BEHIND THE NUMBERS
EARNINGS QUALITY & DIVIDEND SUSTAINABILITY RESEARCH

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Full Yield Curve and 2018's Interest Rate Spike May Boost Pension Expense in 2019 at Large Companies

Tinkering with pensions and their assumptions has been a continual process by government officials and corporations for years. In recent years, first came the Pension Adjustment Act to cure funding shortfalls in a quicker and more orderly manner. Then the MAP-21 plan in 2012 was designed to offset the "temporary" decline in interest rates by allowing companies to use modified higher discount rates in calculating Benefit Obligations (PBO) based on 25-year average bond rates rather than 2-year averages, which reduced the amount of funding required by holding PBO down. MAP-21 was designed to phase out by 2015, but like nearly every government program it has now been extended twice and now will run through 2024. We should add, it doesn't actually expire, it is designed to narrow the difference between the 2-year rate and the adjusted 25-year rate to the point where the 2-year rate is likely to be used. It is the narrowing process that keeps getting pushed out – it was supposed to start narrowing in 2013 and now does not begin until 2020.

There are two items that we have not seen as much discussion about of late but have also impacted some pension plans. The first is companies have been allowed to use a Full Yield

Curve approach for the Interest Rate Expense calculation since 2016. This essentially decouples the discount rate used to calculate PBO from the discount rate to compute interest expense for pension cost. With rates falling, it effectively lowered the interest expense assumption and reduced pension cost without changing the PBO or funding requirements. Second, the spike in interest rates in 2018 – especially late in the year – allowed many companies to boost the discount rate on PBO and thus lower their total liability. At the same time, the rate to calculate interest expense often didn't rise as much giving these companies another boost to earnings via flat to down interest expense in many cases.

We looked at seven companies using this Full Yield Curve approach: Ford, General Motors, AT&T, Verizon, Honeywell, United Technologies, and Johnson & Johnson. We believe the decline in interest rates in 2019 may hurt EPS at several of these companies as the 2018 pension assumptions are changed again. Johnson & Johnson has been the most conservative of the group and a case can be made that it has punished past earnings already and may not see as much of an impact:

- **Changing to Full Yield Curve methods of computing interest expense assumptions in pension costs has given several companies a boost in EPS in recent years. This method brought in more short-term rates, which have been significantly lower and allowed the Interest Cost assumption figure to drop below the PBO Discount Rate. This change can impact EPS but does not impact the PBO for the pension.**

- **Volatility in the bond market has changed the equation further in late 2018 and early 2019. These have the potential to erase the earnings gains. Short term rates have risen faster than longer term rates since 2018 and the spread has dropped to almost zero.**

- **Companies were quick to boost the discount rate on PBO and take advantage of the higher rates overall, but most also either cut or kept their Interest Rate assumption flat, which runs counter to what the market showed. That's another reason why 2019 could see more headwinds in our view.**

- **AT&T had no benefit from a lower interest expense component in Pensions in 2018 as they boosted the interest rate assumption and it equaled the Discount Rate for PBO. The company has already called out a pension headwind in 1Q19 of 5-cents.** We think the headwind is probably about 3-cents, but AT&T could see some higher cash flow needs for the pension in 2019-2020 vs. guidance of minimal attention in that area.

- **Verizon's impact of the accounting change has been minimal of late and outside the margins it is beating forecasts.** It did not raise its interest expense assumption despite boosting the Discount Rate by 70bp. The headwind to EPS may be minimal though.

- **Ford is not beating forecasts by much and while boosting its discount rate it cut the interest rate assumption last year. We think both situations will reserve with a potential 4-7 cent EPS headwind.** Interest expense is rising this year already at Ford and they have not called warning in this area. Realistic cuts to the discount rate could double or triple the underfunding level of the pension.

- **General Motors could lose a decent source of EPS if the discount rate falls and the pension interest rate rises. GM is calling out pension as a headwind for the year already so that may not catch many by surprise. Interest expense on pensions is up $107 million in the 1H19 vs. a decline of $95 million in 2018.**

- **United Technologies cut the interest rate assumption last year and is starting at the lowest level of the companies we examined. They could see a larger increase than the others too. The discount rate hike of 2018 could reverse and combined with the abnormally low interest rate assumption – there could be a 30-cent headwind under tame forecasts for a $300 million negative swing. Interest expense is up $123 million already in 1H19.**

- **Honeywell looks to be in good shape as it never had an undue benefit from the accounting method change. It also has an overfunded pension plan and even a 50bp cut in discount rate won't change that. We saw little reason for concern.**

- **Johnson & Johnson has the most conservative assumptions. Changing accounting methods actually punished EPS in prior years. It also shows that PBO discount rates can fall below the interest cost assumptions.** We do not see much of an EPS headwind and JNJ is still underfunded and will be making cash contributions. We're not sure the outlook at JNJ would change much.

Full Yield Curve Change

Historically, companies use a two-year average of bond rates at various points on the yield curve to compute the discount rate to set PBO. The thought is there are some liabilities being paid out soon, others over a medium term, and the rest over a longer term. So, the weighted average of the term structure plays a role and the average of rates at those various terms over 24-months helps smooth out some of the short-term gyrations of bond rates.

The interest expense calculation was very straightforward. It largely took the PBO that has been discounted to a present value – adjusted it for payments made - and multiplied by the same discount rate to represent the accretion of new obligation from the passage of time. Here are a couple of examples:

Honeywell	2015	2014	2013
PBO discount Rate	4.46%	4.08%	4.89%
Interest Exp. Rate	4.08%	4.89%	4.06%

General Motors	2015	2014	2013
PBO discount Rate	4.06%	3.73%	4.46%
Interest Exp. Rate	3.73%	4.46%	3.59%

See how the PBO discount rate from 2013 is equal to the interest rate assumption in 2014 and the same with 2014's PBO rate and 2015's interest rate.

For 2016, companies were allowed to change the interest rate assumption to a full yield curve method. This would use an average that included more short term rates in that assumption. It effectively lowered the interest expense calculation assumption and decoupled it from the PBO discount rate:

Honeywell	2018	2017	2016	2015
PBO discount Rate	4.35%	3.68%	4.20%	4.46%
Interest Exp. Rate	3.27%	3.49%	3.59%	4.08%

General Motors	2018	2017	2016	2015
PBO discount Rate	4.22%	3.53%	3.92%	4.06%
Interest Exp. Rate	3.19%	3.35%	3.36%	3.73%

Notice how the even though the PBO rates are still declining, the interest expense assumptions the following year are falling faster in some cases and are below the PBO discount rate. Pension expense is still largely determined by the discount rate applied to

new benefits earned (Service Cost) + Accretion of past benefits earned (Interest Cost) – Expected return on pension plan assets. The other two assumptions in most cases have been impacted by the overall decline in rates, but not the components of factors used to create the assumptions. The result has been that basic pension cost has benefited by changing how the Interest Expense assumption is formed when companies switch to the Full Yield Curve method:

Honeywell	2018	2017	2016	2015	2014	2013
PBO discount Rate	4.35%	3.68%	4.20%	4.46%	4.08%	4.89%
Interest Exp. Rate	3.27%	3.49%	3.59%	4.08%	4.89%	4.06%
Interest Exp. $	$573	$586	$600	$696	$771	$677
Old Method Int Exp $	$645	$705	$745	$696	$771	$677
Earnings Benefit	$72	$119	$145	$0	$0	$0

This table simply created an expected interest expense in dollar terms by using the prior year's PBO discount rate to estimate an interest expense under the old method and compared that to the actual interest expense. As expected, there was an earnings benefit starting in 2016 in many cases.

Interest Rate Volatility May Be a Bigger Issue in 2019 and 2020

We are not looking at this now because these companies have an area of low-quality earnings that has been happening for three-years. Instead, we believe the interest rate volatility of late 2018 and in 2019 have set the table for potential negative earnings headwinds. **We think these companies received a nice bump from the pensions in 2018 because the discount rate to calculate the PBO went up and reduced the PBO figure. Then, the interest cost was calculated on that lower PBO using a still reduced interest rate.**

The full yield curve method of determining an interest rate gives more emphasis to shorter yields. While both long and short yields have been declining, the spread has shrunk. This may create a situation where the discount rate falls faster than the interest expense rate.

Also, the PBO calculation is tied to an average of two year corporate bond rates. Those have also seen the spread decrease against the 10-year treasury. Moreover, while the PBO will lose the 2017 figures but keep the higher 2018 figures in determining a PBO discount rate, the 2019 figures replacing 2017 are coming much lower. At this point, it appears to us that the discount rate will fall in 2019 and should rates stay near these levels into 2020 – the

2018 figures start to vanish from the calculation and could push the discount rate down again.

We don't think many have forgotten last fall's activity in the bond market, but trying to keep this illustration as short as possible – here's what was happening:

Yields	10-Year	2-Year	Spread	Aaa Corps	Spread
1Q17	2.50%	1.20%	1.30%	3.95%	1.45%
2Q17	2.30%	1.30%	1.00%	3.80%	1.50%
3Q17	2.20%	1.60%	0.60%	3.65%	1.45%
4Q17	2.30%	2.00%	0.30%	3.55%	1.25%
1Q18	2.70%	2.15%	0.55%	3.70%	1.00%
2Q18	3.00%	2.50%	0.50%	3.90%	0.90%
3Q18	2.90%	2.60%	0.30%	3.90%	1.00%
4Q18	3.00%	2.80%	0.20%	4.10%	1.10%
1Q19	2.70%	2.50%	0.20%	3.75%	1.05%
2Q19	2.25%	2.00%	0.25%	3.50%	1.25%
current	1.50%	1.43%	0.07%	2.95%	1.45%

This doesn't show all the spikes and we eyeballed the average rates for the quarter. What we would expect companies to show in 2018 is higher discount rates for PBO reflecting higher rates overall and interest rate assumptions rising more than discount rates reflecting a shrinking spread between short and long term bonds. Here's what we saw:

	18 PBO	17 PBO	18 Int	17 Int
Verizon	4.40%	3.70%	3.40%	3.40%
AT&T	4.50%	3.80%	3.80%	3.60%
Ford	4.29%	3.60%	3.22%	3.40%
Gen. Motors	4.22%	3.53%	3.19%	3.35%
Honeywell	4.35%	3.68%	3.27%	3.49%
Utd Tech	4.00%	3.40%	3.00%	3.30%
J&J	3.76%	3.00%	3.60%	3.98%

All the companies took basically a 70bp increase in discount rate and lowered their PBO figure. However, only one raised the interest rate at all – AT&T by 20bp. That struck us as odd given that their new method added a greater emphasis on short-term rates, which have seen the largest increase.

As we see how various rates are starting out in 2019, **we think the PBO discount rates will decline this year. The yields on corporates are lower now than in 2017 too which should**

add fuel to a discount rate cut. That should push up total PBO to calculate interest expense. Then the spread has continued to narrow between long and short rates. Both rates have fallen, but two year rates have been above the levels of 2017 for part of this year. **We would expect the interest expense to actually rise this year as the short term rates are higher now than 2017. It was the steepness in the curve that allowed the reductions in rates and expect the interest rate assumptions to likely close the gap to the PBO discount rate. In total this could remove the earnings gain generated by using a lower interest rate assumption at many of these companies from 2016-18.**

Below, we will look at each of the companies individually. Of these companies we have a Buy rating on AT&T and a 4- EQ rating on Ford. In this exercise, we are isolating one source of potential earnings headwinds – these are not complete reviews or recommendations on the stocks based solely on pension assumptions.

AT&T – Early Adopter Has Already Seen Benefits Fade and Announced Headwinds

AT&T has benefitted from this change for more years and has benefitted from a wider change between the interest rate and discount rate. However, its interest rate never reached the low points of others and it was the only company we saw that posted a higher interest rate assumption in 2018. In fact, the interest rate assumption was equal to the prior year PBO discount rate. The EPS benefit from the full curve approach was zero in 2018.

AT&T	2018	2017	2016	2015	2014	2013
PBO discount Rate	4.50%	3.80%	4.40%	4.60%	4.30%	5.00%
Interest Exp. Rate	3.80%	3.60%	3.70%	3.30%	4.60%	4.30%
Interest Exp. $	$2,092	$1,936	$1,980	$1,902	$2,470	$2,429
Old Method Int Exp $	$2,092	$2,366	$2,462	$2,478	$2,685	$2,429
Earnings Benefit	$0	$430	$482	$576	$215	$0

This had been a larger part of earnings until 2018 than at some of the other companies.

AT&T	2018	2017	2016
Adjusted EPS	$3.52	$3.05	$2.84
Interest Benefit	$0.00	$0.05	$0.05

In fact, AT&T in the 1Q19 announced that it saw a 5-cent impact on EPS due to falling interest rates causing adjustments to PBO and assumptions. That would likely include more than just the interest rate assumption in calculating expense.

Looking at a fall in the discount rate of 50-100bp adding $3.5-$7.0 billion to PBO and the interest rate rising again by 20-30bp – we estimate that AT&T would have a 3-5 cent headwind on EPS in 2019. Conceivably, its interest rate assumption may rise less than others after it was raised 20bp in 2018. That would keep the headwind under 3-cents. The company already called out 5-cents in 1Q and has been hitting guidance or beating by 1-cent in recent quarters. It is also possible with AT&T starting at an Interest Rate assumption that is 40-80bp above others on this list – a case could be made that AT&T could see the interest rate decline too and only have the higher PBO to push up Interest Expense. That may put their headwind closer to 2-cents.

The company could make some negative news having the pension underfunding level rise from $3.8 billion to $8 billion on the lower discount rate. The company had been guiding to minimal funding needs this year.

Verizon – We Estimate Minimal Impact on EPS

Verizon adopted the full yield curve assumption in 2016. It had an immediate impact on earnings as the Interest Expense figure declined. Again, notice that the largest change happened in the first year as the rate dropped by 120bp. Last year, it only came in 30bp below the old method.

Verizon	2018	2017	2016	2015	2014	2013
PBO discount Rate	4.40%	3.70%	4.30%	4.60%	4.20%	5.00%
Interest Exp. Rate	3.40%	3.40%	3.20%	4.20%	5.00%	4.20%
Interest Exp. $	$690	$683	$677	$969	$1,035	$1,002
Old Method Int Exp $	$751	$864	$973	$969	$1,035	$1,002
Earnings Benefit	$61	$181	$296	$0	$0	$0

As the interest rate assumption has approached a level closer to where it should be historically, the benefit to earnings has declined. Using the 21%, 35%, 35% tax rates for the last three years, EPS was helped in a minor way of late:

Verizon	2018	2017	2016
Adjusted EPS	$4.71	$3.74	$3.87
Interest Benefit	$0.01	$0.03	$0.07

The company has been beating forecasts by essentially 3-cents per quarter of late. It is worth nothing that interest expense for the pension is up $22 million so far through June so it does appear the interest rate is starting to rise. We're surprised VZ did not raise the interest rate assumption in 2018.

PBO was $19.6 billion at the end of 2018 after the higher discount rate cut $1.4 billion off of PBO. Sensitivity Guidance is that a 50bp drop in the discount rate adds $1.0 billion to PBO. We would not be surprised to see a 50-100bp drop there and a 20-30bp increase in interest rate – that would produce an interest expense of $742-$799 million. The net change would be 1-2 cents of EPS headwind for 2019. We would consider that immaterial.

The larger potential news catching part for Verizon would the discount rate falling for PBO and pushing up the underfunded level. That stood at only $1.75 billion at the end of 2018 and the company is only anticipating $0.3 billion in funding in 2019 and $0 in funding until 2024. That outlook may change a bit based on a falling discount rate.

Ford May See a Jump in Interest Expense Large Enough to Miss Forecasts

Ford is one that surprises us because it still cut the interest rate assumption in 2018. We are not sure that is sustainable at this point. While the y/y change in earnings from the full curve approach declined simply due to heavier cuts in basis points in prior years, Ford still helped EPS in 2018.

Ford	2018	2017	2016	2015	2014	2013
PBO discount Rate	4.29%	3.60%	4.03%	4.27%	3.94%	4.74%
Interest Exp. Rate	3.22%	3.40%	3.46%	3.94%	4.74%	3.84%
Interest Exp. $	$1,525	$1,524	$1,524	$1,817	$1,992	$1,914
Old Method Int Exp $	$1,705	$1,806	$1,881	$1,817	$1,992	$1,914
Earnings Benefit	$180	$282	$357	$0	$0	$0

Ford	2018	2017	2016
Adjusted EPS	$1.30	$1.78	$1.76
Interest Benefit	$0.04	$0.05	$0.06

The interest benefit is a larger percentage of EPS at Ford than at AT&T or Verizon. The company has not increased its forecast for pension contributions for 2019. It has seen interest cost rise by $85 million already in the first half.

Because the interest rate fell 18bp last year, we think a 40-50bp increase this year may be reasonable and match the 20-30bp increase we used on AT&T and VZ. Also, Ford's sensitivity forecast is a 100bp cut in PBO discount rate would add $5.15 billion to the PBO. Assuming a 50-100bp cut and higher PBO – we estimate Ford could see a 4-7 cent headwind from the interest rate assumption falling. With the exception of 1Q19, Ford's recent history has been to be very close to estimates with actual results. This may be enough of a headwind to trigger and earnings miss. If rates stayed flat on the interest expense, the headwind is about 2 cents, but given the rise in costs in the 1H19 that gives us reason to believe the Interest Expense will increase more than just a function of higher PBO.

The underfunding level on US plans was only $2.5 billion on a PBO of $42 billion last year. If it rises to $5.0-$7.5 billion, future cash contributions may need to rise.

General Motors – Material Changes Likely Could Hurt EPS Beats – GM Has Been Talking about Pension Already in 2019

GM also managed to cut its interest rate assumption in 2018 and may have to face a larger increase than other companies in 2019.

General Motors	2018	2017	2016	2015	2014	2013
PBO discount Rate	4.22%	3.53%	3.92%	4.06%	3.73%	4.46%
Interest Exp. Rate	3.19%	3.35%	3.36%	3.73%	4.46%	3.59%
Interest Exp. $	$2,050	$2,145	$2,212	$2,754	$3,060	$2,837
Old Method Int Exp $	$2,269	$2,510	$2,673	$2,754	$3,060	$2,837
Earnings Benefit	$219	$365	$461	$0	$0	$0

The company has been beating forecasts by over 20 cents per quarter of late and the EPS headwind may not be as significant of a problem. Still, the size of the EPS boost from lower interest rates has been material in our view.

Gen. Motors	2018	2017	2016
Adjusted EPS	$6.54	$6.62	$6.12
Interest Benefit	$0.12	$0.16	$0.19

The company has started calling pensions a headwind for 2019. It reported an increase in interest expense of $107 million in the 1H19 vs. a decline of $95 million for all of 2018. The discount rate falling 25bp adds $1.42 billion to PBO. We would forecast a $2.8-$5.6 billion increase this year. Also, like Ford, it started the year with an interest rate down about 20bp. We think it could rise 40-50bp in 2019. Those assumptions would cost GM about 14-23 cents of headwind.

The company is still making sizeable contributions to the pension plan, the underfunded amount was $5.1 billion last year on $61.2 billion in PBO – the underfunded increase would be modest as a percentage compared to other companies here. And GM is alerting investors to the headwind.

United Technologies – Interest Assumption the Lowest of the Group and Interest Expense already jumping in 2019

United Technologies not only cut its interest assumption but is the lowest of the group we looked at. We would not be surprised if it needs to grow 60-70bp in the near term to be in the range of where the others are headed. It is interesting to note that UTX has already seen interest expense increase by $123 million in the 1H19, whereas interest expense was essentially flat last year.

United Tech	2018	2017	2016	2015	2014	2013
PBO discount Rate	4.00%	3.40%	3.80%	4.10%	3.80%	4.70%
Interest Exp. Rate	3.00%	3.30%	3.40%	3.80%	4.70%	4.00%
Interest Exp. $	$1,117	$1,120	$1,183	$1,399	$1,517	$1,373
Old Method Int Exp $	$1,266	$1,290	$1,426	$1,399	$1,517	$1,373
Earnings Benefit	$149	$170	$243	$0	$0	$0

The company has been beating EPS forecasts by over 11-cents per quarter of late so the pension headwind may not be a material issue here. The pension benefit for the last couple of years is only about 2% of EPS.

Utd Tech	2018	2017	2016
Adjusted EPS	$7.61	$6.65	$6.61
Interest Benefit	$0.15	$0.14	$0.19

Still the size of the jump in interest rate may become material. Their pension sensitivity guidance is that 25bp of lower discount rate is $1.06 billion added to PBO. We would then assume a 50-100bp cut there and a 60-70bp increase in interest rate. That would cost them $0.29-$0.40 in EPS in 2019. That would be an increase of $300-$400 million and they already had $123 million in higher costs without spelling out the full reasons. Given the discount rate is already at 4.0% and likely to fall, but probably not through the interest rate figure – it would make us believe this headwind would come in at the lower end of this forecast.

Honeywell – The Benefits to the Accounting Change Were Not Material and Unlikely to Cause Much of a Headwind

The pension plan was overfunded by almost $1 billion at the end of 2018, so Honeywell lacks some of the risk of reporting too much bad news here. In fact, a 50bp cut in the discount rate would boost PBO by only $840 million and it would still be overfunded. Plus, the overall benefit to earnings of changing the interest rate assumption has been minor about 1% of EPS.

Honeywell	2018	2017	2016	2015	2014	2013
PBO discount Rate	4.35%	3.68%	4.20%	4.46%	4.08%	4.89%
Interest Exp. Rate	3.27%	3.49%	3.59%	4.08%	4.89%	4.06%
Interest Exp. $	$573	$586	$600	$696	$771	$677
Old Method Int Exp $	$645	$705	$745	$696	$771	$677
Earnings Benefit	$72	$119	$145	$0	$0	$0

Honeywell	2018	2017	2016
Adjusted EPS	$8.01	$7.15	$7.75
Interest Benefit	$0.08	$0.10	$0.12

So far, the interest cost is only up about $20 million in the 1H19. We still believe HON will need to raise the interest rate figure by 30-40bp. However, even with a 50-100bp drop in discount rate and the PBO rising to $16.9-$17.8 billion – EPS only gets hit 3-8 cents. Also, the low end assumes a $30 million boost to interest expense and $20 million has already

happened. HON is beating forecasts by 2-4 cents per quarter. Overall, it never enjoyed a meaningful benefit to EPS by using this new interest method and won't have the same level of headwind as the others. Without a pension funding shortfall, there is unlikely to be much bad news there either.

Johnson & Johnson – Most Conservative Assumptions, Actually Punished Earnings with Accounting Change

JNJ may have other risk factors in play, but we don't see negatives to its pension assumptions. After changing to the full yield approach, JNJ's interest rate has exceeded its discount rate and it actually hurt EPS. It has the 2nd highest interest assumption to AT&T and may not see much of an increase given that its discount rate is already low and frequently below the interest figure. JNJ does provide a point – the discount rate can go below the interest rate figure. We mentioned a couple times above that may limit the interest rate growth toward the lower part of the range.

JNJ took an increase in discount rate too but took the smallest increase and is starting at the lowest figure still of the group we examined.

J&J	2018	2017	2016	2015	2014	2013
PBO discount Rate	3.76%	3.30%	3.78%	4.11%	3.78%	4.78%
Interest Exp. Rate	3.60%	3.98%	4.24%	3.78%	4.78%	4.25%
Interest Exp. $	$996	$927	$927	$988	$1,018	$908
Old Method Int Exp $	$913	$880	$899	$988	$1,018	$908
Earnings Benefit	-$83	-$47	-$28	$0	$0	$0

The company has been beating forecasts by 2-6 cents per quarter of late and then had a large beat in 2Q. It has actually hurt its earnings by 1-2 cents per year by changing to its new interest rate assumptions:

JNJ	2018	2017	2016
Adjusted EPS	$8.18	$7.30	$6.73
Interest Benefit	-$0.02	-$0.01	-$0.01

This has been immaterial either way. JNJ is still underfunded on the pension by nearly $5 billion on the PBO of $31.7 billion so it will be funding the pension either way also. So much

of the news here is unlikely to change for JNJ. Our estimate is there could be a 3-5 cent headwind if the interest rate assumption rises 20-30bp and the PBO discount rate falls 25-50bp. We would lean very much toward the low-end here which would be $100 million of additional expense and the company has already reported a $48 million increase in the 1H19.

Boeing (BA)EQ Review
Part 1- Program Accounting

We are initiating earnings quality coverage of BA. This report will examine the company's use of program accounting for recognizing the revenue of its Commercial Aviation business. Given the complexity of the topic and length of the report, we will defer assigning our initial earnings quality rating to the company until we have completed and published our review of other components of the company.

Our main observations regarding programming accounting are as follows:

- Program accounting was once common in the aviation industry but has fallen away as the industry consolidated. BA is the only major company that still utilizes the method. It has a controversial history which includes a $93 million lawsuit settlement in 2002 (BA denied wrongdoing) and an SEC investigation in 2016.

- Program accounting is a form of long-term contract accounting which is allowable under GAAP. It seeks to recognize that there is a steep learning curve in building a large, complex aircraft and there will, therefore, be much higher costs per plane on the aircraft built early in the run. Revenue is recognized when a plane is delivered, but development and setup costs are capitalized in inventory. The controversial component of the method is that the company estimates the revenue and cost expected to be incurred over the entire program run many years into the future. From that, it determines a program average profit margin. Any shortfall from the target profit on early planes is also capitalized in inventory and amortized later.

- Critics rightfully point out that the high dependence on estimates made many years in advance leave the method open to significant error and potential manipulation. Earnings reported on planes delivered early in the program will far exceed the actual unit cash flow profits on those planes.

- While we agree there are significant shortcomings to the method, we would point out that all long-term accounting methods have their drawbacks. The more familiar percentage-of-completion (POC) accounting which is used by most defense contractors (and BA in its defense business) also involves considerable estimation. Arguably, this typically is done over a shorter time frame and with some insight

gained from the contract governing the deal. However, revenue under the POC is recognized as the work is done, not as aircraft are delivered. Also, large negative adjustments resulting from estimate changes are commonplace.

- Airbus recognizes revenue as planes are sold and essentially expenses costs on planes as incurred. This leads to much lower profits in the early stages of a program which improve considerably throughout the run. However, we would observe that this leads to overstated profits later in the run and that analysts must make their own adjustments and assumptions about the long-term profitability of Airbus' projects. It is interesting that BA's disclosure which shows what its earnings would be if it utilized a similar method indicate lower results than program accounting produced in the early years of the 787 program, but much higher after the 787 reached cash profitability on a unit basis.

- One advantage of the program accounting method is the relative clarity that we have into key programs due to BA's disclosures. By far the largest component of the company's deferred production cost account results from its 787 program. While BA expected to spend $5 billion developing the 787, by the time the first plane was delivered in 2011 the company had already capitalized more than $11 billion in development and tooling costs. Further production and supplier problems on early runs resulted in the deferred production balance climbing to a peak of over $28 billion in 2016 as below-program average unit profits on early deliveries were capitalized into deferred production costs. Newer deliveries with above-program average unit profits have triggered the amortization of the balance which still stands at over $23 billion.

- The massive cost overruns years ago have guaranteed that the 787 will never live up to its original hopes for financial returns. The key question for investors is if BA can avoid a large write-off of the remaining deferred production costs. To do so, the company must sell the full accounting quantity of the program (currently 1,600 units) at a high enough level of profits per plane to bring the deferred production balance down to zero. If it becomes obvious that it can't, a charge must be taken.

- Over the last two quarters, each plane delivered has reduced the deferred production balance by approximately $29.5 million. However, we estimate it will take closer to $31.5 million per plane to achieve the goal of eliminating the deferred production balance. The company should be able to continue to improve efficiencies as it recently raised the production volume to 12 per month from 10. However, we believe the key

issue will be if it can realize high enough prices to drive the necessary average profit per unit.

- BA has extended the accounting quantity on the 787 from an original 1,100 planes to its current level of 1,600 planes. This can be a normal function of receiving more orders. However, it also gives the company a larger number of planes to spread the deferred production costs over and avoid having to realize a charge. BA extended the accounting quantity to 1,500 from 1,400 in the 9/17 quarter with the new quantity 137 planes more than the cumulative firm order quantity at the time. However, when the company moved the accounting quantity to 1,600 in the 12/18 quarter, it was 215 planes higher than cumulative firm orders. This could imply a more aggressive forecast.

- It is imperative for investors to remember that BA must not only sell the full accounting quantity but do so at adequate profit margins to bring down the deferred production balance to zero. While we believe BA has its work cut out for it to avoid a write-down, we are not ready to predict that the company will have to take a charge related to its 787 program. This report is intended to provide a framework for analyzing the progress for the 787 deferred production account in future quarters. Red flags we will be looking for include a decline in the reduction of deferred production costs per plane on future deliveries, continued expansion in the accounting quantity without evidence of a pickup in demand, and sustained weakness in new order trends.

Boeing's Program Accounting

On the accounting front, perhaps the most important factor to understand in BA's results is its utilization of program accounting by its Commercial Airlines segment. Program accounting is a form of long-term contract accounting which is allowed under GAAP. It was once fairly commonplace in the commercial aviation industry, but has all but disappeared over the years as the industry consolidated. In fact, BA is the only major company that still utilizes it. This fact, coupled with the high degree of estimation involved with the method has led to a great deal of negative attention for BA over the years.

In 2002, BA paid over $90 million to settle a shareholders lawsuit involving its use of program accounting despite the company denying any wrongdoing. Again in 2016, it was

reported that the SEC was investigating the company's program accounting specifically as it related to the 787 and 747 programs after the company recognized a reach-forward loss of $1.3 billion related to the 747 program. The loss stemmed from actual revenues and costs differing from estimates made earlier in the contract. While SEC investigations can drag on, nothing has come of it three years later.

The Basic Mechanics of Program Accounting

Most people identify Henry Ford as the inventor of the modern assembly line. However, as documented in Arthur Herman's book *Freedom's Forge*, it was actually Bill Knudson who made it work and unleashed its potential while working for Ford. Knudson recognized the importance of efficiency and a concise workflow that eliminated any unnecessary movement. Herman states:

> *"Knudson realized the key to production was not uniformity or even speed. It was creating a continuous linear sequence that allowed every part to be fitted where and when it was needed, while keeping costs down by growing volume instead of skimping on materials."*

It is this efficiency gained through experience that program accounting seeks to take into consideration. Percentage-of-completion accounting used for most defense contracts attempts to estimate the total revenue and costs to be incurred over an individual contract (such as BA's F-15 contract with Saudi Arabia) and then recognize the revenue over time based on how much of the project is completed. However, program accounting estimates the revenue and costs to be incurred over the entire aircraft program (such as the 737 or the 787.) Program accounting requires BA to make many long-term estimates including:

- The number of planes it will produce over the program which is known as the "accounting quantity"
- The average net revenue it will realize per plane
- The average cost per plane which together with the revenue per plane, will result in an average gross margin realized per plane over the entire accounting quantity.

Consider BA's explanation of program from its 10-Ks:

> *"A program consists of the estimated number of units (accounting quantity) of a product to be produced in a continuing, long-term production effort for delivery under existing and anticipated contracts limited by the ability to make reasonably dependable estimates. To establish the relationship of sales to cost of sales, program accounting requires estimates of (a) the number of units to be produced and sold in a program, (b) the period over which the units can reasonably be expected to be produced and (c) the units' expected sales prices, production costs, program tooling and other non-recurring costs, and routine warranty costs for the total program. Several factors determine accounting quantity, including firm orders, letters of intent from prospective customers and market studies. Changes to customer or model mix, production costs and rates, learning curve, changes to price escalation indices, costs of derivative aircraft, supplier performance, customer and supplier negotiations/settlements, supplier claims and/or certification issues can impact these estimates."*

Here is where it gets controversial. When BA sells a commercial jet, it recognizes the revenue at the time of the sale. However, the amount of costs it recognizes is capped at its estimated average cost per plane under the total program with the excess cost capitalized in inventory under "deferred production costs." The company explains this as follows in its 10K:

> *"The program method of accounting allocates tooling and other non-recurring and production costs over the accounting quantity for each program. Because of the higher unit production costs experienced at the beginning of a new program and substantial investment required for initial tooling and other non-recurring costs, new commercial aircraft programs, such as the 787 and 777X programs, typically have lower initial margins than established programs. In addition, actual costs incurred for earlier units in excess of the estimated average cost of all units in the program accounting quantity are included within program inventory as deferred production costs. Deferred production, unamortized tooling and other nonrecurring costs are expected to be fully recovered when all units in the accounting quantity are delivered as the expected unit cost for later deliveries is below the estimated average cost as learning curve and other improvements are realized."*

No one would complain about the company amortizing up-front tooling and development costs over an estimated program term or number of units expected to be produced. That is

similar to what Airbus does. However, subsidizing reported profits by capitalizing any shortfall below an estimated profit margin raises a lot of eyebrows.

The rationale is that there is a steep learning curve for building an amazingly complex modern commercial aircraft. Therefore, between inefficiencies and up-front setup costs, the cash unit cost per plane will likely be significantly higher at the beginning of the program run and decline with each plane produced. Rather than incur huge, unrealistic losses on the income statement in the first few years, program accounting essentially assigns the estimated program-average profit margin across all aircraft as they are delivered. For example, let's assume the company has a new aircraft that it expects to sell 1,000 units of over the next ten years. (Note these numbers and percentages in the example are not intended to be indicative of actual experience.) Let's say it sells the first plane for $100 million, but due to production inefficiencies and setup costs, it spends $110 million on the aircraft for a loss of $10 million on a cash basis. However, the company estimated the average gross margin on the total 1,000-plane program would be 15%, which would have resulted in a profit of $15 million. The $25 million difference between the $10 million actual loss and the expected $15 million profit would be capitalized in deferred production costs in inventory. The "deferred production cost" balance will build during the first few years of production as the cash basis profits on the early planes fall well below the estimated average for the total accounting quantity. However, over time, the cash cost per plane will go down until the realized cash margin rises above the estimated long-term average. At this point, the deferred production cost balance will begin to decline as it is amortized into earnings. Prior to this point, program accounting was artificially boosting reported profitability. From this point forward, it will be artificially reducing it. In a perfect world, the deferred production cost balance will reach zero when the last plane in the accounting quantity is delivered at which point the company will have realized profits exactly as estimated at the beginning of the program ten years earlier.

However, we do not live in a perfect world and the possibility exists that the company's projections are too optimistic. It may not realize the revenue per plane it expects, costs may be higher than it foresaw, or it may not even be able to sell the full accounting quantity which will drive up the estimated cost per plane. At the point it becomes clear the estimates are flawed, the company could have to take a writedown to reflect the error.

It is not hard to see how the company has been on the receiving end of criticism and skepticism surrounding its accounting method given the degree to which it involves estimating orders, sales prices and cost figures ten years into the future. However, we believe that sometimes the criticism goes too far. Yes, there is a huge amount of guesswork

involved in which the company could be wrong or even purposefully manipulative. Regardless, this is par for the course when attempting to estimate earnings for any company whose business model involves long-term contracts. Let's compare program accounting with two other options for accounting for long-term contracts: the percentage of completion method and the unit cost method.

Program Accounting Versus Percentage-of-Completion

Most defense contracts utilize percentage-of-completion (POC) accounting for reporting results related to long-term government contracts. In fact, BA utilizes the method for reporting results of its US defense and space businesses. Under the POC, the company makes an estimate of the revenues it will earn and the costs it will incur under a specific contract. It then recognizes the revenue over the contract term based on the percentage of the contract that has been completed as of the end of the reporting period. In most cases, the percentage of the contract completed is determined by the costs incurred to date as a percentage of total expected costs. The feeling among some analysts seems to be that since program forecasts are required to be made so long into the future that they are more prone to error than estimates made under the POC method which are typically shorter in duration and more defined by the contract. Granted, guessing how many 787s will be sold over the next decade and what prices and costs will be that far out is arguably a more difficult task than forecasting what revenues and costs will be under a five-year contract to produce a somewhat defined number of fighter jets. Still, the POC requires considerable estimation of eventual costs years in advance. In addition, revenue under the POC method is being recognized ratably over the contract term rather than when a jet is actually delivered which is in itself a departure from the economic reality of the underlying transaction.

Finally, the POC method is also subject to error and manipulation as management can change estimates of total costs and revenues to accelerate the revenue of recognition and profits. For both program accounting and POC accounting, BA regularly reviews its assumptions and recognizes charges and gains as appropriate. The company describes this process in its 10-K:

> *"The accounting for long-term contracts involves a judgmental process of estimating total sales, costs and profit for each performance obligation. Cost of sales is recognized as incurred. The amount reported as revenues is determined by adding a proportionate amount of the estimated profit to the amount reported as cost of sales.*

Recognizing revenue as costs are incurred provides an objective measure of progress on the long-term contract and thereby best depicts the extent of transfer of control to the customer.

Changes in estimated revenues, cost of sales and the related effect on operating income are recognized using a cumulative catch-up adjustment which recognizes in the current period the cumulative effect of the changes on current and prior periods based on a long-term contract's percentage-of-completion. When the current estimates of total sales and costs for a long-term contract indicate a loss, a provision for the entire reach-forward loss on the long-term contract is recognized."

The net impact of both the cumulative catch-up adjustments and reach-forward losses for the last three fiscal years are shown in the table below. Note that these amounts only pertain to long-term POC contracts, not commercial aircraft contracts accounted for under program accounting.

	2018	2017	2016
Increase to Revenue	$137	$559	$394
Increase/(Decrease) to Earnings from Operations	-$190	-$250	-$263

The table above shows that there are regular negative adjustments made to profits to reflect what have proven to be overly-optimistic forecasts made under the POC method. Note that the figures above include reach-forward losses of $736 million, $445 million and $1.2 billion in 2018, 2017 and 2016 respectively, all related to the KC-46A tanker program. Program accounting received a lot of negative attention in 2016 when BA announced a $1.3 billion reach-forward loss related to its 747 program due to negative development in revenue and costs versus its previous estimates. While we are not discounting the materiality of that development, the similar adjustment to the KC-46 program profits is an indication that the POC method is not immune to errors in forecasts either, be they purposeful or not.

A final observation we have is that BA's disclosure under its program accounting in some ways gives more visibility into the progress of assumptions than disclosures under POC accounting. We will examine this in more detail when we take a closer look at the 787 deferred production cost balance in a later section.

Airbus Is more Conservative Up Front, Less So as Time Goes By

Given the longer-term nature of commercial aircraft programs and the plethora of contracts involved, POC accounting is not ideal for applications to commercial aircraft sales. Therefore, if program accounting is unacceptable, then what else is available? Like BA, Airbus uses POC for its defense-related contracts. However, it recognizes revenue for commercial airliners as they are sold and matches the revenues against costs as incurred. This results in much lower reported profitability in the early part of a program when inefficiencies are high, but rising profits as the program progresses. While some consider this superior, it also has its drawbacks, in our opinion.

First, analysts are left to piece together their own estimates of eventual profitability of aircraft programs in order to value the company. When the A350 was released in 2015, the A380 was just reaching breakeven on a reported basis. Analysts were not assuming that margins at the time would remain stable, but rather that both planes would continue to realize considerable margin improvement. When comparing BA to Airbus, adjustments must be made to reflect all these factors, but we would argue that visibility into BA's long-term earnings is no murkier than that of Airbus. Both require analysts to use judgement to make their own assumptions on future profitability. Analysts have to make their own estimates on future profitability with Airbus, or judge the soundness of the company's estimates in the case of BA.

From the perspective of reported earnings, we would also note that while BA's earnings in the early part of a contract will be well above earnings on a cash flow basis, they will actually trail cash flow-based earnings in later years when the amortization of deferred production costs is penalizing reported margins. However, Airbus' earnings in the later part of a contract will actually be higher than what BA would report on a similar contract (assuming similar efficiencies) as Airbus's margins would reflect the benefit of gained efficiencies without the offsetting impact of deferred production cost amortization. Case in point, BA discloses on its website what its earnings would be under what it calls the "unit cost accounting method. BA describes the unit cost method as follows:

> *This is a non-GAAP measure. Management is providing Commercial Airplanes' Earnings from Operations computed using non-GAAP unit-cost based accounting in response to requests from specific investors. The company does not intend for unit-cost information to be considered in isolation or as a substitute for program*

accounting. ***The basic difference between unit-cost based accounting and program accounting is that unit cost accounting determines cost of sales based on a more discrete costing of the individual airplane while program accounting determines cost of sales based on the average profitability over the airplane program accounting quantity. Unit cost accounting records cost of sales based on the cost of specific units delivered, and to the extent that inventoriable costs exceed estimated revenues, a loss is not recognized until delivery is made.***

The unit cost method sounds more in-line with Airbus' accounting for commercial aircraft. It is interesting to compare BA's earnings from operation under the unit cost method with its reported results under program accounting:

Earnings from Operation Under:	06/30/2019	03/31/2019	12/31/2018	09/30/2018	06/30/2018	03/31/2018	FY 2018	FY 2017
Program Accounting	-$4,946	$1,173	$2,600	$2,033	$1,785	$1,412	$7,830	$5,285
Unit-Cost Accounting	-$4,288	$1,538	$2,992	$2,251	$1,941	$1,644	$8,828	$4,537
Program Accounting - Unit Cost	-$658	-$365	-$392	-$218	-$156	-$232	-$998	$748

Note that while program accounting produced higher earnings for the full year 2017 when the 787 program had just reached the targeted average profitability for the program, unit cost accounting has since produced higher earnings as deferred production costs for the 787 were being amortized.

While we in no way intend to downplay the potential for errors and manipulation in program accounting, we nonetheless believe it is important to realize that all accounting for long-term contracts have their shortcomings. Analysts should be aware of those shortcomings and understand what changes in the various disclosures are telling them about how actual experience is tracking against forecasts.

A Closer Look at BA's Deferred Production Cost Account

As noted above, understanding and tracking BA's deferred production account included in its inventory balance is key to understanding the company's current and future earnings. As of 6/19, BA had inventory of $68.5 billion which included $58.7 billion related to commercial aircraft programs. It disclosed that of that amount, $26.8 billion was work-in-process related to the 787 program with the bulk of that consisting of the above-discussed deferred production costs and unamortized tooling and non-recurring costs. Inventory

included only $1.5 billion in deferred production costs related to the 737 program and the company did not even itemize deferred production costs related to the 747, 767 and 777 programs. This makes sense as those programs have reached the point where the deferred production costs have already been amortized into earnings. Therefore, we will focus our analysis on the trend in the 787 deferred production costs.

Why Is The 787 Deferred Production Cost Balance So High?

One would expect the 787 deferred production balance to be the highest of all the program given its relatively young age. The plane first flew in late 2009 with the first commercial delivery on 9/26/2011. As we discussed in the above section on the mechanics of program accounting, the development and tooling costs related to the 787 were capitalized as deferred production costs prior to the first delivery. After the first delivery, any profits on the plane that fell below the target average for the whole program accounting quantity would have also been capitalized. When the plane began generating profits greater than the projected program average, the deferred production costs were amortized. Almost 8 years after the first delivery, the 787 is still working down its deferred production cost balance.

Unfortunately for BA, it is not just the relatively young age of the program contributing to the large size of the remaining balance. BA originally estimated it would spend about $5 billion to develop the 787. However, the plane was highly complex with new composite wing technology never before incorporated in a BA plane. Production issues and problems with suppliers led to a string of delays. The 9/26/2011 first delivery date was over three years later than the original plan due to these problems. It was even reported that the jet the company used in its 2007 "rollout ceremony" was essentially an empty shell with most of the parts attached with non-aviation fasteners. By the time of the first delivery, deferred production costs and unamortized tooling costs had already topped $11 billion:

	9/30/2011
Deferred Production	$9,699
Unamortized Tooling	$1,770
	$11,469

So, before the first 787 was ever sold, BA had over $11 billion in sunk costs it had to amortize for the program to reach profitability on a cash flow basis.

When Did BA Start to Really "Make Money" on the 787?

The following table shows deferred production cost data along with delivery and order data for the 787 from the 12/15-12/16 quarters:

	12/31/2016	9/30/2016	6/30/2016	3/31/2016	12/31/2015
787 Deferred Production Costs	$27,308	$27,523	$27,673	$28,651	$28,510
787 Unamortized Tooling and Other Non-Recurring Costs	$3,625	$3,691	$3,707	$3,767	$3,890
Total 787 Deferred Production Costs	$30,933	$31,214	$31,380	$32,418	$32,400
787 Deliveries	33	36	38	30	34
787 Cumulative Deliveries	500	467	431	393	363
787 Program Accounting Quantities	1,300	1,300	1,300	1,300	1,300
787 Undelivered Under Firm Orders	700	694	724	746	779
787 Cumulative Firm Orders	1,200	1,161	1,155	1,139	1,142

The numbers above tell us several things about the history of the 787 program. Deferred production costs and unamortized tooling costs for the 787 peaked in the 3/16 quarter at $32.4 billion. Remember, this is up from the $11.5 billion balance as of the first delivery in the 9/11 quarter. While capitalized tooling costs increased, the bulk of the increase was the result of the increase in deferred production costs. The increase represents the capitalized profit shortfall versus the estimated profit for the full accounting quantity on the first delivered jets. The company had delivered 393 jets as of the end of the quarter in which the deferred production balance peaked which means BA had to produce and sell approximately 400 jets to reach the point that cash profitability on the plane exceeded the average projected profit margin for the accounting quantity. At that point, the deferred production cost balance was being amortized into earnings.

It is also important to note that in the 2016 time frame, the accounting quantity stood at 1,300 planes. The accounting quantity in the quarter at the time of the first delivery was 1,100. The accounting quantity can naturally expand over time as new orders are received and the company, in theory, it becomes more clear that it will sell a higher number of aircraft in the program. An increase in the accounting quantity will actually increase deferred production costs as the new planes added will presumably be at higher profit margins. This increases the estimated profit margin for the entire accounting quantity which leads to greater profit shortfalls on previously-sold planes which are capitalized into the deferred production account. However, a higher accounting quantity gives the company more planes over which to amortize the existing deferred production costs which precludes (or delays) the company having to take a huge charge to write off the deferred production costs. As of

the 12/16 quarter, BA had 1,200 cumulative orders for the 787 versus its accounting quantity of 1,300, meaning it would have to obtain 100 new orders (and deliveries) to match the accounting quantity.

A key point is to realize that it is not enough for BA to just sell the number of planes in the accounting quantity. To avoid a charge, it must generate profits on those sales that sufficiently exceed the program estimated average profits to fully work down the deferred production balance. In 2016 (and today), there were many naysayers who doubted BA could do that, particularly with the advent of the A350 which proved to be solid competition for the 787.

Does the Current Deferred Production Balance Indicate There is a Charge in the Future of the 787 Program?

Let's fast-forward to today and examine the current status of the 787 deferred production balance:

	6/30/2019	3/31/2019	12/31/2018	9/30/2018	6/30/2018
787 Deferred Production Costs	$20,969	$22,029	$22,967	$23,584	$24,241
787 Unamortized Tooling and Other Non-Recurring Costs	$2,354	$2,532	$2,638	$2,774	$2,899
Total 787 Deferred Production Costs	$23,323	$24,561	$25,605	$26,358	$27,140
787 Deliveries	42	36	39	34	38
787 Cumulative Deliveries	859	817	781	742	708
787 Program Accounting Quantities	1,600	1,600	1,600	1,500	1,500
787 Undelivered Under Firm Orders	555	596	604	638	655
787 Cumulative Firm Orders	1,414	1,413	1,385	1,380	1,363

As of 6/19, BA has delivered 859 787s and worked down its deferred production cost and unamortized tooling cost balances to $23.3 billion, which is down about $9 million from the peak reached in the 3/16 quarter. It has also raised its accounting quantity to 1,600 and has achieved cumulative firm orders of 1,414 planes. We can take the quarterly sequential reduction in the deferred production cost and unamortized tooling cost amounts and divide that by the number of the deliveries in the quarter to get an idea of how much of the deferred costs are being reduced on a per plane basis:

	6/30/2019	3/31/2019	12/31/2018	9/30/2018	6/30/2018	3/31/2018
Change in Deferred Production Costs	-$1,238	-$1,044	-$753	-$782	-$592	-$799
Per Delivery	-$29.48	-$29.00	-$19.31	-$23.00	-$15.58	-$23.50
Deliveries	42	36	39	34	38	34
Accounting Quantity	1,600	1,600	1,600	1,500	1,500	1,400

The table shows that the 42 deliveries in the 6/19 quarter reduced the deferred production and unamortized tooling costs by an average of $29.5 million which is roughly consistent with the previous quarter. However, BA has 741 remaining deliveries to meet the current accounting quantity (accounting quantity of 1,600 less cumulative deliveries as of 6/19 of 859.) That means to avoid a future charge, BA must boost its cash unit profits earned on the average remaining plane in the accounting quantity to $31.5 million above the targeted average profit per plane, or $2 million per plane faster than the current pace. It is not unreasonable to expect the company to reduce per plane costs as it continues to get more efficient at building the planes. It recently upped its production to 14 787s per months from the previous quantity of 12. Increased volume alone should help with efficiencies. However, the real challenge will be hitting the current accounting quantity while still realizing adequate prices which we will address in the next section.

As a side note, we would point out in the table above that the per delivery reduction in the deferred production balance fell in the 12/18 and 6/18 quarters. This is because the accounting quantity was increased. As we noted earlier, an increase in the accounting quantity gives the company more planes to spread the deferred cost balance over. However, the new planes added to the accounting quantity produce higher profit margins which boost the average profit per plane over the new accounting quantity. This likewise increases the profit shortfall on previous deliveries and increases the deferred production balance.

Can BA Hit the Current Accounting Quantity with a High Enough Price per Plane?

Let's take another look at the long-term development of the accounting quantity. The following table shows the last 12 quarters of 787 accounting quantity, delivery and order data.

	06/30/2019	03/31/2019	12/31/2018	09/30/2018	06/30/2018	03/31/2018
787 Program Accounting Quantities	1,600	1,600	1,600	1,500	1,500	1,400
787 Cumulative Deliveries	859	817	781	742	708	670
Beginning 787 Undelivered Firm orders (Backlog)	596	604	638	655	638	640
787 Deliveries	-42	-36	-39	-34	-38	-34
787 New Firm Orders	1	28	5	17	55	32
787 Undelivered Under Firm Orders (Backlog)	555	596	604	638	655	638
787 Cumulative Firm Orders	1,414	1,413	1,385	1,380	1,363	1,308
Program Accounting Quantity minus Cumulative Firm Orders			215		137	

	12/31/2017	09/30/2017	06/30/2017	03/31/2017	12/31/2016	09/30/2016
787 Program Accounting Quantities	1,400	1,400	1,300	1,300	1,300	1,300
787 Cumulative Deliveries	636	600	565	532	500	467
Beginning 787 Undelivered Firm orders (Backlog)	683	710	679	700	694	724
787 Deliveries	-36	-35	-33	-32	-33	-36
787 New Firm Orders	-7	8	64	11	39	6
787 Undelivered Under Firm Orders (Backlog)	640	683	710	679	700	694
787 Cumulative Firm Orders	1,276	1,283	1,275	1,211	1,200	1,161
Program Accounting Quantity minus Cumulative Firm Orders		117				

As we mentioned earlier, the company must obtain and deliver and additional 186 (1,600-1,414) orders to meet the current accounting quantity and do so with higher profitability than it is currently experiencing. The 1 new order in the 6/19 quarter is an anomaly as data on the company's website indicates that the cumulative firm orders as of this writing is 1,462, implying there have been almost 50 new orders since the end of the 6/19 quarter. Prior to the 6/19 quarter, the rolling four-quarter average of new orders was about 25 which we believe is a decent proxy for the current order rate. At that pace, the company could have enough orders to meet the accounting quantity in about 7 quarters. However, investors should keep an eye on new order rates, noting that they can be volatile (note the minus 7 in the 12/17 quarter).

We also find it interesting that when the accounting quantity was bumped from 1,300 to 1,400 in the 9/17 quarter, the new quantity was only 117 more planes than the existing cumulative orders balance. However, when the quantity was again bumped in the 12/18 quarter, the new quantity was 215 higher than the cumulative order quantity at the time. This implies that BA had evidence of an increase in demand for the 787, insight into

potential orders that gave it confidence to add them to the accounting quantity, motivation to extend the quantity to delay having to take a charge, or possibly some combination of the three.

We reiterate that it is not simply enough to sell the accounting quantity. BA must do so at prices that allow it to realize average profits per plane that are higher than it is currently experiencing. BA understandably does not give revenue or price per plane data for the 787. While the list price of a 787 is about $250 million, the actual price paid by airlines is significantly less. According to Collateral Verifications, the market value of a 787-9 is $142.8 million. However, articles in *Leeham News* indicate that depending on the model, airlines are paying between $110 million to $140 million. BA is likely banking on the hope of selling newer versions of the 787 with more options that will allow it to hopefully realize higher prices. It is possible to monitor the mix of new orders on the company's website at the following link http://www.boeing.com/commercial/#/orders-deliveries. There are currently three 787 models; the 787-8, 787-9 and 787-10 with the latter being the most expensive. While a detailed projection of future demand and prices is beyond the scope of this report, this will be a key driver determining how quickly (or if) BA is able to work down the deferred production costs and avoid a write-off.

Monitoring Results Going Forward

There is no getting around the fact that from a financial return prospective, the 787 has been a major disappointment relative to its original expectations due to the much higher than planned development and start-up costs. This was clear to everyone prior to the first delivery. Successfully reducing the deferred production costs to zero before the 1,600th delivery will not change that. To us, the main issue investors should be concerned with regarding the 787 is the likelihood of a significant write-down to the value of the deferred production costs. We will be watching for the following red flags in the reported 787 numbers in the quarters ahead.

- A lack of improvement or deterioration in the reduction in deferred production costs per delivery

- Large increases in the accounting quantity without supporting evidence of increasing order trends

- Sustained weakness in new order trends

A Quick Look at Cash Flow

The following table shows BA's free cash flow, net income, and cash use of inventory for the last ten years:

	12/31/2018	12/31/2017	12/31/2016	12/31/2015	12/31/2014
Operating Cash Flow	$15,322	$13,346	$10,496	$9,363	$8,858
Capex	$1,722	$1,739	$2,613	$2,450	$2,236
Free Cash Flow	$13,600	$11,607	$7,883	$6,913	$6,622
Net Income	$10,460	$8,458	$5,034	$5,176	$5,466
Inventory Cash Impact	$568	-$1,403	$4,004	-$1,110	-$4,330

	12/31/2013	12/31/2012	12/31/2011	12/31/2010	12/31/2009
Operating Cash Flow	$8,179	$7,508	$7,023	$2,952	$5,603
Capex	$2,098	$1,703	$1,713	$1,125	$1,186
Free Cash Flow	$6,081	$5,805	$5,310	$1,827	$4,417
Net Income	$4,585	$3,900	$4,018	$3,307	$1,312
Inventory Cash Impact	-$5,562	-$5,681	-$10,012	-$7,387	-$1,525

While there are more factors impacting BA's results than the 787 program, it is interesting to note that BA's free cash flow has exceeded its reported net income in each of the last ten years. The capitalization of the early 787 production costs and losses can be clearly seen in the cash use of inventory starting in the 2010 and 2011 periods and falling off as the newer planes reached unit profitability. One could look at the 2009 to 2013 periods and conclude that BA would have reported significantly negative profits in those years had it not capitalized those costs and losses into inventory. However, the flip side of the argument is that if it had expensed them then, current profits would not reflect the actual cost of the overall program. If BA had not spread the costs out over the whole program, it would have been similar in principle to the "big bath" charges we often criticize where a company takes a huge charge at the beginning of a restructuring program which is quickly forgotten while future earnings receive the benefit. Again, none of this means BA will avoid a charge to the

787 deferred costs, but we do not see BA's use of program accounting as being misleading in and of itself.

Air New Zealand (ANZFF)–Update on FY 2019 Results Maintain BUY

We are maintaining our BUY recommendation on Air New Zealand (ANZFF). The company reported lower earnings largely based on higher fuel costs essentially offsetting higher revenues. At the same time, the additional labor costs, passenger service costs, and operations costs of dealing with several of its B-787 aircraft being grounded due to problems with the Rolls-Royce engines all increased. Those issues were known when we first made the recommendation and there is evidence that all of those issues are largely resolved at this point.

The stock still yields 7.6% has been successfully reducing operating costs. It dominates its domestic market and has found cheaper ways to team with foreign partners to share revenues on international routes and maximize aircraft utilization. It still has a very liquid balance sheet and several years coming where capital spending on new aircraft will decline as the company's revenue and income rise based on rising passenger growth and lower costs per passenger. It still is at the high end its cash target of $700 million-$1 billion with over $1 billion now.

- **We still believe that fuel is a wildcard, and the company buys that in US dollars.** Oil prices began the last fiscal year at $70 in July 2018, falling to $46 in December, rising to $64 in April and remaining the mid-$50s since. **Fuel costs could be a positive change in fiscal 2020.**

- **The first reason to expect fuel costs to decline going forward are the 787s are coming back.** Air NZ has had as many as 5 of these new planes being repaired at the same time during the fiscal year ended June 2019. **This issue is essentially over in September 2019 and the 787 burns 25% less fuel than the 777 doing the same route.** There were 3 leased 777s used to replace the 787s under repair.

- **The second reason is Air NZ is forecasting and hedging oil at $75/barrel in US dollars for fiscal 2020. At that price, fuel costs would be $1.3b in NZ dollars. Every $10 move in oil prices would change the fuel costs by $80-$100 million. They are nearly through the first quarter and oil has not been above $60 yet. Fuel costs could come in 7%-10% lower than forecast if that holds up.**

- **Air NZ is still very comfortable that it can reduce costs by $60 million with much of that coming in fiscal 2020.** Without the Rolls Royce engine issues on the 787 and the need to rebook passengers, re-juggle crew schedules, lease extra 777's (all of which added to costs in fiscal 2019) – **CASK (Cost per Available Seat Kilometer) already fell in 2019 by 1.2% or $50 million.**

- **The company can quantify about $41 million from the Rolls Royce problems that will not recur – that will be much of the $60 million forecast. Other aspects of cutting CASK is simply replacing older Airbus planes with new A320/321 NEO models. These carry more passengers at very little incremental cost and that also pushes down CASK.** Last year only had a partial year with some of those planes and more will arrive this year.

- **The company has seen growth return after weakness last fall. It is forecasting 5% growth in fiscal 2020 as more capacity in long International routes is added. Also, the domestic market and business travel has been stronger.**

Overview of 2019 results:

Capacity grew at a slower rate than recent years as the disruption of repairing engines on 787s hit last year and the company opted to defer some new capacity additions on domestic routes when bookings slowed last fall:

Capacity	2019	2018	2017	2016
Domestic Seat KMs	7,104	6,905	6,597	6,065
Domestic Growth	2.9%	4.7%	8.8%	8.5%
Intl Seat KM	38,925	37,369	35,572	33,619
Intl Growth	4.2%	5.1%	5.8%	12.0%

This led to higher load factors as passenger growth exceeded capacity growth for two years in a row. It also leads to better pricing:

Passengers	2019	2018	2017	2016
Domestic	5,957	5,719	5,311	4,887
Domestic Growth	4.2%	7.7%	8.7%	7.1%
International	32,616	30,943	29,503	28,336
Intl Growth	5.4%	4.9%	4.1%	11.7%

Per km stats in cents	2019	2018	2017	2016
Passenger Rev/seat km	12.9	12.8	12.6	13.5
Load Factor	83.8%	82.8%	82.6%	83.7%
Revenue/Seat km	10.8	10.6	10.4	11.3
Cost per seat km	10.0	9.5	9.1	9.3

Looking at total passenger revenue grow0074h it was up NZ$264 million. That was with all the disruptions with the 787s being grounded for repairs. It is worth noting that any passengers who did not make into New Zealand as a result of rescheduling issues – likely also did not fly on a domestic flight while in-country as well.

What jumps out is the spread between revenue per available seat km and cost per available seat km. It was down to 0.8 cents vs. 1.1 cents in 2018 and 1.3 cents in 2017. The largest reasons for that narrowing were fuel costs being higher by $284 million. That is a function of using more fuel overall with less efficient aircraft and higher prices than the year before. The price of fuel is a wildcard, the fuel usage is something actively being addressed by Air NZ. Higher fuel was 0.43 cents of the increase in CASK (Cost per Available Seat Km). On top of that, the disruptions of having the 787s out of service was another 0.09 cents. Those two items alone are the difference in having a spread of 1.3 cents vs. 0.8 cents. That is nearly a $200 million negative swing in cash flow. As it was, cash flow before working capital was only down $100 million. Also, with future bookings being higher with passenger growth – that was a key in keeping cash flow nearly flat at NZ$986 million vs. NZ$1.03 billion y/y.

It may also be worth considering that the 787 issues and rescheduling of many passengers may have made it impossible for some passengers to fly at all. The long-haul routes to Asia, Europe, North America carried 2.2 million people last year. The average flight is 9,800km or about NZ$1,200 per flight. Every 1% of potential passengers lost with the disruptions would be about NZ$27 million in revenue with minimal incremental cost.

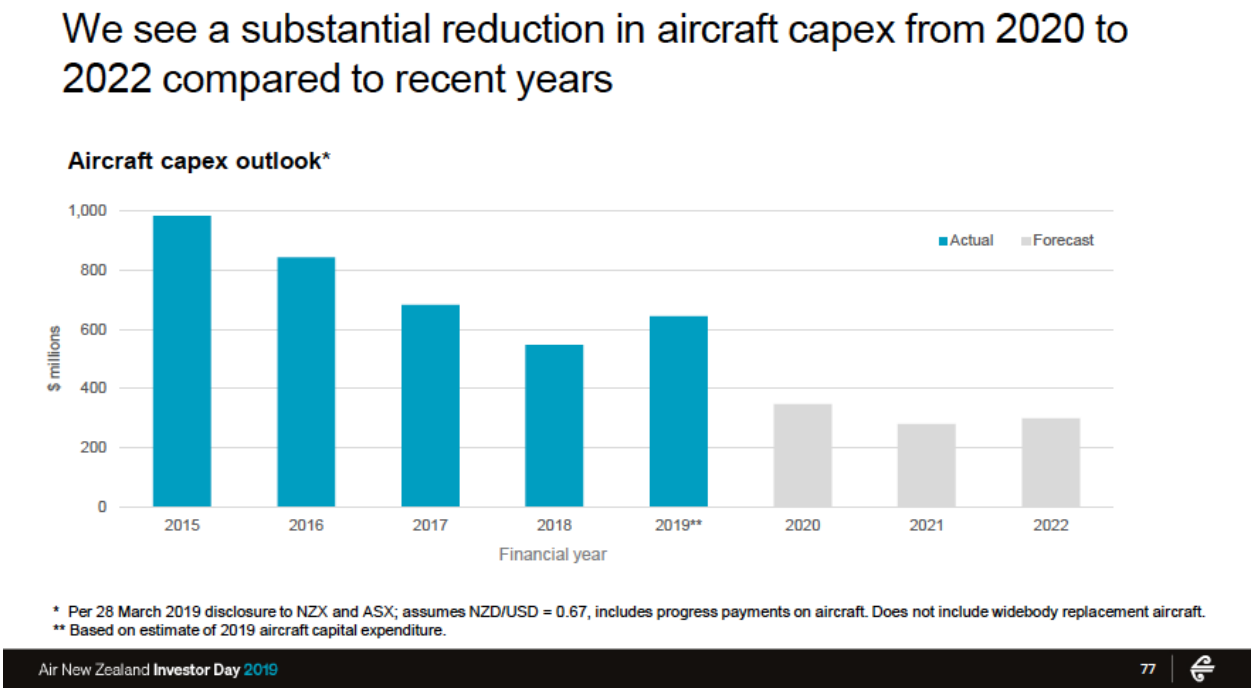
The Cash Flow Statement Looks Tight for the Dividend, Due to Higher than Normal Capital Spending which Is Ending

Cash Flow	2019	2018	2017	2016
CFO	$986	$1,031	$904	$1,074
CapX	$821	$809	$853	$998
Free Cash	$165	$222	$51	$76
Ordinary dividend	$260	$260	$236	$230

The company has been generating essentially $1 billion in cash flow for several years. During that time, it has invested over $2 billion in new aircraft. Some of that is money spent before the new planes arrive. Some of those airplane purchases are financed too. The graph below lays out the amount of spending that has been in Cap-Ex for new planes. The fair view of airplane investments is the last three years has been about $600 million and that is about to fall to $300-$400 million for fiscal 2020-22. Simply adding back $200-$300 million to free cash flow shows that the company covers the dividend over time with solid coverage. In addition, the company's earnings plus depreciation can show ample dividend coverage too:

Earnings in cents	2019	2018	2017	2016
Dividend/Shr.	$22.0	$22.0	$21.0	$20.0
EPS	$23.9	$34.4	$33.5	$40.8
Post Tax Depr.	$36.3	$33.4	$31.3	$28.6
Cash flow/Shr	$60.2	$67.8	$64.8	$69.4

The dividend is normally about 65% of EPS and about 33% of EPS + Depreciation. The growth Cap-Ex is skewing the free cash flow figure down and when looked at in the light of upcoming Cap-Ex for aircraft, the company still has ample room for the dividend.



Management has talked frequently about its dividend and coverage and points toward the longer time horizon to periods when capital spending is not so high:

- *2019 Annual Results Conference Call - **we're coming into a lower-CapEx period, higher free cash flow and the gearing is tracking down. So those will be in our minds as we look at it [fiscal 20 dividend.]** The only other point I'd make actually is if you kind of think back a couple of years, we would have said back then that with the wide-body replacement program coming up in -- from 2023 that we'd targeted gearing below the [target]range as we contemplated that. Now that we've made the CapEx deferral that Christopher alluded to a second ago, that's no longer the case. The CapEx is quite evenly spread. It's quite sort of BAU-like [Business As Usual] almost as we go through that wide-body program. So, **we no longer need to get gearing below the range as we contemplate that. So, it's another thing that we'll factor into the consideration when we look at the dividends** for FY '20.*

- *2019 Investor Day - So first thing to note is we remain committed to consistently paying a sustainable level of ordinary dividend. And we're really proud that we have been able to pay $2.2 billion in dividends over the past 14 years. The thing I wanted to point out, though, is that when we talk to investors, and I talked about that at the beginning, particularly offshore investors, they sort of want to know what we mean*

by consistent and sustainable. So, when we publish this new framework, we will actually conclude definitions of those terms.

*So firstly, by consistently pay, we mean -- what we mean by that is simply that we seek to pay a dividend every year**. By sustainable, what we mean by that is that the amount of that dividend is not a short-term focus thing. It's looking at our medium-term financial projections of earnings, CapEx and gearing. And so, it's not based on a payout ratio of the earnings in a given year.***

- *2018 Annual Results Conference Call - Well we are not really in a position to provide dividend guidance. I mean we would sort of reiterate our policy of providing our consistent and sustainable dividends. **As you know we are getting towards a period, or getting closer to the period, where we have got a lower level of CapEx and an elevated level of free cashflow, so we continue to see that the Board will have an opportunity there to consider further distributions.***

- *2017 Investor Day - One point I made at this forum last year where I said when you think about our dividend, do not think about FY '16. That year is unique. What we know about in front of us [heavy Cap-Ex], that's what's hitting our dividend. And so, I was surprised -- people were surprised we kept $0.10 at February. **That should not have been a surprise given what we had said. So how we think about it is very much looking at those peaks and troughs and trying to sort of project that in a medium-term basis and as I say, sustainable.***

Unit Costs Should Decline Going Forward and Income Growth Should also Be Helped by Revenue Growth

There are several areas where CASK (cost per available seat kilometer) should decline going forward. We already talked above how the price of fuel is lower than the annual forecast and below fiscal 2019 levels. In addition to that, Air NZ has the following tailwinds for unit cost reductions:

- 787 aircraft will be in wider use in fiscal 2020 and fiscal 2021. Those burn about 25% less fuel per similar segment flown by the current 777 aircraft that Air NZ brought in to bridge the maintenance issues. Lower fuel usage should help lower CASK regardless of fuel prices.

- The new A320/321 NEO versions are replacing older planes. These offer more seats to sell, more room for cargo, but operating costs are essentially the same. The seat increase per plane is 27%. Simply dividing the same cost by more seats, lowers the CASK. Air NZ had only a partial year impact of these new planes in FY2019. Planes that arrived later in FY 2019 will have a full impact this year in FY 2020 and 9 more of these planes will arrive between FY20-22 boosting the total from 4 to 13.

- The absence of the Rolls Royce engine issues will cut costs by $41 million, as discussed above. It should also mean better scheduling of crews and other labor and some ancillary costs can decline further.

- The company has been active in reducing costs over time. They see gaining some efficiencies by looking at many areas of ordering, training, electronic communications and ticketing with customers as areas where they can continue to improve. They essentially hope to find about $25 million per year in cost savings. These costs were already down 0.28 cents per km in 2019 before being offset by commodity cost increases.

- Management's view is that they have a $3.4 billion cost structure to continually examine in terms of wages, training, supplies, ordering parts, passenger services. They think they can pull $25 million out of that $3.4 billion per year for a while, which is only 0.7%. If they can compound that as basically a decline in fixed costs, it should help offset variables like FX and fuel price swings and also bolster underlying profitability.

At the same time, revenue should also have some tailwinds:

- The company is forecasting 5% capacity growth in FY20 and essentially 3% for the following two years. That gives them a reasonable growth path to keep supply and demand more in balance. With the lower capacity growth, Air NZ has seen stronger pricing for the last two years already as shown in the first tables above.

- That capacity growth would compound to be 11% higher over the next three years at the same time the unit costs are lower from the fleet changes. Areas like the NEO

models adding more seats without adding flights are a good example of this. The incremental seat revenue should flow largely to the bottom line.

- The company is also targeting more International flight potential for areas that are underserved to New Zealand and offer the potential to bring in premium paying visitors. They are opening Seoul, South Korea this year. There are plans to expand service to Singapore and Taipei. Air NZ also noted it is looking at New York and Sao Paulo in Brazil.

- Some of the competition from Virgin between Australia and New Zealand has been reduced as well.

As we noted above, any combination of higher revenue and lower costs per available seat km totaling 0.5 cents – which is where the company has already been in FY 2018 – would be a $200 million positive to operating earnings vs. $1.2 billion posted in FY19.

Weakness in Bookings Has Recovered

As the company noted on the earnings call, there was a bit of big event/lack of event timing – but bookings have improved since the slow-down from last fall –

> *"We started to gain some momentum in terms of the revenue result, especially with strong close-in bookings in the May and June months, which drove a slightly better overall performance than we had expected when we reaffirmed guidance at our Investor Day in May. Areas that demonstrated the strength included domestic as we saw capacity reductions and pricing adjustments start to drive a stronger RASK result. We also saw a good inbound traffic from North America as well as solid performance from the Pacific Islands as we experienced a significant amount of bookings over the April school holidays, which you may remember had Easter and Anzac Day falling on the same week and was considered something of a super holiday for travel. Now that influx of travel demand also meant that the recent July school holidays had less demand, which is reflected in the recent operating stats we released to the market earlier this week."*

They continued talking about domestic demand – they are still getting positive growth and strong corporate demand:

"So, although when we look at the domestic demand at the moment, it's very much in line with what we indicated back in January. We haven't really seen that change much. We're seeing strong corporate booking, still strong unit revenue growth from that segment. Leisure still softer, but growing -- but still positive growth, so broadly, that's in line with what we expected."

Y/Y Chg	Total Pass.	Dom. Pass	Tas. Pass	Total Load	Dom Load	Tas. Load
19-Jul	2.4%	1.7%	1.8%	0.4	0.9	-0.9
19-Jun	4.0%	4.3%	2.0%	2.2	3.1	2.9
19-May	3.4%	3.2%	2.8%	2.8	3.9	0.9
19-Apr	3.4%	3.0%	1.8%	1.6	0.4	-1.5
19-Mar	4.7%	4.7%	6.1%	-1.3	0.3	-0.4
19-Feb	5.8%	4.7%	10.7%	0.5	-0.9	1
19-Jan	4.1%	1.5%	8.9%	1.7	-0.4	0.2
18-Dec	4.5%	3.2%	6.9%	0.1	-0.7	0
18-Nov	4.2%	3.3%	8.9%	-0.7	0.3	-0.1
18-Oct	4.4%	3.4%	7.5%	0.6	1.1	0.6
18-Sep	6.0%	6.2%	7.5%	1.5	3.9	0.6
18-Aug	5.3%	4.3%	8.5%	2.7	2.3	0.6
18-Jul	4.7%	3.4%	7.0%	0.8	-0.7	-0.1
18-Jun	5.2%	4.0%	8.3%	0.4	2.1	-4.8
18-May	6.3%	5.6%	8.7%	0.3	1.9	-1.2
18-Apr	7.8%	7.7%	9.2%	-0.8	4.1	1
18-Mar	8.6%	7.9%	9.6%	3.5	2.4	2.1
18-Feb	5.3%	4.4%	8.3%	1.5	2.6	2.5

Explanation of EQ Rating Scale

6- "Exceptionally Strong"	Indicates uncommonly conservative accounting policies to the point that revenue and earnings are essentially understated relative to the company's peers. Higher possibility of reporting positive earnings surprises
5- "Strong"	Indicates the company has no areas of concern with its reported results and we see very little risk of the company disappointing due to recent results being overstated from aggressive reporting in recent periods.
4- "Acceptable"	Indicates the company may have exhibited a minor "red flag", but the severity of the issue is not yet a concern. Minimal risk of an earnings disappointment resulting from previous earnings or cash flow overstatement
3- "Minor Concern"	Indicates the company has exhibited either a larger number of or more serious warning signs than companies receiving a 4. The likelihood of an immediate earnings or cash flow disappointment is not considered to be high, but the signs mentioned deserve a higher degree of attention in the future.
2- "Weak"	Indicates the company's recently reported results have benefitted materially from aggressive accounting. Follow up work should be performed to determine the nature and extent of the problem. There is a possibility that upcoming results could disappoint as the impact of unsustainable benefits disappears.
1- "Strong Concerns"	Indicates that the company's recent results are significantly overstated and that we view a disappointment in upcoming quarters is highly likely.

In addition to the numerical rating, the EQ Review Rating may also include either a minus or plus sign. A minus sign indicates that our analysis shows the overall earnings quality of the company has worsened since the last review and there is a possibility the numerical rating will fall should the problem continue into the next quarter. Likewise, a positive sign indicates that the overall earnings quality is improving, and the company may see an upgrade in its numerical rating should the trend continue.

Key Points to Understand About the EQ Score

The EQ Review Rating is much more than a blind, quantitative scoring method. While we utilize proprietary adjustments, ratios, and methods developed over decades of earnings quality analysis, the foundation of all of our analysis is reading recent SEC filings, press releases, conference call transcripts and in some cases, conversations with managements.

The EQ Review Rating is not comparable to a traditional buy/sell rating. The Rating is intended to specifically convey the extent to which reported earnings may be over/understated. Fundamental factors such as forecasts for future growth, increasing competition, and valuation are not reflected in the rating. Therefore, a high score does not in itself indicate a company is a buy but rather indicates that recent results are a good indication of the underlying earnings and cash generation capacity of the company. A low score (1-2) will likely result in us performing a more thorough review of fundamental factors to determine if the company warrants a full-blown sell recommendation.

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