

# IOI ChartBook – Caterpillar (CAT)

It has taken a lot of digging to estimate a fair value for Caterpillar

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## Three Things You Should Know About Caterpillar

• Famous short-seller Jim Chanos is only half-right about Caterpillar. contact: In 2013, Chanos announced that <u>Caterpillar was his best short idea</u> at the recently, be has reiterated that his short position in the firm still stands

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In 2013, Chanos announced that <u>Caterpillar was his best short idea</u> at the time. More recently, he has reiterated that his <u>short position in the firm still stands</u>. His original investment thesis was based on two ideas: 1) strong demand from Chinese infrastructure projects had created a commodity super-cycle peak that was on the verge of collapse, and 2) Caterpillar used dodgy accounting in several of its acquisitions.

Indeed, Chanos has been remarkably accurate about the extreme drop-off in Chinese basic materials demand and in his contention that some acquisition accounting was dodgy (CAT had to write down a Chinese acquisition because of poor due diligence).

Our perspective on commodity super-cycles is this: While there is some historical evidence that they exist, we are cautious to extrapolate historical examples in the present case. We think that the firm's worst-case near-term revenue scenario is more likely to be flat than falling for reasons explained within the body of the full report. Regarding Caterpillar's recent acquisitions, we think there is still a chance for negative news to be announced in this area, but would view the announcements as having a minimal effect on the value of the firm, if not on the price of the stock.

We do see the possibility of an investable fall in Caterpillar's share price, but the economics of Caterpillar's price falling to the average between our best- and worst-case valuation scenarios is not terribly compelling while the stock is trading in the mid-\$90 range. A professional investor gets paid even when they are half-right. A principle owner of capital, however, only gets paid by being wholly right.

#### Caterpillar is a very well-managed company.

A former boss once advised the author of the report to be cautious when shorting a good company, and we think this is good advice for Caterpillar bears. Our proof of this contention is that even though the firm sells into volatile end markets dependent on commodity prices and government spending projects, since 1989, it has maintained profitable operations every year but one (1992) when viewed on an <u>Owners' Cash Profit</u> (<u>OCP</u>) basis. That is an impressive feat.

• Trump's economic policies are not likely to be an undiluted positive for the firm.

President-elect Trump's infrastructure spending proposals have the potential to benefit a revenue stream that now makes up roughly one-third of Caterpillar's total sales. Even if the spending boosts Caterpillar's domestic sales by 10%, that still provides a revenue tailwind of just over three percentage points. While better than a sharp stick in the eye, this boost would put Caterpillar's near-term revenue growth closer to our worst-case estimates than to our best-case ones, all else held equal. Possibly offsetting this potential tailwind is the fact that over half of Caterpillar's sales are generated overseas, and these revenues would be damaged in a trade war that looks increasingly likely the closer we get to inauguration.

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# Valuation Overview



Figure 1. Source: YCharts, CBOE, IOI Analysis. Geometrical markers show IOI's best-case (triangle), worst-case (square), and equally-weighted average value (circle). Cone-shaped region indicates option market's projection of Caterpillar's future stock price (dotted line represents ask price projection, solid line, bid price projection). Shaded region represents the purchase of an In-the-Money (ITM) put option on Caterpillar's stock. "ESP" = "Effective Sell Price." We have included a section discussing the considerations that went into our decision to structure this bearish investment as the purchase of a long ITM put option. Please see <u>that section</u> for more information.

	IOI Best Case	IOI Worst Case	Historical Median
Year 1-5 Average Revenue Growth	9%	-2%	-1%, 8% (5, 10-year)
Year 1-5 Average Profitability	7%	9%	8% (5 & 10-year)
Year 6-10 Cash Flow Growth	10%	0%	3%

The best- and worst-case revenue growth and profitability figures reflect the influence of Caterpillar's FY 2016 results, three quarters of which have been realized.



Figure 2. Source: CBOE, IOI Analysis

The firm appears slightly overvalued, with only two valuations above the present price, four below, and two (one above, one below) which we consider extremely unlikely. Despite famous fund manager Jim Chanos's high-profile short position on the firm, we consider this a reasonable, but not riskless, bearish investment.



# Valuation Waterfall

### **Revenue Growth**

Core business is US Construction & US Energy – both of which may see demand increases due to infrastructure spending and oil price increases, respectively. Worst-case assumes that spending on equipment for resource extraction and energy production at least stabilizes. Figures here include 19% YTD revenue declines in calculation of average values shown.

#### Profitability

Caterpillar management's ability to manage profitability (measured on an OCP basis) is truly impressive. Even through some terrible downturns like the one at present, OCP margin hugs 8%. Considering that CAT's business depends on commodity demand and government policy – two very fickle drivers, we are impressed at the constancy at which it generates profits.

#### Medium-Term Cash Flow Growth

Attempting to forecast commodity prices and infrastructure demand five years in the future is folly. We look at two scenarios from a statistical perspective. Caterpillar profits have historically reached a plateau and bounced around that plateau for some time. If near-term growth is fast, medium-term is likely to be slow and vice versa. Our meanreversion assumption is wrong if we're at end of supercycle.

### Fair Value Range

Our fair value range extends from \$63 to \$103 / share and excludes the two most extreme valuation scenarios. We believe the present stock price reflects the market's opinion that 1) near-term revenues are likely to increase, 2) nearterm profitability is likely to be high, and 3) medium-term growth is likely to mean revert to a lower level after the nearterm boost.



\$72

\$103

\$101

\$144

Near-term (years 1-5)

# Methodology

IOI analyses focus on three main valuation drivers: revenue growth, profitability, and medium-term cash flow growth. We estimate a best- and worst-case scenario for each of these drivers resulting in a total of  $2^3 = 8$  fair value scenarios based on discounted cash flow methodology. Profitability is measured by Owners' Cash Profit (OCP) margin. We use a discount rate of 10% for large capitalization stocks.

\$46

\$63

\$63

\$88

A wide spread of lowest and highest fair values indicates a firm whose value is uncertain. Risk depends on the stock price's relationship to the valuation range.

Best-case scenarios are represented with a solid line; worst-case scenarios, with a dotted one.



# **Valuation Drivers**

## **Revenue Growth**



Figure 3. Source: Company Statements, IOI Analysis

Our best-case revenue scenario assumes a significant rebound in demand generating a 15% growth in years 2017-2020. In contrast, our worst-case scenario assumes a 2% annual growth during those years. Both scenarios implicitly assume that the idea that commodity prices travel in long run "super-cycles" is incorrect. Our thinking about these revenue growth scenarios are shown in greater detail below.



Figure 4. Source: Company Statements, IOI Analysis. There is a tiny sliver of "Other" in the product-line breakdown in addition to the other three. This segment is involved in refurbishment of used equipment.

Caterpillar's largest revenue source is still the domestic market, and its most important product line is Construction equipment. However, Caterpillar's revenue base is much more diverse. In addition to construction and mining equipment (the "Resources" segment in the figure above), the company manufactures and sells turbines used for oil and gas transmission and energy production, engines for ships, and railroad locomotives. We were struck by the degree to which many of Caterpillar's products competed with those of General Electric.





Figure 5. Source: Company Statements, IOI Analysis

We represent all graphs above on the same scale to give a sense of each geography's relative importance. Much of the 2012 uptick in Resources across regions was likely due to demand for input commodities for China's infrastructure boom. Clearly, the Resources segment has shrunk in importance across the board as China has taken its foot off the infrastructure development gas pedal. Our conceptual model for Caterpillar's revenue stream is that North America and Europe form the company's "base" revenues – growth is tepid, but demand, steady. Asia/Pacific and Latin America represent optionality, with the former much more important than the latter. Note the stability of Energy & Transportation revenues.





Figure 6. Source: Company Statements, IOI Analysis.

Note the relative constancy of the dark blue and gray bands above, representing North America and EMEA, respectively.



Figure 7. Source: Company Statements, IOI Analysis

The importance of the domestic market is easily visible in the chart above. Development in the BRIC (Brazil, Russia, India, and China) was an important driver of Caterpillar's revenue growth in the mid- to late-1990s and again in the early- to mid-aughts, but the steadiness and predictability of the domestic market forms the foundation of the company's revenues.





Figure 8. Source: Company Statements, IOI Analysis.

Caterpillar's first big project in China was supplying 300 pieces of construction equipment for use in the Three Gorges Dam project. The gray line in the figure above shows the 5-year compound annual growth rate (CAGR) for Caterpillar's revenues, which are represented by the blue line. We were struck by the relative regularity of the cycles in the figure above. A revenue increase generating a CAGR in the 10%-12% range is followed by a dependable drop to the 0% level with predictable regularity until the mid-2000s. In the aughts, Chinese infrastructure projects created seemingly insatiable input commodity demand. Mining companies responded by increasing productive capacity by purchasing more production equipment. I am not in the camp of people who think that China is on the verge of collapse due to overbuilding, overleverage, etc., but it does seem very unlikely that a similar swell of demand will appear in China for a while, at least.



Figure 9. Source: Company Statements, IOI Analysis.

Whereas we usually like to look at demand for end products and / or end market geographies, in the case of Caterpillar, we decided that we would never have enough information to build a projection in this way. As such, we have based our best- and worst-case scenarios on what we perceive to be the historical pattern of Caterpillar's revenue increases. Our best-cases scenario mirrors an historical boom period – with revenues roughly doubling in five years (blue dashed line above); our worst-case scenario mirrors an historical trough time, exacerbated by the loss of strong Chinese mining demand (yellow dashed line above).

From our research, we believe that Caterpillar customers tend to purchase too much equipment in boom times, creating excess production capacity. Demand for equipment falls until a point at which older equipment is inefficient enough that it would be cheaper to carry out



projects with newer equipment and / or a new regional boom creates fresh organic demand. At this point the cycle starts again and growth increases again.

One of the arguments underlying Chanos's short position in Caterpillar is that the mid-2000s boom was an occurrence of a peak in a commodity super-cycle. Chanos's argument suggests that the peak of this super-cycle was reached several years ago, and we are now in a period in which prices will steadily head toward a trough.

The best academic research regarding commodity super-cycles is one done by two academics in 2012 (<u>a copy of this paper</u> is posted for members on the IOI site). While they do find statistical evidence of super-cycles since the late-1800s in the price of metals, oil, and agricultural commodities, we find two issues with the research that make it hard to apply to practical investing considerations:

- 1. There are so few occurrences of super-cycles in the period studied
- 2. The shape of the curves differs from commodity to commodity, and a peak is sometimes followed by a dip rather than a trough

In case of metals – the commodity most closely tied to Caterpillar's resources business – there are only three and a half super-cycles identified in the research, and each has different durations and intensities. We doubt that many useful investing conclusions may be drawn from the research for the simple reason that there are too few examples to generalize.

In the case of oil – the commodity most closely related to Caterpillar's energy and transportation business – the cyclical pattern is much different from that demonstrated by metals, with much longer stretches of weak increases and slight dips rather than a few pronounced, strong ups and downs. Are oil super-cycles qualitatively different from metals super-cycles, and if so, why? Might present metals super-cycles take on a pattern similar to historical oil super-cycles, and display only a slight dip after a peak rather than a steep trough? Again, these questions make wholesale belief in a super-cycle or belief that a super-cycle peak necessarily has to be followed by a steep super-cycle trough difficult.

Theorists hypothesize that super-cycles may be caused by technological innovations, which tend to be bunched. This may well be true, but certainly, the propagation rate of innovations in 2016-2017 will be much different than the propagation rate in 1875-1876, simply because of improved communication and transportation. Future super-cycles may then bunch closer together or be extended longer in time than they have in the past.

Because these fundamental questions regarding super-cycles remain outstanding, we believe it better to exclude the concept of super-cycles from our underlying demand environment assumptions.

Our forecasts implicitly assume that the base demand for mining, construction, and energy-production equipment rises slowly over time in a stair-step fashion and will not collapse as a result of the end of a super-cycle. Our best- and worst-case revenue assumptions, added to Caterpillar's historical revenue series back to 1984 would generate a 31-year CAGR of 8.0% and 5.5%, respectively. In contrast, the firm's revenues grew at a compound average annual rate of 6.6% from 1984 – 2015. The nominal increase in US GDP from December 1984 – December 2015 was 4.9% on a compound annual growth basis.



## Profitability

Note that we assess profitability using our favored measure – <u>Owners' Cash Profits (OCP)</u> – a measure similar to Buffett's concept of "Shareholder Earnings."



Figure 10. Source: Company Statements, IOI Analysis

We were impressed by the degree to which Caterpillar management has been able to retain stable profitability during different, and sometimes challenging operating environments. The graphic above might not strike the reader as "stable", but looking at a longer-term chart as below brings the point home.





The company changed the way it accounted for loans to customers in the 2002 - 2004 period. We made a simple correction for this accounting change in our historical series, but this correction may not have incorporated all the bookkeeping line items. Even the simple correction allows the resiliency of the company's profit line to show through. Note that the company was able to generate profits during every year but one – 1992. During this period – the US went through three recessions, one of which was the most severe since the Great Depression.



## **Investment Level**



Expansionary Cash Flow is IOI's measure of investment spending net of asset sales and divestments.

Figure 12. Source: Company Statements, IOI Analysis

For the period shown above, the median proportion of profits spent on investment projects is 44%. Note, however, that the firm generated cash flow from its investments, rather than spending on them, in 2009, and spent nothing in 2010. The last few years have also seen gradually decreasing investment levels and this year will likely to be roughly the same as 2015 or lower (we will not be able to see all investment line items until the 2016 financial statements are filed). The recent drop-off in investment spending reflects the enormous pull back in capital spending among Caterpillar's resource-extracting customers. The present drop-off in basic materials demand is very severe, and Caterpillar's management is clearly adjusting investment spending to match the demand environment.

The big spike in investment in 2011 represents Caterpillar's acquisition of mining vehicle and equipment maker Bucyrus.



Figure 13. Source: Company Statements, IOI Analysis

A longer-term look at Caterpillar's investment spending shows just how different from normal the four-year period from 2013-2016 has been. Investment spending in all the years shown above averages out to roughly 81% of profits. The firm spent heavily in the years not shown (due to the reason mentioned in the profitability section), and including those years, the average shoots up to 88% of profits. In other words, Caterpillar management has been spending four-fifths or more of the owners' profits on investment projects. We look at the relative efficacy of these investments in the Investment Efficacy section below.





Figure 14. Company Statements, IOI Analysis

Investment spending is tied to revenue growth, so we were curious to find out how Caterpillar management invested during years of flat revenue growth like in 1998-2003 (refer to the long-term revenue growth diagram on p. 7). In fact, the company spent heavily during this period – driving Free Cash Flow to Owners (FCFO) negative (i.e., the firm was investing more money than it was generating in profits). We found that the firm borrowed heavily during this time to fund the investment program. Considering that these investments allowed the firm to boost profits very quickly during the mid-aughts Chinese infrastructure boom, we believe the managers made a sensible investment decision.



Figure 15. Source: YCharts Data

Issuance of debt increased Caterpillar's financial leverage just as the Chinese market began booming. The debt-to-asset level at the end of 3Q2016 was 49%.





Figure 16. Source: Company Statements, IOI Analysis

We consider the money loaned to clients to buy equipment and paid back to be "In- / Out-Flows from JVs." In essence, Caterpillar is working collaboratively with clients to pull demand forward and allow revenues to be boosted during boom times. During boom times, the company makes many more loans than it collects. During busts, it cuts back on granting loans and collects those loans that are outstanding. In other words, its investment program allows its revenues to expand quickly during boom times and provides a cushion to cash flow in bust times. The gray band in 2011 is the Bucyrus acquisition, which you can see is large from an historical perspective. This acquisition allowed Caterpillar to expand its mining equipment product offering to be the broadest in the industry. This may not seem like a wise investment today, and it is possible that some portion of goodwill from the Bucyrus acquisition will be judged as "impaired" due to the present mining industry downturn. If this is the case, the company will take a one-time, non-cash accounting charge that will depress accounting earnings. While this does not have a cash effect, the drop in earnings may be enough that Caterpillar will be bound to lower its dividend payout ratio. We did not assess the likelihood of this scenario, but it would likely aid a bearish position if it were to happen.



The company changed its product break-downs after the Bucyrus acquisition, but the simple split between revenues generated by equipment sales and revenues generated by sales of financial services can be compared directly. Notice that Caterpillar is disciplined about the loans that it is making – even in the 2008 boom, the company's revenues from financial services was less than \$4 billion, and the total revenues are consistently in the \$3 - \$4 billion range. As a percentage of revenues, financial services sales are between 6% and 10% for every year in this series, with 2009 being the highest.





Figure 18. Source: Company Statements, IOI Analysis

Our ECF scenario assumes that Caterpillar will generate cash from investments this year, and gradually increase spending over the next four. We assume that ECF as a percentage of OCP will be 45% in 2019-2020 and will average 20% over the entire period.

### Investment Efficacy

Corporate investments lead to profit growth. IOI measures profit growth versus the standard yardstick of nominal GDP growth to assess the efficacy of the company's past investments.



Figure 19. Source: Company Statements, Bureau of Economic Analysis, IOI Analysis

Investment efficacy looks poor on this 10-year basis, however, its efficacy improves when considered over a longer time frame (see figure below).





Figure 20. Source: Company Statements, IOI Analysis

Looking at growth in the company's profits since 1989 versus nominal growth of US GDP, we can see that Caterpillar's substantial, sustained investments have allowed firm profits to grow much faster than the economy at large. This is largely due to its international exposure, and especially to the BRIC boom in the mid-aughts.

That said, we do not believe that there is likely to be the kind of boom the firm saw in the 2006-2007 timeframe for many years to come. China, the region that drove the lion's share of the natural resources boom, is feeling the effects of its infrastructure building frenzy. Chinese banks hold "zombie" loans that are unperforming, but will not be counted as such due to the involvement of local and national government on both sides of the loans. China still needs development in the inland areas especially, but we believe it will be another 10 years at least before the country will be in a position to initiate this work.



We do not believe we have any advantage over other investors in forecasting price cycles for fickle commodities or demand cycles for public infrastructure projects. As such, we have opted to look at medium-term growth (a function of investment efficacy) from a statistical standpoint, similar to our approach for revenues. Considering the firm's revenue's historical tendency to stair-step over time, we have thought about Caterpillar's medium-term growth in terms of stair-steps as well. Given what we see in the present environment, we believe it is extremely unlikely that the company will see a period of rapid profit / cash flow growth in the next five years followed by another five years of rapid cash flow growth. Similarly, we think it is unlikely (though perhaps less so than the rapid-rapid case) that profits / cash flow growth in the near term will be tepid followed by another five-year tepid period. As such, we are removing the two extreme cases from our valuation and focus in on the long-term history assuming fast near-term growth (16%) followed by tepid medium-term growth (0%) for the best case and slow near-term growth (-5% CAGR) followed by robust growth in the medium term (10%) for the worst-case assumption.



## Free Cash Flow to Owners

Free Cash Flow to Owners (FCFO) is the metric IOI uses to value companies. It equals Owners' Cash Profits less Net Expansionary Cash Flow.



Figure 22. Source: Company Statements, IOI Analysis

Our best-case scenario sees the firm generating \$18.8 billion of FCFO over the next five years compared to \$16.2 billion over the last 10 years. Our worst-case scenario sees the firm generating \$10.6 billion over the next 10 years.

# **Investment Structure**

This investment is structured as a long ITM put option, which can be considered as a short position with a hard stop-loss set at the strike price. There are several reasons why we structured the investment in this way:

- 1. Valuation
- 2. Time value
- 3. Market risk

Regarding the valuation, looking back at Figure 1 on page 2, we see that the equal-weighted fair value (i.e. the average of the best-case scenario and worst-case scenario) is \$83 per share. We would like to pick a strike that would allow us a reasonable profit if the stock is trading at the equal-weighted fair value mark when the option expires. This would suggest a strike price at \$85 or \$90, which, for reasons we discuss below, were unattractive to us.

If one did not wish to set aside a large amount of capital for this investment, as is necessary for the ITM investment, one might make a more speculative investment that the true value will gravitate toward one of the lower scenarios and buy a far OTM put option. We discuss that structure at the end of this section.



Regarding time value, the chart below shows the time value for each put contract struck from \$75 to \$125 on the day we published our Tear Sheet.



Figure 23. Source: CBOE, IOI Analysis

Recall that for a positive "expected value" investment (i.e., one that would yield a profit if the stock was at our weighted average valuation at option expiration) we would need to buy the put option struck at \$85 or \$90. Time value on the 85-strike put option was \$7.25 implying an effective sell price (ESP) of (\$85.00 - \$7.25 =) \$77.75. Time value on the 90-strike option was \$9.40, implying an ESP of \$80.60. Since both ESP's are below the expected value, using either of these options would result in a negative expected value investment, which is never a good idea!

In fact, the first positive expected value investment is the put option struck at \$95, and as you can see from the chart, the time value of that option is at its maximum (because that was the ATM strike price). Our strike selection of \$115 was mainly based upon trying to minimize the time value we were paying while increasing our the dollar return of our investment from an expected value basis.

The put option struck at \$105 had \$2.10 more of time value than the put option struck at \$115. This means that an investor in the \$105strike option would have to realize an additional loss of \$210 per contract up front – an increase of nearly 40% over the loss one would realize with the put option struck at \$115.

The put option struck at \$110 only carried about \$1.00 more time value than the 115-strike, so one might chose to conserve capital by buying the 110-strike put option as shown in the diagram below:



Figure 24. Source: CBOE, YCharts, IOI Analysis



Selecting the 110-strike rather than the 115-strike, the ESP is pulled down from \$88.45 to \$87.50.

Buying an ITM option implies the position will have less leverage than one purchased OTM, and requires the investor to risk a greater amount of capital. However, it is more "forgiving" in that the position can be profitable with a smaller downward move in the stock price.



The OTM structure mentioned earlier might take this form:

Here, we have selected the 77.50-strike put option that was asked at \$4.80 at the time these data were taken. This would generate a profit if 1) the stock price fell sharply relatively quickly and / or 2) the price declined to one of the lowest valuation scenarios.

It is worth noting that we selected expirations roughly 1 year in the future even though the 2-year LEAPS were also available. The time value was much higher for the 2-year leaps due to Caterpillar's very high dividend yield. The buyer of a put option basically has to prepay the amount of expected dividends, so we wanted to minimize the number of dividends we were paying for while also getting as good a per-day price for time value as possible.

Our final reason for selecting the 115-strike put option was because our Price-to-Sales analysis of market risk suggested that the \$115 level was as high as the shares were likely to go. Our calculation simply takes the average of our best-case revenue scenarios over the next five years and multiplies it by (in this case) the top quartile Price-to-Sales ratio over the past 10 years. We do not pretend to know what market prices will do in the future, but believe that this metric provides a structure for considering strike price placement.

Obviously, there are several valuation scenarios above the present stock price and the investment's expected value outcome is fairly low, so we are considering opening up only a small allocation with a plan to add more if and when the stock price moves up.

Options involve risk and are not suitable for all investors. For more information, please read the <u>Characteristics and Risks of Standardized</u> <u>Options</u>.

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Figure 25. Source: CBOE, YCharts, IOI Analysis