | 4.23% | 7.12% | 8.61% | 11.87% | 13.01% | 15.79% | 17.27% | 14.90% | 16.21% |
| Gross Margin (Net Sales/COGS) | 45.01% | 44.79% | 44.35% | 47.48% | 48.97% | 51.09% | 53.38% | 56.06% | 58.73% | 60.37% | 62.40% | 55.08% | 57.69% | 60.29% | 61.86% | 63.82% |
| Pretax ROA (Pretax Income/Total Assets) | 1.71% | 0.63% | 1.22% | 1.58% | 2.16% | 1.65% | 1.46% | 2.10% | 2.30% | 2.84% | 3.38% | 3.69% | 4.75% | 5.26% | 5.38% | 6.96% |
| Payout Policy Ratios: | | | | | | | | | | | | | | | | |
| Dividends per Share | | | | | | 3.61 | 3.90 | 4.28 | 4.58 | 4.81 | 5.05 | 5.15 | 5.25 | 5.36 | 5.47 | 5.58 |
| Earnings per Share | | | | | | 0.95 | 0.80 | 1.23 | 1.79 | 2.29 | 2.92 | 3.17 | 3.61 | 3.68 | 3.66 | 3.90 |
| FFO | | | | | | 4.31 | 4.21 | 5.20 | 5.85 | 6.03 | 6.49 | 6.73 | 7.22 | 7.44 | 7.45 | 7.75 |
| Payout Ratio (dividends/FFO) | | | | | | 83.72% | 92.71% | 82.25% | 78.34% | 79.75% | 77.76% | 76.49% | 72.75% | 72.02% | 73.40% | 71.91% |

Crown Castle International Corporation
Present Value of Operating Lease Obligations

| Fiscal Years Ending Dec. 31 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Year 1 | 289.3 | 298.4 | 301.3 | 428.8 | 565.6 | 569.3 | 564.1 | 573.7 | 635.3 | 640.0 | 534.0 |
| Year 2 | 296.2 | 302.9 | 305.3 | 430.3 | 573.1 | 574.7 | 571.3 | 577.6 | 632.8 | 531.0 | 528.0 |
| Year 3 | 300.6 | 305.6 | 507.3 | 434.2 | 578.6 | 578.8 | 575.6 | 581.6 | 622.6 | 628.0 | 52.0 |
| Year 4 | 303.6 | 306.2 | 308.8 | 437.7 | 582.2 | 580.2 | 579.4 | 579.2 | 618.0 | 623.0 | 520.0 |
| Year 5 | 304.5 | 306.9 | 311.2 | 440.6 | 583.8 | 581.0 | 580.9 | 579.6 | 609.8 | 619.0 | 517.0 |
| Thereafter | 3714.6 | 3659.9 | 3907.9 | 5761.4 | 7546.1 | 8067.1 | 7669.4 | 7741.7 | 7941.2 | 8054.0 | 6357.0 |
| Total Minimum Payments | 5208.9 | 5179.9 | 5641.8 | 7933.1 | 10429.3 | 10951.2 | 10540.7 | 10633.3 | 11059.6 | 11095.0 | 8508.0 |
| Less: Cumulative Interest | 1380.9 | 1353.7 | 1483.8 | 2181.4 | 2848.9 | 3107.8 | 2912.2 | 2950.9 | 3011.1 | 3044.4 | 2325.6 |
| PV of Minimum Payments | 3828.0 | 3826.2 | 4157.9 | 5751.7 | 7580.4 | 7843.4 | 7628.5 | 7682.4 | 8048.6 | 8050.6 | 6182.4 |
| Implied Interest in Year 1 Payment | | 137.8 | 137.7 | 149.7 | 207.1 | 272.9 | 282.4 | 274.6 | 276.6 | 289.7 | 289.8 |
| Pre-Tax Cost of Debt | 3.60% | 3.60% | 3.60% | 3.60% | 3.60% | 3.60% | 3.60% | 3.60% | 3.60% | 3.60% | 3.60% |
| Years Implied by Year 6 Payment | 12.2 | 11.9 | 12.6 | 13.1 | 12.9 | 13.9 | 13.2 | 13.4 | 13.0 | 13.0 | 12.3 |
| Expected Obligation in Year 6 & Beyond | 304.503 | 306.938 | 311.242 | 440.573 | 583.775 | 581.02 | 580.894 | 579.585 | 609.796 | 619 | 517 |
| Present Value of Lease Payments | | | | | | | | | | | |
| PV of Year 1 | 279.3 | 288.0 | 290.8 | 413.9 | 545.9 | 549.5 | 544.5 | 553.8 | 613.2 | 617.8 | 515.4 |
| PV of Year 2 | 276.0 | 282.2 | 284.4 | 401.0 | 533.9 | 535.5 | 532.3 | 538.1 | 589.6 | 494.7 | 491.9 |
| PV of Year 3 | 270.4 | 274.8 | 456.2 | 390.5 | 520.3 | 520.5 | 517.7 | 523.0 | 559.9 | 564.8 | 46.8 |
| PV of Year 4 | 263.6 | 265.8 | 268.1 | 380.0 | 505.4 | 503.7 | 502.9 | 502.8 | 536.4 | 540.8 | 451.4 |
| PV of Year 5 | 255.1 | 257.2 | 260.8 | 369.2 | 489.2 | 486.8 | 486.7 | 485.6 | 511.0 | 518.7 | 433.2 |
| PV of 6 & beyond | 2483.6 | 2458.2 | 2597.6 | 3797.1 | 4985.7 | 5247.4 | 5044.3 | 5079.0 | 5238.5 | 5313.9 | 4243.6 |
| Capitalized PV of Payments | 3828.0 | 3826.2 | 4157.9 | 5751.7 | 7580.4 | 7843.4 | 7628.5 | 7682.4 | 8048.6 | 8050.6 | 6182.4 |

Crown Castle International Corporation*Effects of CS Issuances on CS Account and Shares Outstanding*

Cost of Equity: 5.45%
 Current Stock Price: \$167.05

| <i>Fiscal Years Ending Dec. 31</i> | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E |
|---|----------------------|--------------------|--------------------|--------------------|--------------------|----------------------|--------------------|
| Increase in Shares Outstanding: | 15,428,571 | 428,571 | 5,428,571 | 428,571 | 428,571 | 16,428,571 | 3,928,571 |
| Current Price | \$ 167.05 | \$ 167.05 | \$ 167.05 | \$ 167.05 | \$ 167.05 | \$ 167.05 | \$ 167.05 |
| Increase in Common Stock Account: | 2,577,342,857 | 71,592,857 | 906,842,857 | 71,592,857 | 71,592,857 | 2,744,392,857 | 656,267,857 |
| Change in Treasury Stock | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Expected Price of Repurchased Shares: | \$ 167.05 | \$ 176.16 | \$ 185.77 | \$ 195.90 | \$ 206.58 | \$ 217.85 | \$ 229.73 |
| Number of Shares Repurchased: | - | - | - | - | - | - | - |
| Shares Outstanding (beginning of the year) | 416,000,000 | 448,428,571 | 448,857,143 | 454,285,714 | 454,714,286 | 455,142,857 | 471,571,429 |
| Shares Issued from Convertible Stock | 17,000,000 | | | | | | |
| Plus: Shares Issued Through SBC & Offering | 15,428,571 | 428,571 | 5,428,571 | 428,571 | 428,571 | 16,428,571 | 3,928,571 |
| Less: Shares Repurchased in Treasury | - | - | - | - | - | - | - |
| Shares Outstanding (end of the year) | 448,428,571 | 448,857,143 | 454,285,714 | 454,714,286 | 455,142,857 | 471,571,429 | 475,500,000 |