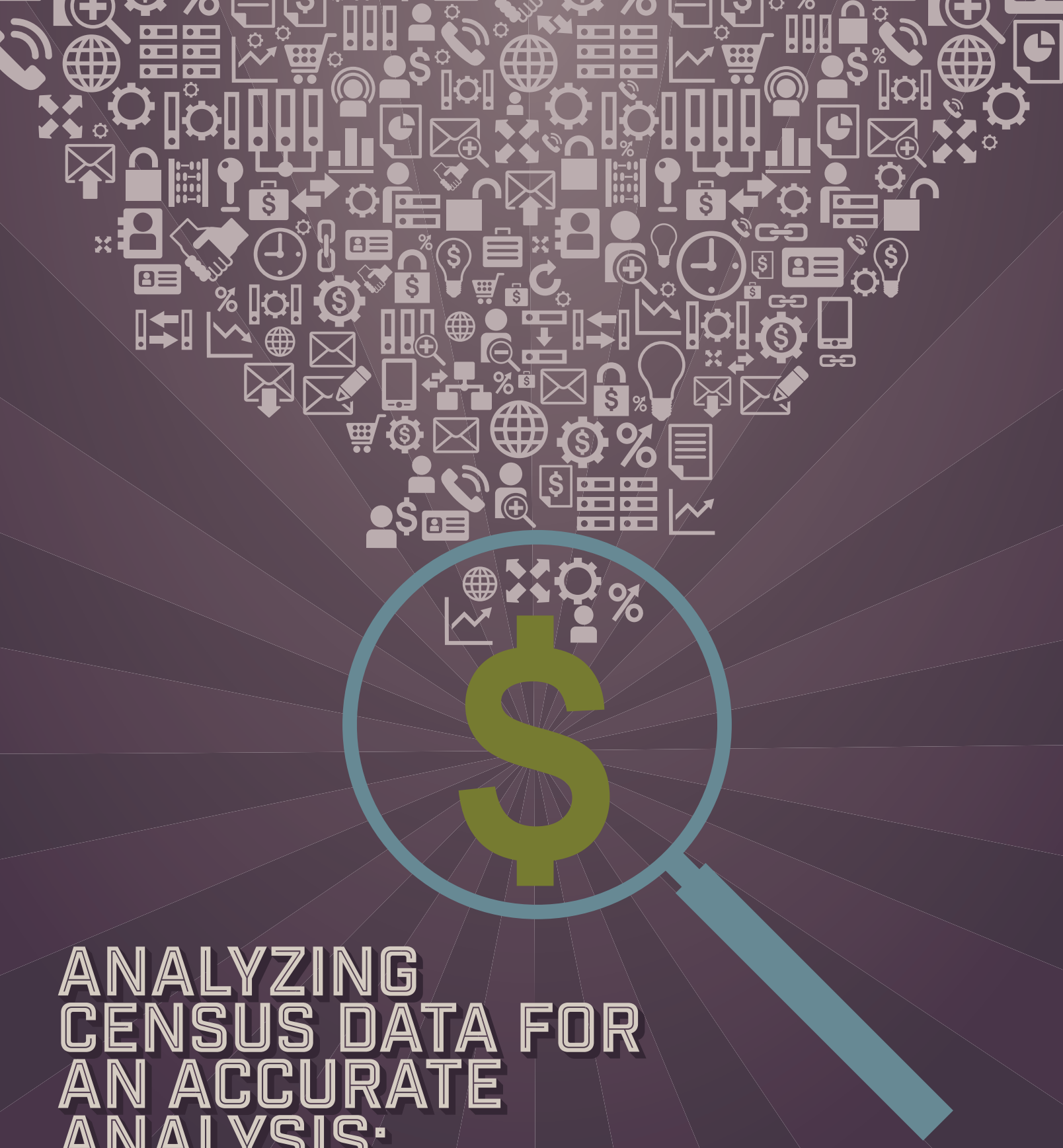


ANALYZING CENSUS DATA FOR AN ACCURATE ANALYSIS:

How to Conduct Price Analysis for Services

BY: DANIEL A. CHALFANT

An analysis of data from over 25 years of research and empirical studies that presents a method to accurately estimate fully burdened labor rates using *Economic Census* data.

Service contracting is getting BIGGER AND BIGGER.

In fiscal year 2015, nearly two-thirds of U.S. federal government contract obligations were spent on services, accounting for $283 billion out of a total of $447 billion (63%) in contract obligations.[1] In comparison, products accounted for only $164 billion (37%).[2] (See FIGURE 1 on page 42.)

But how do we know if the rates we are paying for these services are fair and reasonable?

The *Federal Acquisition Regulation* (*FAR*) requires that some kind of cost or price analysis be performed on all acquisitions.[3] The seven price analysis techniques listed in FAR Part 15 are all sound techniques; however, they are more appropriate for buying manufactured goods than they are for procuring services. For example, the term price is used throughout this section of *FAR*, but the word rate does not appear. One could argue that the word rate could be substituted for the term price in this context, but this would only work for some of the seven techniques, but not all.

The first two of the seven techniques are preferred, and the remaining five may not be appropriate for the procurement of services at an hourly "rate":

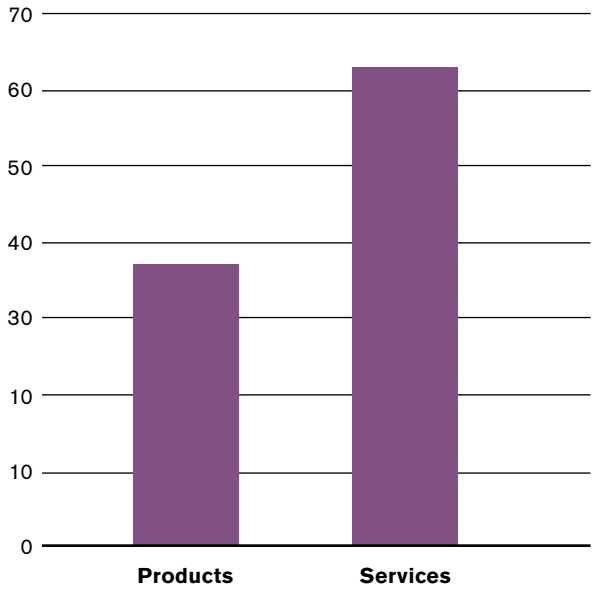
1 | The first technique is "comparison of proposed prices received in response to the solicitation."[4] Normally, adequate price competition establishes a fair and reasonable price. This technique is easily adapted to the procurement of services at hourly rates. Comparison of proposed "rates" and hours can result in adequate price competition, and fair and reasonable rates.

2 | The next technique is "comparison of the proposed price to historical prices paid."[5] This technique is also easily adapted to the procurement of services at hourly rates. Comparison of proposed rates to historical rates (if validated) is a good price analysis technique.

3 | This technique, "parametric estimating methods," as well as the next four, may not be appropriate for procuring services. Use of "parametric estimating methods" does not seem to apply when analyzing proposed rates for services. There are few sources of parametric data for rates for services.

4 | "Comparison with competitive published price lists" may apply to the procurement of some services. Some companies list their service rates in their published price list. They tend to be national averages and not specific to geographic areas. The

FIGURE ONE. Products vs. Services



Source: *Annual Review of Government Contracting*, 2015 Edition (Ashburn, Virginia: National Contract Management Association/ Bloomberg Government, 2015).

proposed services should also meet the definition of commercial services in accordance with FAR 2.101.

5 | "Comparison of proposed prices with independent government cost estimates" may not appear to apply to the procurement of services, but it can work. This technique may have been designed for manufactured goods, but it can work for services also. The buyer can independently estimate a supplier's rate for services.

6 | "Comparison of proposed prices with prices obtained through market research" can also work for proposed rates for services. The market research should allow for geographic differentials in direct labor rates, and consider the appropriate industry for application of indirect rates.

7 | "Analysis of data other than certified cost or pricing data" can also be used to analyze proposed rates for services. However, obtaining this type of data for low-dollar procurements can be difficult, and analysis of the data can be very rigorous.

INDEPENDENT ESTIMATE OF RATES

A method for the application of the price analysis technique outlined in item number five in the previous list is presented as follows. A buyer can independently estimate a supplier's proposed fully burdened rates for services. Just like an engineer estimating direct labor hours and direct material based on an engineering drawing, a buyer can estimate the appropriate direct labor rate and indirect rates for services based on the location and the industry.

This estimate starts with estimating the direct labor wage rate. The wage rate should be based on the geographic location where the work will be done. The Bureau of Labor Statistics (BLS) is a good source for direct labor wage rate averages by metropolitan area. Independent salary surveys can also be used to determine average wage rates by geographic area.

Wage Rate Example

Using the BLS website,[6] a buyer can select multiple occupations for one geographical area. The buyer can then select the metropolitan area and the occupations to review. **FIGURE 2** on page 43 shows how this type of data can be downloaded into HTML or Excel. Using this data, the buyer should use the "hourly median wage" as a starting point for estimating the direct labor wage rate.

In this example, a computer and information research scientist earns about $58.99 per hour in the Washington DC metropolitan area. The data also shows a range of between $50.92 and $72.95 for the 25th to 75th percentile wage.

WHAT ABOUT THE INDIRECT RATES?

The Harvard Business Review recorded this statement from a senior executive:

> We've been brought up to manage in a world where burden rates… are 100% to 200% or so. But now some of our plants are running with burden rates of over 1,000%. We don't even know what that means![7]

Perhaps some light can be shed on the subject of burden rates. You can accurately estimate the indirect rates of a supplier. This has been accomplished by a few researchers in the past 20 years. The following is a brief history of some of this research and application of these methods.

The Research

In 1990, Dr. David N. Burt, a professor at the University of San Diego, used data from the 1986 *Economic Census* to develop various cost ratios. His initial research showed that indirect rates typically ranged between 100 percent and 500 percent of direct labor costs. Therefore, a labor "multiplier" (or load factor) of between 2.0 and 6.0 could apply.

In the mid-1990s, Peter Dreesen of SAIC conducted annual empirical studies of actual supplier "loading factors."[8] These studies researched suppliers who disclosed their direct and indirect rates in proposals to SAIC. The studies included all indirect costs into one single "load factor," which included all fringe benefits, overhead, and general and administrative type costs. The calculations can be expressed in two ways:

- Fully Burdened Labor Rate ÷ Direct Labor Rate = Load Factor (e.g., $100 ÷ 40 = 2.5); or

FIGURE TWO.

Area: Washington/Arlington/Alexandria, DC/VA/MD/WV Metropolitan Area
Period: May 2014

Occupation (SOC* code)	Hourly 25th Percentile Wage	Hourly Median Wage	Hourly 75th Percentile Wage
Computer and Information Research Scientists (151111)	50.92	58.99	72.95
Computer Systems Analysts (151121)	36.75	48.72	61.81
Information Security Analysts (151122)	40	50.59	64.65
Computer Programmers (151131)	34.55	44.06	54.44

Source: BLS, "Occupational Employment Statistics," Query System, *available at* **http://data.bls.gov/oes/**.

*"SOC Code" = "Standard Occupational Classification Code." (*See* **www.bls.gov/soc/home.htm**.)

- (1 + Overhead Rate) × (1 + General and Administrative Rate) = Load Factor (e.g., (100% + 1) × (1 + 25%) = 2.5).

The SAIC empirical studies conducted in 1993, 1994, and 1995 included actual rates from 355 companies. The companies were assigned to one of five categories:

- Engineering,
- Manufacturing,
- Universities,
- Consulting, or
- Temp Agencies.

The average actual "load factor" for engineering companies was 2.4 in all three years of the study. The average load factor for manufacturing was 4.0 in all three years of the study.

In 1996, SAIC researched labor rate load factors,[9] which were based on the 1992 *Economic Census*.[10] The 1992 *Census* included 368,000 firms. The average load factor for engineering companies was 2.4, and the average load factor for manufacturing firms was 4.3. These results were in line with the previously discussed SAIC empirical studies.

FIGURE THREE.

Manufacturing Industry	NAICS	Number of Firms	Factor
Plastic & Rubber Manufacturing	326199	5,518	4.7
Fabricated Metal Products	332999	3,665	3.8
Machinery Manufacturing	333999	1,649	5.8
Other Electronic Components	334419	1,173	4.5
Miscellaneous Electrical Equipment	335999	818	7.1
Other Transportation Equipment	336999	403	6.0
Miscellaneous Manufacturing	339999	6,446	6.7
Data Processing Services	518	13,893	2.3
Professional, Scientific & Technical	541	854,274	2.4
Administrative and Support	561	361,733	1.8
Waste and Remediation	562	23,581	4.4
Educational Services	611	68,215	2.8

In 2001, 2005, 2010, and 2014, Alexander Associates updated this research with data from the Economic Census for 1997, 2002, 2007, and 2012. The number of firms included in the Census grew to over 854,000. The load factors were calculated by North American Industry Classification System (NAICS) code using the following three-part formula:

1 | Value of Shipments – Total Cost of Materials = Value Added;

2 | Value Added – (Profit + Taxes) = Indirect Costs;

3 | Indirect Costs ÷ Production Workers' Wages = Load Factor.

The "value of shipments," "total cost of materials," and "production workers' wages" all come from the *Economic Census* data. The average "profit" values come from the Internal Revenue Service Corporation Returns.[11] Over the 15 years, the average load factor for engineering companies ranged from 2.4 to 2.5. The average load factor for manufacturing firms ranged from 4.5 to 7.6.

Since 2009, the accounting firm Grant Thornton has conducted annual surveys of engineering firms doing business with the federal government.[12] However, these surveys calculate a "labor multiplier," which is equivalent to the "load factor" values calculated in the previously discussed research, and these surveys do not include data for manufacturing firms. The reported results Grant Thornton's surveys of between 2.1 and 2.4 for engineering firms are very similar to the SAIC and Alexander Associates findings.

In 2013, CBIZ Tofias published an architectural survey[13] that included industry average "breakeven multiples." These values were calculated by adding direct labor costs and overhead and then dividing by direct labor costs. The industry average breakeven multiples ranged from 2.5 to 2.8.

Empirical Studies

In early 2015, Alexander Associates performed an empirical study,[14] which included 67 actual rates from their consulting file data. The model predicted an average manufacturing factor of 5.5, and an average engineering factor of 2.3. The results of the study showed the actual average load factor for manufacturing firms was 5.4 and for engineering companies it was spot on at 2.3.

Later in 2015, General Atomics conducted an empirical study of average load factors of their suppliers,[15] which included 57 current suppliers who disclosed their rates. The model predicted an average manufacturing factor of 5.3, and an average engineering factor of 2.4. The results of the study showed the actual average load factor for manufacturing firms was 5.2 and for engineering companies it was 2.4.

These recent studies re-confirm the findings of the older empirical studies from the mid-1990s and validate the load factors derived from *Economic Census* data.

The Load Factors

The 2014 labor rate load factors that follow are based on the 2012 *Economic Census*.[16] The industry average factors for 12 common NAICS codes are shown in **FIGURE 3** to the left.

These factors include all indirect expenses, including fringe benefits, overhead, and general and administrative type expenses. No profit or fee is included in the factors.

The labor rate load factors can be used to "load" direct labor rates from BLS or a salary survey with industry average burden rates. These "loaded" rates can be compared to proposed rates to establish fair and reasonable rates. They can also be used to "unload" proposed fully burdened rates to estimate the proposed direct labor rate.

Application

Applying this research, we can now accurately estimate a supplier's indirect rates. For example, in the Washington DC metropolitan area, the average direct labor rate for a "computer and information research scientist" is $58.99 per hour (based on the BLS data previously discussed). The average load factor for an engineering company (NAICS 541) is 2.4 (based on the labor rate load factor). The average "fully burdened labor rate" (also known as a "wrap rate")[17] can be calculated with the following formula:

- Average Direct Labor Rate × Labor Rate Load Factor = Average Fully Burdened Labor Rate.

In this particular example, 58.99 × 2.4 = 141.58; therefore, the average fully burdened labor rate is $141.58 per hour.

With this formula, we can easily estimate the fully burdened labor rate for all four of the previously discussed BLS labor categories:

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It is important to note that the average direct labor rates in the Washington DC metropolitan area are higher than other metropolitan areas. (In this model, lower direct labor rates will yield lower estimated fully burdened rates.) It is also important to note that if we were procuring manufacturing services, the estimated fully burdened rate would be much higher. For example, if the supplier was in NAICS code 326199, "Plastic & Rubber Manufacturing," the estimated fully burdened rate for the computer programmer would be $277.25 per hour (58.99 × 4.7 = 277.25). (Of course, a more typical direct labor rate for this particular NAICS code would be more like $16.00 per hour, so the fully burdened rate would be $75.20 per hour (16.00 × 4.7 = 75.20).)

This brings up a key point: Be sure to select the appropriate labor category and load factor for the supplier's industry.

Onsite/Offsite Rates

Another factor to consider in estimating fully burdened rates is the "onsite/offsite" effect on a supplier's cost. If the supplier is to be working in the customer's facility, a lower load factor would be applied. According to Alexander Associates LLC,[18] facility costs typically represent about 33 percent of an engineering firm's indirect costs. Therefore, the indirect costs should be reduced by 33 percent for work at a customer's facility. The formula to calculate this reduction is as follows:

- ((2.4 – 1) × 0.67) + 1 = 1.9.

Grant Thornton's research[19] also recognizes the reduction to the labor multiplier due to working at the customer's site. Their survey of offsite labor multiplier factors range from 1.8 to 2.0. This is very similar to the estimated factor of 1.9 in this formula.

SUMMARY

Over 25 years of research and empirical studies have shown that fully burdened rates can be accurately estimated using the *Economic Census* data method presented in this article. Many major government contractors are using this method, including Accenture, BAE, Booz Allen, CACI, Ciber, Cubic, General Atomics, Leidos, Northrop Grumman, and United Technologies. This price analysis technique has also been used by the U.S. Navy, U.S. Marine Corps, and the Department of Energy. The resulting price analysis has been reviewed and accepted by government contractor purchasing system review teams without exception.[20] **CM**

ABOUT THE AUTHOR

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Send comments about this article to cm@ncmahq.org.

ENDNOTES

1. *Annual Review of Government Contracting*, 2015 Edition (Ashburn, Virginia: National Contract Management Association/Bloomberg Government, 2015).
2. *Ibid*.
3. FAR 15.404-1, "Proposal Analysis Techniques."
4. FAR 15.404-1(b)(2)(i).
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6. **http://data.bls.gov/oes/**.
7. Jeffery Miller and Thomas Vollmann, "Accounting, The Hidden Factory," *Harvard Business Review* (1985).
8. *See* SAIC Annual "Loading Factor" Reports (1993, 1994, and 1995).
9. *See* Alexander Associates LLC, "Labor Rate Load Factors" (1996, 2001, 2005, 2010, and 2015).
10. U.S. Department of Commerce, U.S. Census Bureau, *Economic Census* (1992). (The U.S. Census Bureau conducts economic surveys every five years, and it usually takes two to four years for the Census Bureau to publish the results of its surveys.)
11. IRS, "2012 Corporation Returns—Basic Tables, Returns with Net Income": Table 7.
12. *See*, *e.g.*, *2015 Government Contractor Survey* (Grant Thornton LLP: 2015).
13. CBIZ Tofias and Mayer Hoffman McCann PC, "2013 Architectural Survey" (2013).
14. Alexander Associates, "2015 Labor Rate Load Factor" study.
15. General Atomics Aeronautical Systems Inc., "2015 Labor Rate Load Factor" study.
16. *See* Alexander Associates LLC, note 9.
17. Terminology is from Defense Acquisition University Lesson CLB 029, "Wrap Rate Calculations."
18. *Ibid*.
19. *See* note 12.
20. For additional information, *see* **www.alexanderassociatesllc.com**.