

**2005 Electronic Commerce and Mail Order Sales Revenue Estimates –
Technical Documentation
May 23, 2007**

I. Business-to-Consumer (B-to-C)

Data Sources and Estimates of the Electronic Sales Portion

We define remote sales as all sales from retail sellers to households that are made electronically or by using traditional mail order sales channels. The Census Bureau has two separate data estimation programs for remote sales, and they use different definitions. First, the Census Bureau publishes monthly and annual sales estimates for all retail industries by North American Industrial Classification System (NAICS) codes. NAICS Industry 4541 (“electronic shopping and mail order houses,” or ESMOH) includes retailers whose primary business (or a separate subsidiary) is mail order or electronic commerce sales.¹ According to a Census Bureau staff member we contacted, these exclude online auction sales such as E-Bay. Sales made by NAICS Industry 4541 are our starting point for measuring all remote sales. As discussed below, retailers not classified in NAICS Industry 4541 can also make remote electronic sales, and we believe we need to include them to have a more accurate estimate of remote sales.

Preliminary Census Bureau estimates show that sales from NAICS Industry 4541 totaled \$161.6 billion in 2005. These sales are up about 10 percent from those made in 2004, and have doubled since 1998. The \$161.6 billion in NAICS Industry 4541 sales includes both electronic and mail order sales. Car sales are not included in this industry.

Our second data source for remote sales are Census Bureau estimates of electronic commerce retail trade sales, which the Census Bureau has stated can be assumed to be mostly B-to-C sales.² These estimates are available for 2005 as total sales figures, and they include more detailed information for 2004 and earlier years. These estimates include electronic commerce sales both in NAICS Industry 4541 and other industries. We use these data to: (1) estimate the electronic sales that are not included in NAICS Industry 4541, and (2) estimate the electronic portion of all remote sales.

Table 1 shows detailed electronic commerce sales for 2004, percentages of total 2004 electronic commerce sales, 2005 total electronic commerce sales, and our estimates of detailed 2005 electronic commerce sales based on the 2004 percentages. As shown in Table 1, based on shares of 2004 sales, we estimate 2005 electronic commerce sales for NAICS Industry 4541 (ESMOH) at \$64.8 billion. Electronic commerce sales in 2005 for “All other Non-ESMOH E-Commerce” industries are estimated at \$7.2 billion. Summing these two figures, electronic commerce sales relevant to our revenue estimate are \$72.1 billion (using unrounded data). Sales of motor vehicles and other nonstore retailers (fuel dealers and other direct sellers) are displayed in the table, but are not relevant to our revenue estimate because we believe that sales taxes are very likely to be collected by such sellers in California.

¹ *Annual Benchmark Report for Retail Trade and Food Services: January 1992 Through February 2006*, U.S. Census Bureau, March 2006, web site: http://www.census.gov/prod/www/abs/br_month.html
Electronic commerce data are found in: *2004 E-Commerce Multi-sector Report*, U.S. Census Bureau, May 25, 2006, web site: <http://www.census.gov/eos/www/ebusiness614.htm>.

² Electronic commerce data are found in *2004 E-Stats E-Commerce Multi-sector Report*, U.S. Census Bureau, May 25, 2006, web site: <http://www.census.gov/eos/www/ebusiness614.htm>. Total 2004 electronic commerce sales from this document were updated to 2005 using data found in *Quarterly Retail E-Commerce Sales*, U.S. Census Bureau, May 18, 2006, web site: <http://www.census.gov/mrts/www/current.htm>.

Table 1				
U.S. Retail Electronic Commerce Sales - Census Bureau Data				
	2004 (\$ Billions)	Percent of 2004 Total	2005 (\$ Billions)	Source of 2005 Figures
Total Retail Trade Electronic Commerce	\$70.9	100.0%	\$88.0	Census Bureau
Nonstore Retailers (Direct Sellers)	53.6			
Electronic Commerce and Mail Order Houses (ESMOH, NAICS Industry 4541)	52.2	73.6%	64.8	Proportions in 2004
Other Nonstore Retailers	1.4	2.0%		
Motor Vehicles and Parts Dealers	11.4	16.1%		
All Other Non-ESMOH E-Commerce Sales	4.6	8.2%	7.2	Proportions in 2004
Electronic Commerce Sales Potentially Unremitted (Electronic Shopping and Mail Order Houses Plus Non-ESMOH Sales)			\$72.1	Proportions in 2004

Note: Numbers may not add to 100 percent due to rounding.

The \$64.8 billion of estimated 2005 electronic sales shown for NAICS Industry 4541 in Table 1 are already included in the NAICS Industry 4541 total of \$161.6 billion in 2005 mentioned earlier. However, the \$7.2 billion in estimated electronic sales of other industries are not included. Since the \$7.2 billion in electronic commerce sales in other industries were not included in the estimate of sales by NAICS Industry 4541, we need to add them to more accurately estimate remote sales. Therefore, total remote sales relevant to the revenue estimate are estimated to have been \$168.8 billion in 2005 (\$161.6 billion + \$7.2 billion = \$168.8 billion). Of the \$168.8 billion, \$72.1 billion are electronic sales and the remaining \$96.7 billion are assumed to be traditional mail order sales.

Determination of B-to-C Nexus Percentage

Board of Equalization Research and Statistics staff used a two-step procedure to estimate remote sales made from companies registered with the California Board of Equalization. First, we determined aggregate estimates of remote sales for three sizes of companies. To do this we estimated U.S. remote sales for three groups of firms: (1) those with 500 or more employees and (2) those with 100 to 499 employees, and (3) those with less than 100 employees. (In this discussion we will call these groups “large firms,” “medium firms,” and “small firms.”) Second, we estimated nexus percentages (that is, the percentage of remote sales made by registered companies) for these three groups. This procedure required us to estimate remote sales for representative individual companies registered by the Board of Equalization for medium and large companies. We assumed California shares of U.S. remote sales for small companies without making individual company estimates. Then we calculated a weighted average nexus percentage of the three groups.

Aggregate Estimates of Remote Sales by Small, Medium and Large Company Sizes. The Census Bureau published estimates of remote sales made in 2005. Using data relationships from the 2002 Economic Census, we calculated that about 77 percent of 2002 remote sales were made by large firms, 9 percent were made by medium sized firms, and that 15 percent were made by small firms (these figures do not sum to 100 due to rounding). We applied these

percentages to 2005 remote sales to estimate aggregate remote sales for all three sizes of retail companies.

Firm-Level Estimates of Remote Sales by Large Firms. From library and Internet research, we found sales and employment information for 154 large firms and 15 medium sized firms. We assumed that the 154 large firms we identified and found information for were representative of all 280 large firms making remotes sales in 2002. Using the total remote sales estimate for all large firms and the information we have collected, we estimated remote sales for each of these 154 companies. We found information on remote sales for 47 of these large firms. Remote sales from these 47 firms represented about 50 percent of our estimate of 2002 remote sales of all large firms.

For the remaining large firms we assumed that remote sales must be a relatively very small part of their business activities for them not to be mentioned in their Security and Exchange Commission (SEC) filings or annual reports. If the firms for which we could not find information had remote sales averaging 2.8 percent of their total sales, this would account for the remaining remote sales by large firms for which we have no specific information.³ These imputed estimates accounted for the remaining 50 percent of remote sales by large firms in 2002.

The second major step in the process was to estimate how many of these sales were made by firms registered with the Board. We looked up each of the 154 company names in our registration data base to determine if they are registered. Using this information, we estimated that 78 percent of all remote sales by large firms were made by large firms that have California nexus.

Remote Sales by Medium-Sized Firms. In our searches for company information, we found total sales and remote sales information for 15 companies having 100 to 499 employees. This is about 6 percent of the number of medium firms making remote sales according to the 2002 Census data. About 8 percent of estimated 2002 remote sales by all medium companies are represented by sales of these 15 individual ones. We found that remote sales representing 37 percent of these 15 firms are registered with the Board. We assumed that these 15 firms are representative of all medium-sized firms.

Remote Sales by Small Firms. For small firms making remote sales, we assumed that the shares of sales by these firms that are registered with the Board are proportional to the California share of total U.S. sales by electronic shopping and mail order houses found in the 2002 Economic Census. We found that California accounted for about 11 percent of U.S. sales of electronic shopping and mail order houses in 2002.

Weighted Average Nexus Percentage. Table 2 summarizes the data from the list of companies we used to derive our weighted average nexus percentage. The table shows that 64 percent of remote sales were made by companies registered in California.

Independently Estimated Remote Sales Nexus Percentages. To verify the reasonableness of this result we obtained a copy of the 2006 edition of *The Internet Retailer Top 500 Guide: Profiles and Statistics of America's 500 Largest Retail Web Sites Ranked by Annual Sales*,

³ This assumes proportional sales for the large firms for which we had no information at all. We had, as a minimum, total sales information for 154 of the 280 large firms (55 percent of them).

published by Vertical Web Media LLC, Chicago, Illinois. This report tabulated 2005 data for electronic sales. These data differ from the U.S. Census Bureau data in that they were estimated by a private sector entity and in that they only estimated electronic commerce sales rather than 2002 electronic and mail order sales (remote sales). The data also differ in that they do not tabulate sales by employer size groups. The data are available for all 500 companies, which is 331 more than the 169 companies we found in our research. We used these data as an independent source to verify the 64 percent weighted average sales by companies registered with the Board.

Table 2						
Weighted Average Nexus Percentage – All Companies Making Remote Sales						
Employment Size Group	Number of U. S. Companies on BOE List	Number of U. S. Companies in 2002	Estimated U.S. Remote Sales in 2005 (\$ Millions)	Estimated Shares of Total Remote Sales (Percent)	Estimated Remote Sales With California Nexus (Percent of U.S.)	
Small Companies (0 - 99 Employees)	n.a.	10,288	\$23,716	15%	11%	
Medium Companies (100 - 499 Employees)	15	232	\$13,966	9%	37%	
Large Companies (500 or More Employees)	154	280	\$123,896	77%	78%	
Totals	169	10,800	\$161,578	100%	n.a.	
Weighted Average Nexus Percentage						64%

Table 3						
Weighted Average Nexus Percentage - Companies With More Than 100 Employees Making Remote Sales						
Company Employment Size Group	Number of Companies in BOE List	Number of U.S. Companies in 2002	Estimated U.S. Remote Sales in 2005 (\$ Millions)	Shares of Total Remote Sales [More Than 100 Employees] (Percent)	Average Estimated Remote Sales With California Nexus (Percent of U.S.)	
Medium Companies (100 - 499 Employees)	15	232	\$13,966	10%	37%	
Large Companies (500 or More Employees)	154	280	\$123,896	90%	78%	
Total (More Than 100 Employees)	169	512	\$137,862	100%	n.a.	
Weighted Average Nexus Percentage, More Than 100 Employees						74%

We tabulated these data and determined sales of the 500 companies made by firms registered in California. We found that 222 of the 500 companies were registered and that these companies represented about 70 percent of all sales by the Top 500 electronic commerce

companies. (Sales of all 500 companies totaled \$68.9 billion. Sales by firms registered in California totaled \$47.9 billion.)

As shown in Table 2, the 2002 Census data show that there were 232 medium companies and 280 large companies in 2002, a total of 512 companies. It is likely that many of these companies are included in the Top 500 list since there tends to be a strong correlation between sales and numbers of employees. To compare the two data sources we estimated the weighted average percent of sales made by medium and large companies that were registered in California. This weighted average omits the small companies to make the comparison of the two data sources as close as possible given their differences. As shown in Table 3, this weighted average is about 74 percent, close to the 70 percent weighted average found using the *Internet Retailer Top 500* data.

Since remote sales are so concentrated in medium and large firms (especially in large firms), these calculations imply that the overall nexus percentage of close to 64 percent would result from using either the 2002 Census data by employee size or the 2005 electronic sales data from *Internet Retailer*. The calculations also imply that it is reasonable to assume the same nexus percentage for both all remote sales and the portion that are electronic rather than traditional mail order.

II. Business-to-Business (B-to-B)

Data Sources and Definitions

The Census Bureau publishes annual estimates of electronic commerce sales collected from four separate surveys.⁴ The "Note to Reader" section of the report states that their e-commerce surveys have definitional differences among them, and suggests caution in totaling figures among the four surveys. One reason for caution is that the sum of all shipments and sales is subject to double counting. The data for manufacturers includes shipments, which may be among divisions of the same company. Manufacturers may sell components to themselves, to other manufacturers, or to merchant wholesalers. The Census Bureau surveys annual sales made; relatively little is known about purchasers of the goods.

From a sales and use tax perspective, the sale of a manufactured good is taxable at the point of the final sale; components and ingredients are generally not subject to tax. Conceptually, the value of taxable sales is similar to gross domestic product by industry (value added approach), which does not count the value of production of components and ingredients more than one time. Sales may not be subject to tax for two major reasons: (1) as ingredients or components which have been purchased for resale, or (2) as items exempt from the sales and use tax (such as food for home consumption). While some data from federal agencies excludes the value of components or ingredients to avoid counting the value of production more than one time, no federal data source enables a precise estimate of the value of production under California definitions of exempt goods.

There are no federal estimates of the portion of gross domestic product (GDP) that is sold electronically; the Census Bureau only estimates sales. A distinction between sales and GDP is that the sales may be counted more than once, whereas GDP includes only the value of final

⁴ See footnote number 2 for the reference.

sales. All Census Bureau surveys include some degree of double counting of the value of sales or shipments, and none has sufficient detail to exclude all items that would be exempt under California sales and use tax law. There are two B-to-B Census Bureau surveys, one for Manufacturers' Shipments and one for Merchant Wholesale Sales. By choosing only one of the two surveys, we attempt to minimize the problem of double counting. Given these data limitations, we decided to choose the Census Bureau survey that we believe best represents final B-to-B sales and adjust the data to reflect exempt sales using the most accurate information we have available. We also cross-checked our national estimate with other outside information for reasonableness.

The Census Bureau survey this estimate is based on is merchant wholesale sales. We believe all sales from manufacturers are included in merchant wholesale sales. There still is some double counting of the value of components. However, we believe using merchant wholesale sales is more accurate than manufacturers' sales and shipments because merchant wholesale sales include the value added by manufacturers.

The most recent Census Bureau estimate shows that U.S. electronic commerce merchant wholesales sales were \$825 billion in 2004, increasing 9.1 percent over those of 2003. With continuing economic growth, we assume U.S. B-to-B electronic commerce sales increased an additional 9.1 percent in 2005. Therefore, our estimate of 2005 U.S. B-to-B electronic commerce sales is \$900 billion. As discussed below, we reduce this figure by \$3.6 billion to adjust for California sales and use tax law in exempting sales of custom software and electronically delivered software, resulting in 2005 California-taxable U.S. B-to-B electronic commerce sales of about \$896 billion.

Software Adjustment

Custom software and electronically delivered software are exempt from sales and use taxes under California law. The *E-Stats* data do not break out software sales; wholesale sales of hardware, software and peripheral equipment are all included in a single category of spending. We made an adjustment to the U.S. B-to-B electronic commerce sales to consider estimated software sales that are exempt under California sales and use tax law. As it turned out, this adjustment was relatively small, only about 0.4 percent of U.S. B-to-B sales were exempt software sales.

Our software adjustment reduces the 2005 estimated \$900 billion in B-to-B electronic commerce sales (calculated earlier) by \$3.6 billion. The details of how we made this adjustment are outlined as follows. The source of our figures is the *2002 Economic Census*, published by Census Bureau.⁵ U.S. sales of package software (\$18.7 billion) and custom software (\$14.7 billion) are provided in this document. These are both electronic and all other sales. We could not find data for electronically-delivered software. Based on research and anecdotal discussions with BOE information technology staff, we believe that no more than 50 percent of business software is delivered electronically. If we assume that 50 percent of business software is delivered electronically, \$24.1 billion of U.S. software sales are exempt under California sales and use tax law [(\$18.7 billion in electronically delivered software x 0.5) + \$14.7 billion in custom software = \$24.1 billion]. The *2002 Economic Census* data show \$244 billion in hardware,

⁵ Table 3, "Product Lines by Kind of Business for the United States: 2002," in "Computer Hardware and Software, and Other Electronic Parts and Equipment: 2002," *Wholesale Trade Industry Series*, November 2004.

software and peripheral equipment sales. Therefore, exempt software sales of \$24.1 billion are about 10 percent of this total. The *E-Stats* data show that electronic merchant wholesale sales of hardware, software and peripheral equipment were \$35.6 billion in 2004.⁶ Ten percent of this figure is about \$3.6 billion.

Exempt Sales

In a 2004 study of electronic commerce sales done by Drs. Bruce and Fox, they estimated that on average, 43 percent of B-to-B sales were exempt, being either a sale for resale or an exempt sale of a commodity, such as food for home consumption.⁷ Data from the *2002 Economic Census of Wholesale Trade* indicate that a much larger percentage, 66 percent of merchant wholesale sales were exempt. In the 2002 census, about 31 percent of wholesale sales were made to other wholesalers for resale, 32 percent went to retailers for resale, and 3 percent were exported. Sales of these three categories sum to 66 percent.⁸ For purposes of our revenue estimate, we will assume that 60 percent of sales are exempt, which is close to the 2002 census percentage. As explained further below, we believe that this assumption implies B-to-B electronic commerce sales consistent with high but reasonable percentages of such sales being capital goods. If we assume 66 percent of sales are exempt, the implication is that virtually all B-to-B sales are of capital goods sales, which does not seem reasonable.

If 60 percent of sales are exempt, this implies that the remaining 40 percent of sales are California taxable. Taking 40 percent of \$896 billion implies U.S. electronic commerce B-to-B sales of \$358 billion ($\$896 \text{ billion} \times 0.40 = \358 billion).

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⁶ Table 2.0 of the *E-Stats* Multi-sector report released May 25, 2006.

⁷ "State and Local Sales Tax Revenue Losses From E-Commerce: Estimates as of July 2004," Donald Bruce and William F. Fox, University of Tennessee Center for Business and Economic Research, July 2004.

⁸ *2002 Economic Census of Wholesale Trade, Subject Series, Miscellaneous Subjects*, December 2005, <http://www.census.gov/prod/ec02/ec0242sxsbs.pdf>.