

# Notes on Operations

## Determining the Average Cost of a Book for Allocation Formulas

### Comparing Options

By Virginia Kay Williams and June Schmidt

*Academic libraries that use allocation formulas to divide monographic funds among academic departments frequently include the average cost of books per discipline as a variable. Published price indices provide average costs for some subjects, but for libraries serving interdisciplinary departments, purchasing nonbook materials with monographic funds, or purchasing foreign language materials, the published price indices may prove insufficient. This study investigates methods of determining average prices to be used in allocation formulas. As part of evaluating the allocation formula at Mississippi State University, the authors reviewed literature pertinent to library use of allocation formulas, surveyed Carnegie Doctoral/Research Extensive and grant university libraries on their use of average price as a variable in allocation formulas, and calculated allocations using average price data from four sources: The Bowker Annual, previous acquisition cost data, Blackwell Price Reports, and Blackwell approval plan profiles. The pros and cons of each method of determining average price are discussed.*

Some academic libraries consider an allocation formula helpful in equitably distributing budgetary resources for materials purchases and seek to include formula variables that reflect the needs and interests of the disciplines or departments among which the resources are divided. Many such libraries use the average cost of books per discipline as one of the factors in the formula. The price variable is used as a proportion, to give departments with relatively expensive titles a larger share of the available dollars than departments with relatively inexpensive titles. If all other variables in the formula are equal, the price variable will allow the library to purchase the same number of titles per department, even though one department's titles tend to be much more expensive than another department's titles.

Mississippi State University (MSU) Libraries use an allocation formula to allocate funds for monographic purchases, and that formula historically included use of average price data from *The Bowker Annual*:

*Library and Book Trade Almanac (Bowker)*.<sup>1</sup> The current study began with the concern that the method MSU used for determining average price data was inadequate because the source data did not match the university's departmental structures well and did not address interdisciplinary materials, nonbook formats, or titles in languages other than English. The authors surveyed similar libraries on their use of average price as a variable in allocation formulas and calculated allocations using average price data from four sources to answer three research questions. First, what methods do libraries at similar institutions use to determine average price data for allocation formulas? Second, to what extent do average book prices derived from *Bowker* correlate with other data sources? Third, what are the pros and cons of each method of calculating average price?

The authors conducted a literature survey to determine historical and current thinking regarding use of allocation formulas and the value of

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The authors wish to thank Damen Peterson for assisting with correlation statistics.

Submitted July 14, 2006; rejected with significant revisions suggested August 8, 2006; revised and resubmitted November 7, 2006; tentatively accepted pending revision January 15, 2007; revised and resubmitted January 26, 2007, and accepted for publication.

including price data in such formulas. Similar libraries were surveyed on their use of average price as a variable in allocation formulas. Finally, the authors calculated allocations using average price data from four sources and evaluated the pros and cons of each method.

## Background

MSU Libraries have historically allocated a portion of the funding available for monographic purchases to the university's academic departments. Selection of materials for each department's funds was made by departmental faculty and the librarian assigned as liaison to the department. Until 1992, allocations were made based on historical spending patterns with occasional adjustments to support new programs and accreditation needs. In 1992, the library faculty, in consultation with the University Library Committee, decided to implement a fund allocation formula using eight variables: undergraduate credit hours, undergraduate majors, graduate credit hours, graduate majors, average cost of book in discipline, publishing output, relative importance of books and serials, and local use. Average book cost, a critical factor in the formula, would be determined by identifying subject areas pertinent to each department and using average prices from "North American Academic Books: Average Prices and Price Indexes" published in *Bowker*.<sup>2</sup>

Determining the departments' average book costs in this manner was not without challenges. One of the most serious problems was that the subject breakdown used in *Bowker* did not reflect the curricular and research needs of a land grant institution like MSU. For example, the term "Engineering and technology" was listed with no subdivisions to distinguish price differences among MSU's engineering departments.

The problem was exacerbated by an increase in the number of interdisciplinary departments; for example, the Geosciences Department includes programs in geography, geology, meteorology, and geographic information systems.

Another problem was that data in the *Bowker* table represented hardcover, trade, and paperback books. Belanger noted that the data used in the calculation of the average price of North American academic books is derived from titles included in the approval plans of Blackwell's Book Services and YBP, as well as books supplied through all order types from Baker and Taylor.<sup>3</sup> The increasing number of paperback books included in approval plans and sold through firm orders deflate the average prices and price indices in a manner not indicative of purchasing patterns typical at the MSU Libraries. While a few departments prefer paperback whenever available, most prefer hardcover almost exclusively.

Another challenge was the preference by some departments to collect materials in nonbook formats and in non-English languages. For example, the Music Education Department is concentrating on expanding the libraries' collection of music recordings on compact discs while the Philosophy and Religion Department requires numerous titles in German. Although *Bowker* published data on average costs of audiovisual materials, this information was omitted after the 46th (2001) edition.<sup>4</sup> Foreign language titles represent a very small percentage of the titles used to compute the average prices and price indices in *Bowker*. Cost coverage reports from the Blackwell and YBP Web sites suggest that about 2 percent of the titles included in approval plans are published in languages other than English. The MSU Libraries had made no attempt to adjust the average prices based on selection of nonbook media or foreign language materials.

The University Library Committee's periodic reviews of the formula had found no fault with the use of an average price variable, but the Libraries' collection development unit grew concerned with the appropriateness of determining the average price data for each department from the *Bowker* information. In 2004, the collection development unit chose to use average prices derived from "Approval Program Coverage and Cost Study" (Blackwell study) compiled by Blackwell's Book Services.<sup>5</sup> This study details subject areas and list prices of monographs covered by Blackwell's New Titles/Approval program for academic library collections. The collection development unit customized price information by matching each academic department's approval slip profile with the pertinent subject disciplines, a time-consuming procedure. For the 2005/06 academic year, the collection development unit decided to explore options available for determining average prices using the most current data available from several sources.

## Literature Review

Allocation formulas and their components have been widely discussed in library literature. Critics have pointed out that allocation formulas can lead to an aggregation of specialized materials and a lack of general interest and interdisciplinary materials; they also are often tied to faculty selection, and minimize the librarian's role in building a balanced collection.<sup>6</sup> Proponents say that they can help distribute funding equitably, minimize the tendency for rapid and vocal selectors to acquire a disproportionate share of funding, and cope with the political tensions of departments fighting for a fair share of materials funding.<sup>7</sup> While acknowledging the limitations of formulas, Lowry observed in 1992 that allocation formulas serve two purposes:

they help allocate limited resources equitably and “are extremely useful in solving the dilemmas of unequal resource allocation.”<sup>8</sup> Lowry proposed a matrix formula including as many as twelve variables chosen based on institutional goals. Many libraries apparently agree with Lowry that formulas are useful since about 40 percent of academic libraries surveyed by Budd and Adams, and Tuten and Jones, have used formulas.<sup>9</sup>

The average cost of materials per discipline is a common, though not easily established, variable in allocation formulas. As Genaway noted, the collection of an academic library should proportionally reflect all the programs, instruction, and research of the institution.<sup>10</sup> One could infer that subject fields receiving equitable library support would acquire the same proportion of titles published in their field. Since the average cost would significantly affect the library’s ability to acquire titles, a variable to compensate for the broad variation in average prices would help insure proportional subject acquisitions. Biblarz, Bosch, and Sugnet noted that book price disparities among disciplines should be considered as a major piece of data that drives resource development in respective subject areas.<sup>11</sup>

Librarians have used numerous sources for average price information and noted problems with each. When Randall discussed allocating book funds based on average publishing output and cost of books published in a subject, he relied on *A List of Books for College Libraries* as his source of information.<sup>12</sup> However, he acknowledged that he omitted two foreign language departments from the formula because his source contained too few priced titles in foreign languages to be considered reliable.

Ellsworth tried using data from *Publishers’ Weekly* and *Bookseller* to determine cost and publishing output by fields, but experienced difficulty matching the publications’

general subject categories to academic departments.<sup>13</sup> He also noted that these sources did not cover foreign books. Sweetman and Wiedemann identified subject categories and restriction to books published in the United Kingdom as problems in using price data published in the *Library Association Record*.<sup>14</sup> When Werking and Getchell used *Choice* to estimate publishing output and cost, they identified matching *Choice* categories with academic departments, lack of vocational literature, and *Choice*’s focus on undergraduate materials as concerns.<sup>15</sup>

The costs compiled from approval plan vendor data and published in *Bowker* have been used by some libraries to determine average cost. When Axford compared average prices of books purchased through approval plans at three academic libraries to average prices reported in *Bowker*, he concluded that the differences between the published price index and the locally generated data were too large for *Bowker* to be used reliably for allocating book budgets among departments.<sup>16</sup> In a letter replying to Axford’s article, Lynden and Birkel pointed out that the published indices were intended to indicate overall price trends and provide data for state and national policy decisions, not to reflect a particular library’s buying patterns.<sup>17</sup> Lynden and Birkel opined that published indices could be useful in preparing budget justifications, but could not substitute for local statistics.

Rein discussed using data from the most recent Blackwell study.<sup>18</sup> He reported the challenge of matching the study’s subject areas to the academic departments of George Mason University. Rein noted that data from two tables had to be combined to cover all the subjects relevant to a department. Rein also suggested that the library should consider foreign publications and nonbook materials in future price studies.

Cubberly also used approval plan data, noting the necessity of sort-

ing the data by Library of Congress (LC) classification before matching it to department interests as identified in the collection development policy.<sup>19</sup> Cubberly mentioned the lack of data on nonbook, foreign language, and retrospective materials as a concern, especially for the University of Southern Mississippi’s large music program. Similarly, Goehner noted a faculty committee’s recommendation that the library and foreign language department at his university work together to identify a book cost for foreign language materials, as data was not available from the library’s approval plan vendor.<sup>20</sup>

Bourgeois reported that Southwest Texas State University uses a faculty-determined allocation formula that includes two price averages for monographs.<sup>21</sup> One average comes from vendor’s tables and the other from the price of monographs bought by the library in previous years. As O’Connor explained, the University of Technology, Sydney, uses actual prices paid by the library to calculate average cost, because that reflects reality for a library purchasing substantial amounts of overseas publications.<sup>22</sup> Evans discussed the decision to change from using average price of previous purchases to price indices published in *Bowker* when Monash University Library (AUS) adopted a new allocation formula.<sup>23</sup> As Evans explained, the allocation formula committee felt that using average cost based on past purchases served to “enshrine past purchasing practice.”<sup>24</sup> The committee decided that adding the number of monographs published by subject and average price from a published index would address that concern.

### Research Method: Survey of Libraries Similar to MSU

Because the literature review described situations in various types of academic libraries, the authors selected

forty-five Carnegie Doctoral/Research Extensive land grant colleges to survey about allocation formula use in institutions similar to MSU. The survey, which appears as an appendix, was developed to determine:

- if the libraries use a formula to allocate all or a portion of their materials budget to academic departments, and if so, what percentage is allocated to departments;
- what formats are included in the formula;
- if the average cost of books per discipline is used as a variable; and
- how that average cost is determined.

The survey also included questions regarding the amount spent annually on monographs and the portion of the monographic budget devoted to approval plans, if any. Twenty-six (58 percent) of the forty-five librarians responded.

### Survey Findings

As table 1 shows, only eight (31 percent) of survey respondents reported using a formula to allocate all or a portion of the library's materials budget. A library's use of a formula did not appear to be related to the amount of money spent annually on monographs. The library with the largest monographic budget (\$5,000,000) and the one with the smallest (\$241,500) both use allocation formulas.

Half of the libraries using an allocation formula included price as one of the formula variables and half did not. One respondent commented that the difficulty of matching the library's fund and curricular structure with the book disciplines used in price indices led to a decision to omit price as a variable. Respondents mentioned using data from book vendors, *Bowker*, and

local expenditure information from their integrated library systems to determine average price.

### Research Method: Comparison of Average Price Data Sources

Since neither the literature review nor the survey of institutions similar to MSU pointed to a single best source for determining average book prices, the collection development unit chose to compare price information from four data sources: (1) approval plan profiles for each MSU department, (2) the *Bowker* study, (3) the Blackwell study, and (4) three-year average of local expenditures.

The authors chose to use the most current data available from each source in June 2006 to calculate average prices. The years for each data source varied, with the *Bowker* prices from 2004, Blackwell study from 2004–2005, approval plan from 2005, and three-year average expenditure from 2003–2005. The difference in time period covered by each source makes a direct comparison of the average prices inappropriate, but allocation formulas focus on the relationships between prices rather than the actual prices. The authors calculated the average price of books for each department from the most current available data for each source, as using the most current data is normal practice.

After the average price of books for each department was calculated from the four data sources, eleven departments were chosen for further study. The departments represent five of MSU's seven colleges, with the College of Veterinary Medicine and the College of Architecture, Art, and Design omitted because of their highly specialized content needs. Other criteria determining selection included:

- representation of several disciplines within one department

resulting from the merger of two or more departments (counseling, educational psychology, and special education; geosciences; human sciences);

- a single department's reliance on resources from multiple disciplines (agricultural information science, biochemistry and molecular biology, entomology and plant pathology, industrial engineering);
- a significant percentage of non-book or non-English language purchases (music education, philosophy and religion); and
- interesting discrepancies among the average prices from the various data sources (English, marketing).

### Approval Plan Profiles

Approval plan profiles for departments were established with Blackwell Book Services in the early 1990s. Departments are offered the opportunity to update their profiles annually. If the profiles are updated regularly, the approval plan data should closely reflect the average price of hardcover, English-language books of interest to the department. Use of the profiles eliminated the need to match departments with subjects or LC classification ranges. The library did not receive books on approval in 2005, but the profiles generated electronic approval forms for librarians and department faculty to review for purchase. The collection development unit ran reports in Blackwell's Collection Manager to compile approval titles identified during 2005 by each department's profile into Excel spreadsheets. The total number of titles and associated prices generated by each departmental profile were calculated, and an average price was determined for each department. The unit spent thirty-seven hours creating departmental approval plan reports from Collection Manager and calculating averages from the reports.



**Table 1.** Responses to survey on library allocation formulas (N=26 unless noted)

|  | Yes | No | Total |
|--|-----|----|-------|
| Does library use a formula to allocate materials budget?   | 8   | 18 | 26    |
| If yes, which formats are included in the formula?   | 8   | 18 | 26    |
| Formats included: (N=8)  |     |    |       |
| Serials  | 3   | 5  | 8     |
| Monographs   | 8   | 0  | 8     |
| Electronic resources   | 2   | 6  | 8     |
| Audiovisual  | 4   | 5  | 8     |
| Other  | 0   | 8  | 8     |
| Is the average cost of a book per discipline one of the variables? (N=8):  | 5   | 3  | 8     |
| How much does the library spend annually on monographs?  |     |    |       |
| Less than \$1,000,000  |     |    | 10    |
| \$1,000,000 to \$2,000,000   |     |    | 9     |
| \$2,000,000 and above  |     |    | 7     |
| Is a portion of monographic budget devoted to approval plan? (N=24; two respondents answered "no.")  |     |    |       |
| Less than 30 percent   |     |    | 9     |
| Between 30 percent and 50 percent  |     |    | 9     |
| 50 percent and above   |     |    | 6     |
| Is a portion of your monographic budget allocated to academic departments? (N=13; 6 respondents answered "no" and 7 qualified answers with phrases such as "to subject librarians.") |     |    |       |
| Less than 35 percent   |     |    | 4     |
| Between 35 percent and 70 percent  |     |    | 5     |
| 70 percent and above   |     |    | 4     |

### ***Bowker Annual***

Average prices were determined for each department from the 2004 prices listed in the 2006 *Bowker Annual*. The two-year delay in reported prices is a factor to be considered in using *Bowker* as a source for average price data. Subjects were matched to

departments based on the LC classification numbers assigned to each department by the collection development unit. When more than one subject was appropriate for a department, price data and number of titles for each subject was used to calculate an average price for the department. Calculating average prices from

*Bowker* required two hours, much of which was spent deciding how to match subjects to departments.

As table 2 shows, seven of eleven MSU departments were matched with more than one subject from the price index published in *Bowker*. Among the seven departments was the School of Human Sciences, which includes programs in fashion design and merchandising, family and consumer science education, and family and youth studies. Four *Bowker* subjects are required to cover the Human Sciences topics, with a price range from \$28.69 to \$62.30. Even the more traditional Industrial Engineering Department acquires materials in disciplines as diverse as engineering and business.

In cases where the collection development unit was able to match a department with a single subject, the *Bowker* study is still not ideal for every department at MSU because its coverage focuses on books published or distributed in North America and written almost exclusively in English; less than 2 percent of titles used in compiling the *Bowker* price index are in non-English languages.<sup>25</sup> These factors would be problematic for departments selecting a significant percentage of materials in nonbook format or written in non-English languages. For example, during the fiscal years 2003 through 2005, 12 percent of items acquired for Philosophy and Religion were in languages other than English. During the same time period, 58 percent of the items acquired for Music Education were nonbook formats.

### **Blackwell**

Since the broad subjects in *Bowker* do not accurately reflect MSU's departments, the collection development unit matched departments to the eight-digit LC table of the Blackwell study, one of the underlying sources of the *Bowker* data. The LC classifications had been assigned to each department previously for collection evalua-

tion projects. The number of titles and total price for each classification range assigned to a department were added; then the department's total price was

divided by its total number of titles to determine the average price from the Blackwell study. The unit spent 13.5 hours calculating average prices from the Blackwell study, including converting the Blackwell study eight-digit LC table to a spreadsheet, identifying matching classification ranges for each department, and performing price calculations.

While the Blackwell study's LC classification ranges do not precisely match those used by MSU, the variations are slight in most instances. For example, the Blackwell ranges used for Biochemistry and Molecular Biology were much broader than those needed. Using the Blackwell study allowed the collection development unit to match subjects and departments closely, but in areas with small publication outputs the validity of the data may be doubtful. Of the 11 departments in this study, Human Sciences had the lowest output with 52 titles, and English had the highest with 5,221 titles. Using the Blackwell study data also does not address concerns with lack of pricing data for non-English language books and nonbook materials because 98 percent of titles included are in English and no nonbook materials are included.

### Local Expenditures

Because published price indices such as *Bowker* do not adequately cover non-English and nonbook materials and do not reflect vendor discounts, the collection development unit considered using the library's expenditures to determine average prices. Average monographic expenditures were calculated from the integrated library system by dividing the total expenditures by the number of titles purchased from each department's monograph fund. To investigate the extent to which average expenditures fluctuate, averages were calculated for each of the three most recently completed fiscal years (2003, 2004,

**Table 2.** Average prices from *Bowker* (2004)

| Departments   | <i>Bowker</i> subjects     | Subject average price (\$) | No. of titles | Department average price (\$) |
|---|----------------------------|----------------------------|---------------|-------------------------------|
| Agricultural information systems                          | Agriculture                | 68.45                      | 1,057         | 52.92                         |
|   | Education                  | 46.45                      | 2,536         |                               |
| Biochemistry and molecular biology                        | Chemistry                  | 166.26                     | 450           | 105.24                        |
|   | Zoology                    | 91.56                      | 1,765         |                               |
|   | Science (general)          | 95.60                      | 343           |                               |
| Counseling, educational psychology, and special education | Education                  | 46.45                      | 2,536         | 46.45                         |
| English   | Literature and language    | 33.33                      | 15,242        | 33.33                         |
| Entomology and plant pathology                            | Science (general)          | 95.60                      | 343           | 95.60                         |
| Geosciences   | Geography                  | 69.05                      | 699           | 74.66                         |
|   | Geology                    | 92.33                      | 222           |                               |
| Human sciences  | Business and economics     | 70.21                      | 5,900         | 59.36                         |
|   | Fine and applied arts      | 48.41                      | 3,728         |                               |
|   | Industrial arts            | 30.13                      | 230           |                               |
|   | Home Economics             | 34.07                      | 652           |                               |
| Industrial engineering                                    | Engineering and technology | 100.09                     | 4,933         | 83.82                         |
|   | Business and economics     | 70.21                      | 5,900         |                               |
| Marketing   | Business and economics     | 70.21                      | 5,900         | 70.21                         |
| Music Education   | Education                  | 46.45                      | 2,536         | 47.62                         |
|   | Fine and applied arts      | 48.41                      | 3,728         |                               |
| Philosophy and religion                                   | Philosophy and religion    | 48.63                      | 5,026         | 48.63                         |

2005) and for the three-year period 2003 through 2005. As seen in table 3, the average expenditure by department varies substantially from year to year.

Acquiring journal backfiles, a multivolume title, or an important but expensive out-of-print title can cause the average expenditure to be unusually high one year. Timing of requests may affect expenditures for a department, as acquisitions staff may not have time to search for vendors offering the best discounts when selectors submit many requests late in the fiscal year. Another problem with using average expenditures from a single year is the small number of monographic titles acquired to support departments that rely heavily on serials or that have relatively low credit hour production. Using a three-year average expenditure helps to level these fluctuations. Determining average expenditure by department required slightly less than one hour, including time to collect the data for each of three fiscal years and calculate a three-year average.

### Comparison of Average Price Data Sources: Findings

The approval plan and Blackwell study methods tended to produce higher average prices, while the *Bowker* and expenditure methods tended to produce lower average prices (see table 4). Lower prices were expected from *Bowker* because the data reflected two-year old prices. The expenditure method produced lower prices because it reflected discounts received by the library, while other methods reflected list prices. Allocation formulas rely on the proportional differences in average book price among departments, not the absolute price. While the various methods produced differing average prices, the authors wanted to determine if all methods produced similar proportional differences among the departments.

The authors compared the four pricing methods using Pearson correlations ( $r$ ) (see table 5). All four methods are significantly related to each other at the  $p < 0.05$  level ( $n = 11$ , two-tailed). The Blackwell study and approval plan prices were the most closely related; the correlation between them was significant at the  $p < 0.01$  level ( $n = 11$ , two-tailed). Significant correlations between the data were expected, as all four methods are attempts to measure the same variable, the average price of monographic materials in a specific academic field.

The authors computed the coefficient of determination ( $r^2$ ) to determine the shared variability among the methods. If the four methods are producing very similar proportional differences in average prices, one would expect the shared variability to be

very close to 1.00. As shown in table 6, the shared variability ranges from 0.46 between the approval plan and expenditure methods to 0.83 between the Blackwell study and approval plan methods. Although the average prices calculated by all four methods are significantly correlated, the coefficient of determination shows that the source of the price data does make a difference in the proportional difference among the average prices, and in the department's allocations.

Because none of the coefficients of determination are very close to 1.00, the methods of determining average price are not producing nearly interchangeable proportional differences. The MSU Libraries will need to consider all the pros and cons of each method to select the most appropriate method for local use.

**Table 3.** Average cost of monograph (2003–2005)

| Department  | 2003 (\$) | 2004 (\$) | 2005 (\$) | Three-year (\$) |
|---|-----------|-----------|-----------|-----------------|
| Agricultural information systems                          | 44.41     | 61.60     | 41.85     | 47.30           |
| Biochemistry and molecular biology                        | 121.37    | 79.26     | 68.85     | 80.82           |
| Counseling, educational psychology, and special education | 43.82     | 42.47     | 79.35     | 53.53           |
| English   | 35.89     | 25.15     | 23.53     | 26.27           |
| Entomology and plant pathology                            | 82.67     | 98.27     | 97.08     | 91.56           |
| Geosciences   | 75.85     | 62.64     | 71.66     | 70.46           |
| Human sciences  | 80.76     | 50.92     | 46.77     | 55.22           |
| Industrial engineering                                    | 83.06     | 86.57     | 84.37     | 84.30           |
| Marketing   | 38.23     | 59.59     | 43.09     | 46.10           |
| Music education   | 22.59     | 20.16     | 37.72     | 24.74           |
| Philosophy and religion                                   | 48.18     | 25.80     | 49.30     | 38.55           |

**Table 4.** Comparison of average prices computed by four methods

| Department  | Bowker average<br>(2004) |                 |                       | Three-year average<br>expenditure<br>(2003–2005) |                 |                       | Blackwell study<br>(2004–2005) |                 |                       | Approval plan (2005) |                 |                       |
|---|--------------------------|-----------------|-----------------------|--|-----------------|-----------------------|--------------------------------|-----------------|-----------------------|----------------------|-----------------|-----------------------|
|   | Total<br>cost (\$)       | Total<br>titles | Average<br>price (\$) | Total<br>cost (\$)                               | Total<br>titles | Average<br>price (\$) | Total<br>cost (\$)             | Total<br>titles | Average<br>price (\$) | Total<br>cost (\$)   | Total<br>titles | Average<br>price (\$) |
| Agricultural<br>information<br>systems                                | 190,149                  | 3,593           | 52.92                 | 4,446  | 94              | 47.30                 | 3,627                          | 56              | 64.77                 | 8,282                | 931             | 94.82                 |
| Biochemistry<br>and molecular<br>biology                              | 269,211                  | 2,558           | 105.24                | 4,526  | 56              | 80.82                 | 31,945                         | 220             | 145.20                | 42,730               | 294             | 145.34                |
| Counseling,<br>educational<br>psychology,<br>and special<br>education | 117,797                  | 2,536           | 46.45                 | 7,601  | 142             | 53.53                 | 16,663                         | 317             | 52.56                 | 233,599              | 3,699           | 63.15                 |
| English   | 508,016                  | 15,242          | 33.33                 | 59,285   | 2257            | 26.27                 | 204,668                        | 5,221           | 39.20                 | 284,975              | 5,901           | 48.29                 |
| Entomology<br>and plant<br>pathology                                  | 105,142                  | 1,400           | 75.10                 | 4,944  | 54              | 91.56                 | 8,235                          | 88              | 93.58                 | 16,738               | 163             | 102.69                |
| Geosciences   | 68,763                   | 921             | 74.66                 | 21,701   | 308             | 70.46                 | 31,865                         | 348             | 91.57                 | 70,145               | 693             | 101.22                |
| Human<br>sciences   | 623,855                  | 10,510          | 59.36                 | 5,025  | 91              | 55.22                 | 3,128                          | 52              | 60.16                 | 201,466              | 2,733           | 73.72                 |
| Industrial<br>engineering   | 907,984                  | 10,833          | 83.82                 | 7,081  | 84              | 84.30                 | 64,368                         | 906             | 71.05                 | 113,030              | 1,271           | 88.93                 |
| Marketing   | 414,239                  | 5,900           | 70.21                 | 10,003   | 217             | 46.10                 | 13,015                         | 177             | 73.53                 | 279,541              | 2,460           | 113.63                |
| Music<br>education  | 298,270                  | 6,264           | 47.62                 | 7,842  | 317             | 24.74                 | 44,533                         | 850             | 52.39                 | 30,684               | 591             | 51.92                 |
| Philosophy<br>and religion  | 244,414                  | 5,026           | 48.63                 | 8,095  | 210             | 38.55                 | 5,756                          | 100             | 57.56                 | 298,554              | 3,896           | 76.63                 |



### Implications for Other Libraries

Some factors considered by MSU that may be pertinent to other libraries considering sources for price data included difficulty of matching source subjects to departments, inclusion of non-English and nonbook materials or of paper bindings, currency of price

data, and staff time needed to arrive at price averages. Table 7 summarizes factors that might be taken into account by MSU and other libraries with similar programs.

Two of the methods, expenditure and approval, do not require matching the source data's subject divisions to departments. The expenditure method uses the prices of titles specifically

selected and purchased to support the departments' programs. However, the library will need an alternative way to determine average price when new programs are established or departmental programs change dramatically. The approval method uses existing profiles associated with the library's approval or new book notification plans that already match subjects to departments. Libraries should be aware of how non-subject limits on the approval profile may affect the average price. For example, approval plans can be limited to university press titles or to books without media, which may produce average prices that differ from the average prices of books from all publishers or in all formats.

The *Bowker* and Blackwell study methods both require matching the source data's subject divisions to departments. *Bowker* data are divided into broad subjects, so the library may need to use the same price data for several departments. Interdisciplinary subjects may need to be matched to several *Bowker* subjects. The Blackwell study data is divided into more than one thousand subject divisions based on LC classifications, allowing close matches between the departments' interests and the subject divisions.

The library may consider the inclusion of price data on non-English, non-book, or paper bindings important. A very small proportion of titles in the Blackwell study and *Bowker* data are non-English, while approval plans may exclude non-English materials completely. The *Bowker* and Blackwell study data do not include nonbook materials, and approval plans may exclude non-book materials as well. The *Bowker* data include paper bindings, while the Blackwell study presents

**Table 5.** Pearson correlation matrix for price comparisons ( $N=111$ )

|                        | <i>Bowker</i> | Three-year expenditure | Blackwell |
|------------------------|---------------|------------------------|-----------|
| Approval Plan          | 0.76**        | 0.68**                 | 0.91*     |
| Blackwell              | 0.89**        | 0.72**                 | —         |
| Three-year expenditure | 0.86**        | —                      | —         |

\* $p < .01$ , two tails; \*\* $p < .05$ , two tails

**Table 6.** Coefficient of determination ( $r^2$ ) matrix for price comparisons

|                        | <i>Bowker</i> | Three-year expenditure | Blackwell |
|------------------------|---------------|------------------------|-----------|
| Approval plan          | 0.58          | 0.46                   | 0.83      |
| Blackwell              | 0.80          | 0.52                   | —         |
| Three-year expenditure | 0.74          | —                      | —         |

**Table 7.** Advantages and disadvantages of four methods of computing average price

|   | <i>Bowker</i> | Three-year expenditure     | Blackwell Study | Approval Plan |
|---|---------------|----------------------------|-----------------|---------------|
| Requires matching departments to subject of LC classification | Yes           | No                         | Yes             | No            |
| Non-English materials included                                | < 2%          | In proportion to purchases | About 2%        | No            |
| Nonbook materials included                                    | No            | In proportion to purchases | No              | No            |
| Staff time required to compile at MSU                         | 2 hours       | 1 hour                     | 13.5 hours      | 37 hours      |
| Paper bindings included                                       | Yes           | Yes                        | Yes             | No            |
| Most current data available in June 2006                      | 2004          | 2003–2005                  | 2004–2005       | 2005          |

data on cloth and paper bindings separately, and libraries can choose whether to include paper bindings in approval profiles. The expenditure method has the advantage of including price data in the same proportion as non-English materials, nonbook media, and paper bindings are purchased. When non-English materials or nonbook media are a significant portion of the library's purchases, the library should seriously consider using average expenditure in the allocation formula. Libraries also should consider whether the data source they use for determining average price matches the library's preference for acquiring paper or cloth bindings.

Currency of data also may be a consideration for libraries. The MSU comparison used the most recent data available for each source at the time the study was conducted. The *Bowker* data was for books published in 2004, the Blackwell study for books published between July 2004 and June 2005, the approval plan for books published in 2005, and the expenditure method for books purchased in 2003–2005. Allocation formulas rely on the proportional differences in average book price among departments as opposed to the absolute price, so the currency of the data may not be important to the library. When the library uses the same average price data for other purposes, such as budget requests, currency may be a factor.

Finally, the staff time required to compile the data and compute average price should be considered. The expenditure and *Bowker* methods required minimal staff time. The Blackwell study method was more time-consuming, but had the advantage of allowing the library to match subjects to departments more closely than *Bowker* allows. The Blackwell study also reflects the English-language academic book market, while expenditures reflect only a small portion of the titles available for purchase. The approval plan method was very

time-consuming, a major disadvantage for most libraries.

### Suggestions for Further Study

Libraries use price data in many ways, such as allocating funding among departments or broad subjects, preparing budgetary projections, and assessing charges for lost materials. The Library Materials Price Index Group (LMPI) has noted that the *Bowker* indices can serve as useful benchmarks against which local costs can be compared, but they cannot substitute for cost data that reflect collecting patterns of individual libraries.<sup>26</sup> LMPI has indicated an interest in pursuing studies that correlate individual libraries' costs with the national prices. This study found a significant correlation between MSU expenditures supporting specific departments and the *Bowker* price index. Expanding the study to include all MSU departments would be necessary to validate this finding, and could serve as a case study for other libraries considering the most appropriate method for determining average price data for use in allocation formulas.

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### Appendix. Survey Questions on Library Allocation Formulas

1. Does the library use a formula to allocate the materials budget (all or a portion) among academic departments?  
If not, skip to question 5.
2. If so, please indicate all formats that are included in the formula:  
a) serials \_\_\_\_ b) monographs \_\_\_\_ c) electronic resources \_\_\_\_ d) audiovisual \_\_\_\_ e) other \_\_\_\_ please explain other:
3. Is the average cost of a book per discipline one of the variables?
4. If so, how do you determine the average cost?
5. How much does the library spend annually on monographs?
6. Is a portion of your monographic budget devoted to an approval plan? If so, what percentage?
7. Is a portion of your monographic budget allocated to academic departments? If so, what percentage?
8. Would you like us to e-mail you a summary of survey results?