

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 | <u>1</u> | <u>28</u> | <u>5</u> | <u>17</u> | <u>55</u> | <u>32</u> |
| 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 | <u>-7</u> | <u>8</u> | <u>64</u> | <u>11</u> | <u>39</u> | <u>6</u> |
| 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 an 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.

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.

Disclosure

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