

A Case Study on the Effects of Program Accounting

Boeing vs. Airbus



By Charles Gray, Edward R. Walker, PhD, CPA and Katherine P. Terrell, EdD, CPA

A significant question in accounting and financial research is how investors and creditors evaluate the performance of companies within an industry whose members utilize alternative methods for recording costs. This can result in substantially different reported earnings and shareholders' equity across different companies. For example, oil and gas exploration and development companies may use either the successful efforts or the full cost pool method to record exploration and development costs (Corine Cortese, Helen Irvine, and Mary Kaidonis, "Extractive Industries Accounting and Economic Consequences: Past, Present and Future," *Accounting Forum*, March 2009, <http://bit.ly/2dBYBym>). Although less obvious, this problem also exists in the large commercial aircraft manufacturing industry, where U.S. GAAP allows the use of program accounting. Program accounting allows a business to record inventory at costs that could exceed the recoverable value of the planes in inventory.

The theory behind program accounting asserts that with each program or model, production cost per unit will be reduced over time due to volume efficiencies and learning effects. The additional costs on the first units produced should be capitalized and amortized to expense over the units subsequently produced (*Proposed Statement of Position, Program Accounting*,

AICPA, June 3, 1981, <http://bit.ly/2dqJUNC>). The Boeing Corporation currently uses program accounting to account for the costs of its major plane models, most recently the 787. Airbus, Boeing's largest competitor, follows IFRS, which requires inventories to be measured at the lower of cost or net realizable value [International Accounting Standard (IAS) 2, *Inventories*] and records the cost of goods sold on a job order basis for each commercial aircraft it has manufactured and sold. This raises the question of whether and how financial statement users factor in the effect of program accounting on current earnings and shareholders' equity when making investment decisions.

Background

It is normal for manufacturers to enter into long-term construction contracts to produce a given number of units of an item. The Accounting Standards Codification (ASC) identifies certain characteristics common to contractor accounting, including a contract entered into between the contractor and a customer that may expose the contractor to significant performance risk [ASC 910-10-15-4(c)]. The costs and revenues are accounted for on the specific contract basis [ASC 910-10-14-4(e)]. These contracts can be categorized into one of four types: fixed-price, unit-price, cost-plus, or time-and-materials [ASC 910-10-14-4(f)]. GAAP normally allows either the percentage of completion or the completed contract method for income recognition purposes on long-term construction type contracts (ASC 605-35-05-5).

Accounting for long-term contracts has been subject to abuse in the past. Halliburton reported \$434 million in revenues related to change orders that had not been approved by its customers during the three years ended in 2001 (J. Edward Ketz, "Klayman's Suit against Halliburton," SmartPros, July 2002, <http://bit.ly/2d0P82L>). During 2003, the SEC commenced a formal investigation into Raytheon's revenue recognition for its commercial aircraft unit (Anne Squeo and Judith Burns, "Inquiry of Raytheon Accounting Is Upgraded to Formal by the SEC," *Wall Street Journal*, Sept. 10, 2003, <http://on.wsj.com/2duuZRD>). In April 2005, Raytheon entered into a settlement agreement with the SEC whereby it acknowledged having inadequate documentation, disclosures, and accounting practices, resulting in the delayed recognition of losses of between \$67 million and \$240 million related to its commuter aircraft business.

Program accounting is a modified version of percentage of completion contract accounting. The primary difference between contract accounting and program accounting is that program accounting estimates the number of units of a given model that will be sold over its lifetime and estimates the total costs the company will incur to build that number of units in the program, whereas contract accounting bases its estimated costs on the cost to complete a specific contract (ASC 912-20-25-5A). A secondary difference is that program accounting recognizes revenues when the customer takes delivery of the product, while contract accounting

recognizes revenues based on estimates of the percentage of the costs that have been incurred to complete the contract (ASC 912-20-25-5A).

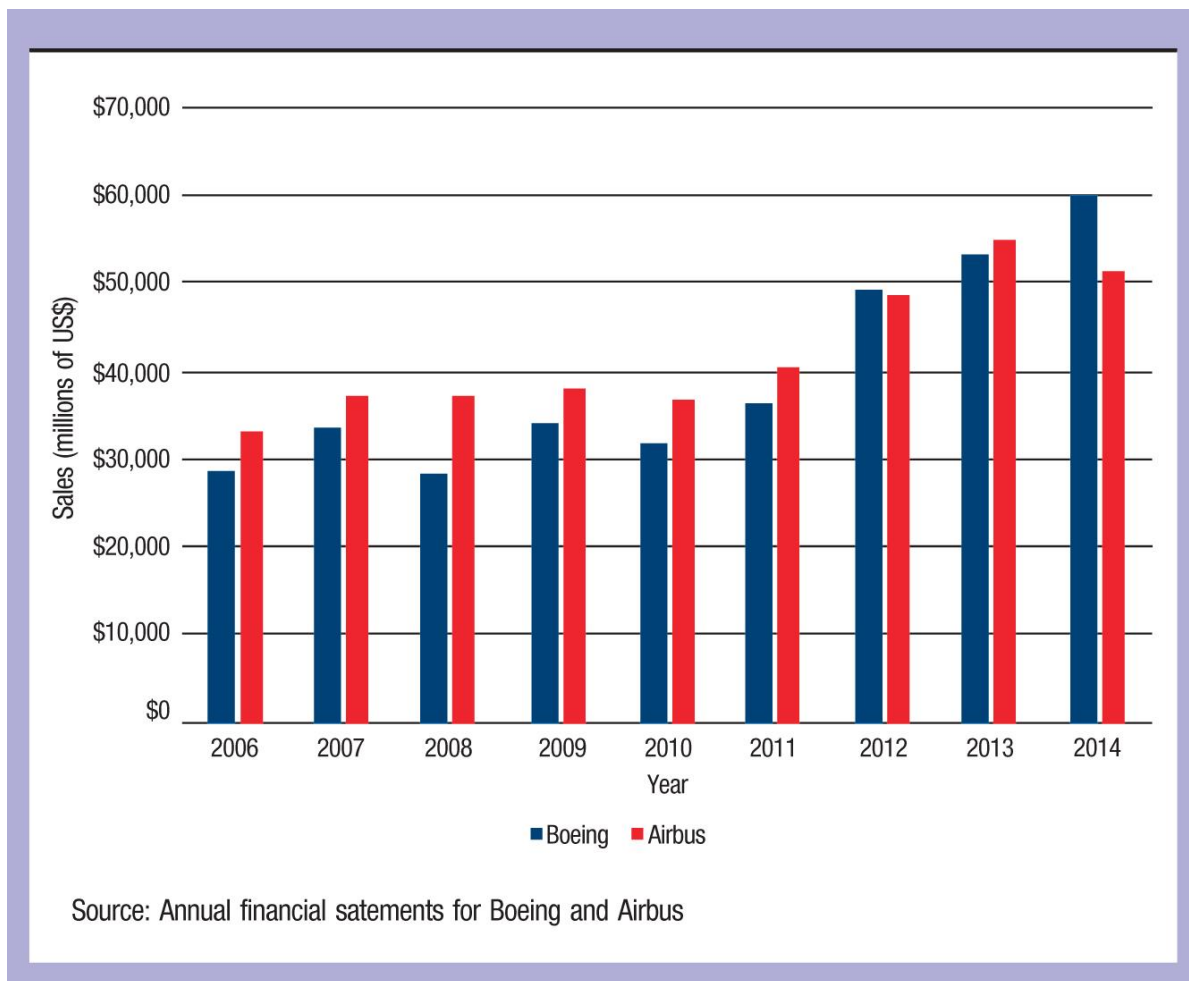
According to Boeing's 2013 Form 10-K, "program accounting requires the demonstrated ability to reliably estimate the relationship of sales to costs for the defined program quantity" (page 44). Difficulties encountered with program accounting arise from 1) significant uncertainties associated with making reasonably dependable estimates of the total number of units to be produced; 2) significant uncertainties as to the length of time to produce and sell the units; and 3) significant uncertainties as to production costs and selling prices (ASC 912-20-26). Considering the magnitude of difficulties with the first few 787 aircraft in use, one should consider if significant uncertainties exist in estimating Boeing's production costs and sales prices.

Sales and Deferred Costs

To address the above question, the authors compared historical financial data for both Boeing and Airbus. As illustrated in [Exhibit 1](#), Boeing and Airbus have experienced comparable sales for the nine years ended December 31, 2014. Prior to the fourth quarter of 2009, Boeing's deferred costs were associated primarily with the 747 and 777 models. Starting in the fourth quarter of 2009, Boeing began capitalizing manufacturing costs associated with the 787. The first 787 was not delivered until the third quarter of 2011. At that time, construction costs of \$8.246 billion were deferred. To more timely recognize the deferral of costs associated with the manufacturing of the 787s, the \$8.246 billion in deferred costs was prorated evenly over the eight quarters ended with the fourth quarter of 2011 for purposes of this article. Deferred costs related to Boeing's program accounting remained relatively stable prior to commencement of the 787 program and did not result in substantial differences in earnings and shareholders' equity from what would have been reported if Boeing had not elected to use program accounting.

EXHIBIT 1

Aircraft Sales by Year, Boeing vs. Airbus (dollars in millions)



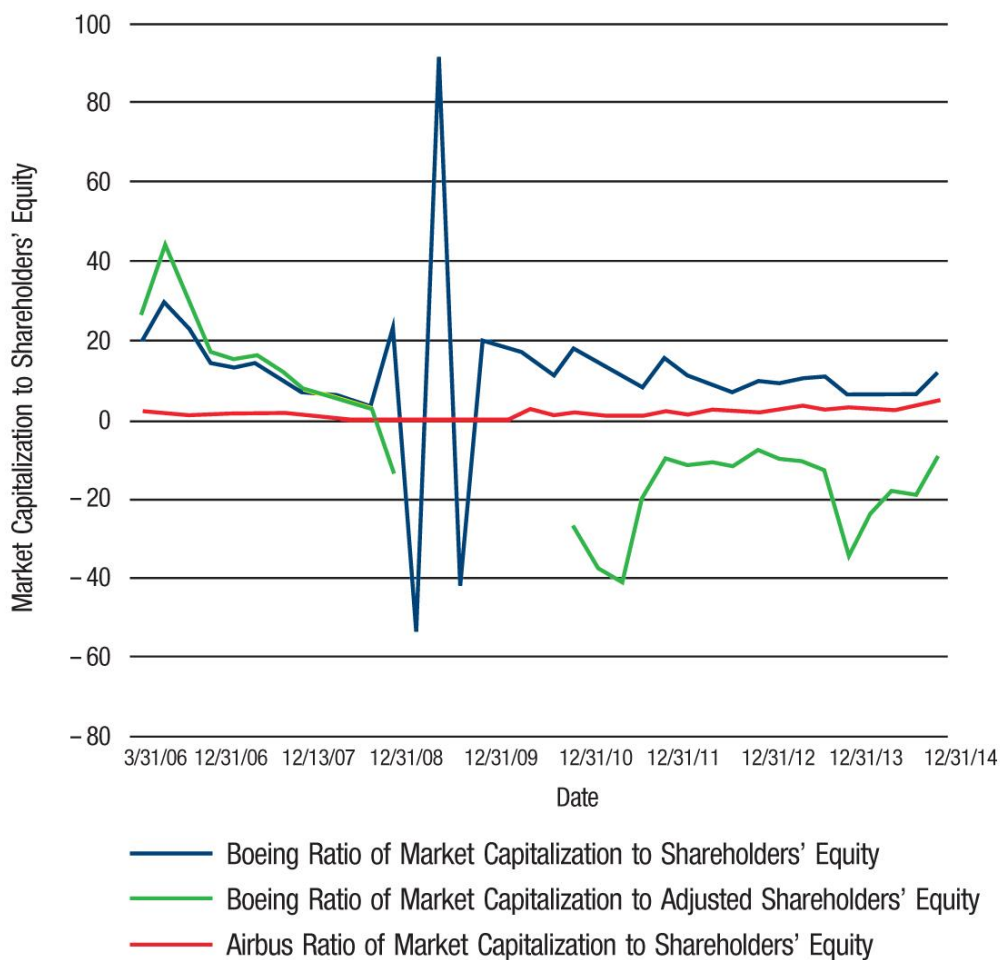
By March 31, 2015, Boeing had deferred a total of \$28.7 billion of construction costs, of which \$26.9 billion related to the 787 program. Thus, on average, each of the 258 planes built and sold as of March 31, 2015, added \$104.4 million to the deferred costs, leaving 1,042 planes to absorb \$26.9 billion in additional construction costs (Boeing Form 10-Q for the quarter ended March 31, 2015). The list price for a 787 is \$218.3 million; however, customary discounts of up to 50% can reduce the sales price to approximately \$109 billion (Jon Ostrower, "Boeing Struggles to Find Buyers for Early Version Dreamliners," Aug. 29, 2014, *Wall Street Journal*, <http://on.wsj.com/2dte3vf>). Assuming an average sales price of \$125 million per plane, Boeing would need to recover \$25.9 million of deferred costs per 787 plane remaining to be built. It is interesting to note that Boeing's gross profit margin from product sales was 15.1%, 14.6% and 15.4% for 2014, 2013 and 2012, respectively (Boeing 2014 Form 10-K). Therefore, Boeing would need to lower its construction costs on the remaining 1,042 planes to an average of \$80.4 million per plane to recover deferred construction costs and maintain a 15% gross profit margin on the sale of each of these planes.

Stock Performance

Shareholders and potential investors seemingly do not fully calculate, or understand, the potential risk associated with looming unrecovered costs like those discussed above. To analyze the effects of Boeing's program accounting on earnings and shareholders' equity, compared with Airbus's earnings and shareholders' equity, three separate comparisons were made. The ratio of market capitalization to the 12 months trailing earnings was used as a proxy for the effect of reporting earnings on stock prices. To eliminate the effect of program accounting, pro forma earnings were computed by reducing reported earnings by the increase in deferred construction costs, net of income taxes. Finally, Boeing and Airbus have similar ratios of market capital to stockholders' equity. With the onset of the 787 program, however, a large deferral of expenses indicates the possibility of a very negative stockholders' equity. *Exhibit 2* reflects the results of this proxy comparison. To measure the effect of stockholders' equity, the ratio of market capitalization to shareholders' equity was used as a proxy. Again, to eliminate the effect of program accounting, pro forma equity was computed by reducing reported shareholders' equity by total reported deferred construction costs, net of income taxes.

EXHIBIT 2

Ratio of Market Capitalization to Shareholders' Equity, Boeing vs. Airbus



Source: Boeing and Airbus's quarterly financial statements. Stock prices obtained from Google Finance. For the sake of clarity, three outliers with ratios in excess of 100 were eliminated. All of these outliers were in the Boeing adjusted shareholders' equity graph line. These very large ratios were due to a very small adjusted equity.

The impact of program accounting on return on assets (ROA) was also examined. Boeing's ROA, computed using the reported 12 months trailing earnings, appeared to be fairly constant until the commencement of manufacturing of the 787, at which time it took a short-term decline and then returned to between 4% and 5%. According to Boeing's 2010 Form 10-K, this temporary decline was due to the reclassification in August 2009 of \$2.4 billion of costs related to test flights from inventory to research and development costs. Boeing's pro forma ROA, calculated without the effects of program accounting, closely parallels its actual ROA prior to the commencement of the 787 program, indicating that program accounting did not significantly

impact the balance sheet or reported earnings. Afterwards, however, program accounting resulted in significantly increased reported earnings.

It is interesting to note that Airbus's ROA reflected a significant dip in earnings around the end of 2007 and then came back to a rather steady 2% ROA. According to the Airbus 2007 Annual Report, this dip in ROA can be attributed largely to delays in production of its new A-380 model (Airbus 2007 Annual Report). Consequently, Airbus's ROA seems to hover around 2%. This may be attributable to the ownership structure, under which three governmental partners, which may be more concerned about jobs than profitability, owned approximately 25.4 % of the issued shares as of March 31, 2015.

Back orders reduce the market risk associated with future sales.

The next issue addressed was risk premium. This article used back orders as a proxy for risk premium. Back orders reflect the extent to which orders have been received for aircraft that have not yet been built or delivered. Thus back orders reduce the market risk associated with future sales. Both Boeing and Airbus had very close to the same number of units in back orders from 2006 to 2014. Thus, it appears that the risk premium, if any, associated with these two companies should be approximately the same.

Exhibits 3 and *4* reflect Boeing and Airbus's market capitalization and earnings, respectively. Historically, European high-tech companies have suffered from a higher-risk premium than comparable U.S. high-tech companies (Michele Bagella, Leonardo Becchetti, and Fabrizio Adriani, "Observed and 'Fundamental' Price-Earnings Ratios: A Comparative Analysis of High-Tech Stocks Evaluation in the U.S. and in Europe," *Journal of International Money and Finance*, March 2005, <http://bit.ly/2d0WBP4>). Another study, however, found that market values of public companies reporting financial results using IFRS and similar companies reporting financial results using GAAP were similar, with no market premium for either IFRS or GAAP (Amanda Grossman, Murphy Smith, and Wayne Tervo, "Measuring the Impact of International Reporting Standards on Market Performance of Publicly Traded Companies," *Advances in Accounting*, December 2013, <http://bit.ly/2cQTUwl>). In addition, the elimination of the SEC requirement for foreign filers to provide reconciliations of financial statements to GAAP had no significant impact stock prices or market liquidity of these foreign filers (Yongtae Kim, Haidan Li, and Siqi Li, "Does Eliminating the Form 20-F Reconciliation from IFRS to U.S. GAAP Have Market Consequences?" February–April 2012, <http://bit.ly/2cQsP1f>). Thus it is difficult to determine with any certainty why Boeing's market capitalization has historically been significantly higher than Airbus's.

EXHIBIT 3

Market Capitalization, Boeing vs. Airbus

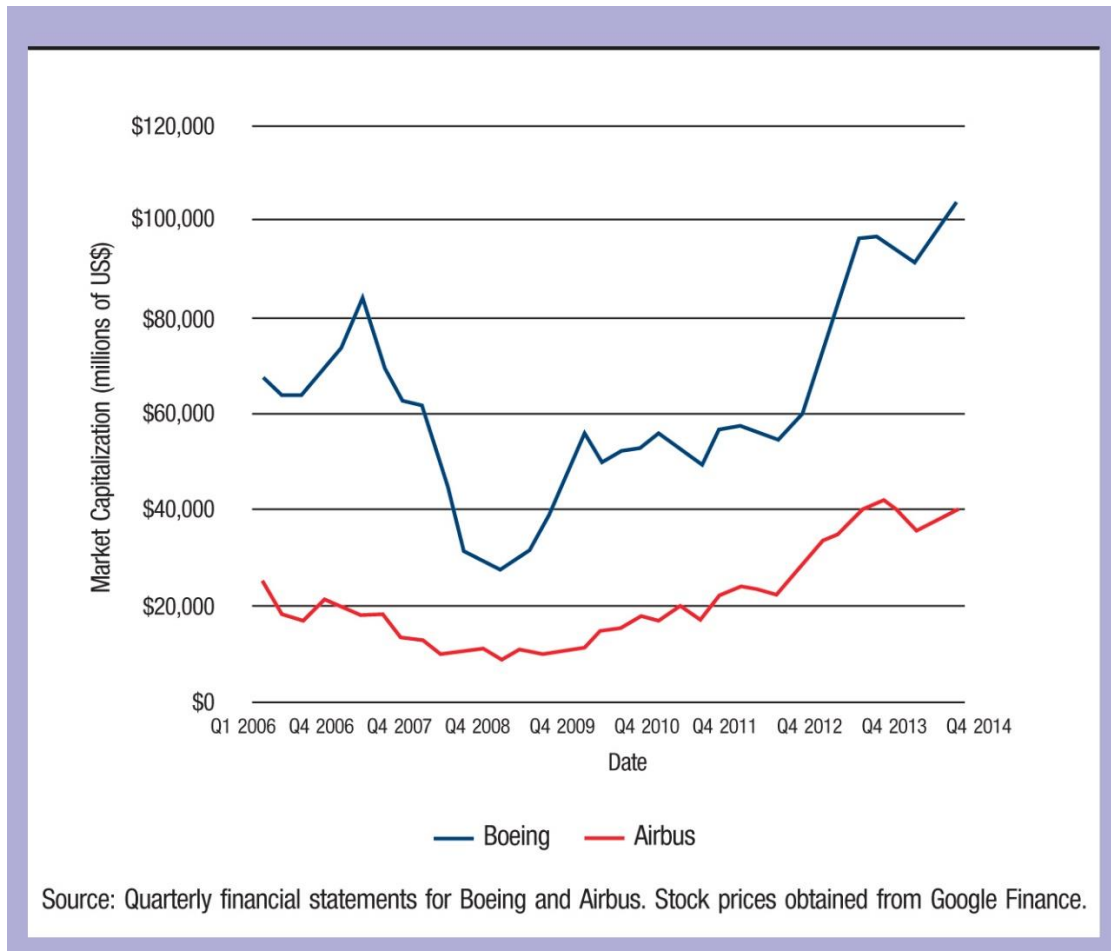
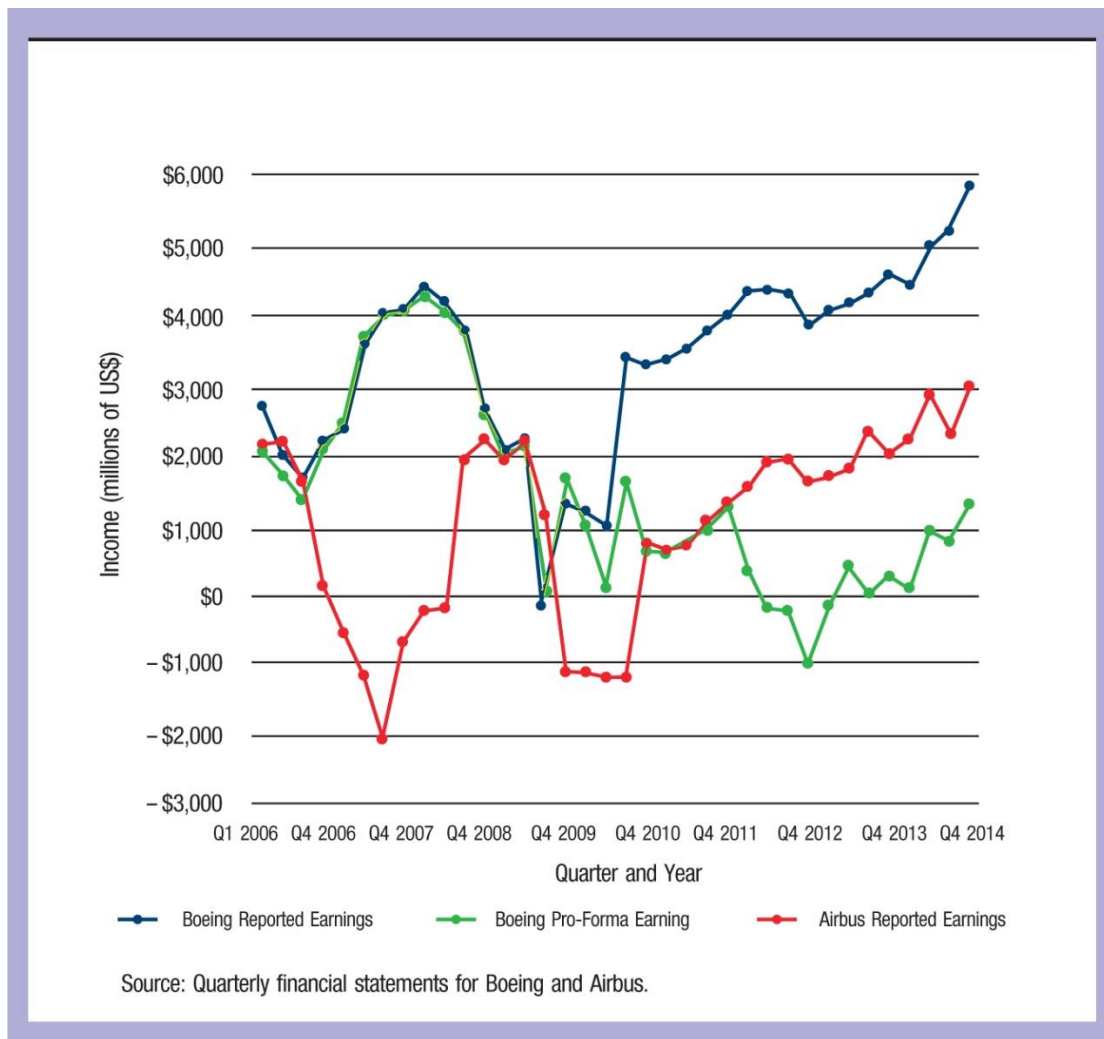


EXHIBIT 4

Trailing 12 Months' Earnings, Boeing vs. Airbus



Statement of Financial Accounting Concepts (SFAC) 1, *Objectives of Financial Reporting by Business Enterprises*, says in part that the purpose of financial statements is to provide “information that is useful to present and potential investors and creditors in making rational investment, credit, and similar decisions.” Based on the comparisons of the reported financial performance of the world’s two largest commercial airplane manufacturers, price-earnings ratios are comparable. If the effects of program accounting are eliminated, however, there appears to be some disconnect between Boeing’s stock prices and financial performance with the commencement of the 787 program.

Will Boeing Soar or Crash with the 787?

Current and potential investors should consider that program accounting involves deferring the recognition of actual expenses via the capitalization through inventory of manufacturing costs related to the initial plans of a new program that exceed the estimated average

manufacturing cost per unit over the life of the program. Investors should evaluate the cost per unit that must be amortized to cost of goods sold over the remaining units to be produced. In Boeing's case, on March 31, 2015, it had \$26.9 billion in construction costs that had been deferred on the production and delivery of its first 258 model 787 aircraft. This equates to approximately \$25.9 million per plane, which will be amortized over the remaining 1,042 aircraft that the company anticipates to be built over the life of the 787 program. Investors should evaluate whether they believe Boeing can sufficiently reduce its manufacturing costs related to the 787 program to profitably recover these deferred costs. It is also relevant to note that Boeing's shareholders' equity as of March 31, 2015—minus the deferred production costs—leaves the company with a significant deficit in net worth. On that date, Boeing's Form 10-Q reflected consolidated shareholders' equity of \$7.9 billion. Had Boeing not deferred construction costs on planes already built, it would have had a deficit in net worth of \$10.9 billion, net of estimated income tax benefits of \$8.1 billion.

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