Allocating a Public Good for the Good of the Public: Journal Budget Allocation Model for the University of Oregon Libraries

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Abstract

The skyrocketing costs of scholarly journals are causing a huge problem for university library systems. These costs have forced university libraries to look at cuts, alternative journal use, and most notably, budget formulas to help them determine how to allocate cuts without making the process overly political. We reviewed multiple formulas used by other colleges and determined the right variables and weights for the University of Oregon Libraries. Our results suggest that no one model will ever be flawless; libraries should remember any method is just an estimate as well as a starting point for further analysis. Each school is unique, and needs to develop their own model that will fit their distinctive factors as a library, university, and journal consumer.

Approved: _____

Professor Joe Stone Date

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1. Introduction

The main problem presenting our client, the University of Oregon Libraries, is the increasing cost of journal subscriptions. Expenditures for serials have increased 89% over the past 16 years, far exceeding both the rate of inflation and the 42% increase in the libraries' budget. The widening gap between costs and budget allocations have forced the libraries to make over $2.5 million in cuts to journal spending, spreading it out across all subject areas, yet the expenses continue to increase. If the University of Oregon Libraries does not come up with an efficient and equitable long-run solution to this budget problem, the trend of forced and blind journal cuts will continue to the point where none of the departments can supply its students and faculty with adequate research tools. The recent economic downturn has had a large effect on the libraries' budget; therefore, each department will need to make the difficult decisions of what journals to keep and what journals to cut. Consequently, the university has a public good allocation problem where each department's self-interest is not reconciled with collective needs. To deal with this dilemma, the Libraries want to develop a statistical formula that gives them an estimate and guides their professional judgment in making both fair and equitable allocations for all departments, but that retains flexibility for the changing budget landscape.

The problem of increasing journal subscriptions is not limited to the University of Oregon, libraries nationwide have to deal with the constant increase in journal prices. All universities, to some extent, purchase scholarly journals to make available for their students, and the constant increases in prices that far exceed increases in budgets require universities to force cuts on their departments and consume fewer journals. The problem of determining the allocations of these cuts exists for all libraries and has caused many of these libraries to look at

developing formulas that could determine ways to allocate cuts across departments backed up by hard data. Research into this problem has not found a reliable solution so far and it is likely that each library needs to develop a unique formula based on its specific factors. One thing is certain, that this problem is nationwide and not likely to abate as more publishing companies increase their prices.

The University of Oregon Libraries currently allocates its departmental journal budgets by tweaking the previous year's expenditures with inflationary expectations and adding in the very subjective "squeaky wheel" factor, where departments that fuss the most usually get a larger allocation. There are two main problems with the current allocation method: 1) relying on previous year's expenditures in such volatile times is almost worthless; and 2) the "squeaky wheel" factor is a political variable instead of a scientific one and has very little lasting value with decisions.

When it comes to forecasting the next year's expenditures across departments, behaviors from year to year would need to be stable in order to produce an accurate estimate. However the increase in the cost of journals and the change from year to year in the libraries budget are both volatile and hard to predict accurately, with the libraries budget dependent on tax revenues and the cost of journals dependent on the pricing of the publishing companies. The combined effect of yearly changes in budgets as well as journal costs makes relying on the previous year's expenditures alone a dangerous bet.

In addition to inaccurate predictors, the current allocation method lacks hard evidence for the libraries administration to defend their verdicts. Most of the unrest about the allocation comes from the 'squeaky wheel' factor. One of the crucial pieces of this project is the understanding that journals are priced differently across different departments. For example the

average cost of science journals is $1980 while the average history journal costs $263; these differences are due to a multitude of reasons and must be accounted for in any regression. The price difference in journals across departments, and therefore allocated budgets, creates a bit of unrest between departments and is then felt by the libraries through departmental complaints. Without a formal allocation method, these complaints, warranted only on a skewed perception of "equality" and not on an efficiency/demand basis, change the libraries' decisions purely for political reasons and are not in the best interests for the libraries or its stakeholders--the students.

This project will provide the University of Oregon Libraries with a model to aid their professional judgment in determining efficient journal budget allocations across departments. Our approach attempts to deal with the exogenous economic pressures in two main ways: 1) our project will provide an allocation formula for individual departments that incorporates the changing library budget as well as the differing costs of journals across disciplines; and 2) our project will also provide a long-run incentive plan that will assist the university in trying to supply research tools to students and faculty despite an ever-decreasing budget.

2. Literature Review

STATISTICAL MODEL

Journal prices have been increasing for years, forcing libraries to find ways to combat increase in journal prices with budgets that cannot keep up. However, the University of Oregon Libraries is a unique entity with a different research emphasis, size, number of departments, and so on. The literature already written on this topic reflects that libraries have been working to solve this problem; however, the dissimilarities between the available case studies and the University of Oregon calls for a revised approach tailored to fit the University of Oregon Libraries specifically.

Libraries at schools such as State University of New York and Washburn University have experimented with the Percentage Based Allocation (PBA) method to determine journal budget allocation. This method determines journal budget allocations across departments by looking at the percentage of how the university allocates its total research budget. The two case studies found that this particular method worked best when applied to the larger university, State University of New York, than the smaller Washburn University. For the smaller school, the Percentage Based Allocation method produced a larger gap between predicted budget requirements and the actual allocation. The University of Oregon Libraries cannot solely rely on the PBA method not only because it is a smaller research institution, like Washburn, but also because the libraries cannot base the budget on the school's internal policies alone. Other case studies as well as the University of Oregon's head librarian indicate that more factors need to be considered in order to provide an efficient allocation, which we define as each department's budget allocation directly correlating to their needs.

One such study that attempts to add in other factors to produce a more efficient allocation comes from the University of North Texas (UNT). In 2005, the UNT created a model using several key factors, including number of undergraduate majors, number of graduate majors, number of undergraduate credit hours, number of master credit hours, number of doctoral credit hours, number of Full Time Equivalent faculty, average cost of print monographs in the discipline, and average cost of a print journal in the discipline. Using these factors, the library was able to come up with a regression model that gave weights to the above categories, which, when applied to the department's information, produced an allocation estimate. This study is the basis of our formula mainly because it was the first of its kind to take into account the differing costs across disciplines. However, the results of the implemented formula from 2005 were not published. On a follow up call to the University of North Texas, our team was surprised to find out that that school's administration was *not* happy with the formula's allocation. UNT's model did not reflect the school's electronic subscriptions, which made up 60% of their holdings at the time and decreased the accuracy of the estimates and failed to reflect departmental needs. Luckily, this problem is not as severe for the University of Oregon Libraries because multidisciplinary electronic packages are budgeted "off the top" and are not included in the allocation across departments.

Another school to develop a budget allocation formula with multiple factors is Idaho State University (ISU). Their model includes the number of full-time equivalent faculty and grad students, with grad students getting a lower weight than faculty, the degree of journal dependency and the average cost of journals. At a follow-up interview with the Director of Library Resources and Management, who attended the conference where this was presented, she talked about the problems with the model, as it produced estimates that were up to 400%

different than the current allocations. In conjunction with research on other school's statistical models that attempt to predict budget allocation, our team also recognized the need to research long-run alternatives and incentive programs in place at the University of Oregon and abroad.

LONG-RUN SUGGESTION MODEL

Through our research we have found that the current methods for public and university libraries to save their subscription costs include establishing interlibrary loan programs, joining open access alliances, purchasing electronic copies instead of print copies, performing regular cost-effectiveness tests, and tracking journal usage. According to the head of Libraries, the University of Oregon Libraries is working on all of the above cost-saving methods with varying intensity. The libraries feel that they have found a useful combination of these programs; focusing on just one would not be as useful in the long run because each program has its strengths and weaknesses. In fact, the University of Oregon Libraries is at the top amongst its peer-libraries in terms of the items loaned and items borrowed within the inter-library loan program. Adopt-a-Journal is another long-term program that the Libraries utilizes. This program allows the public to pay for a journal subscription that was canceled due to the budget. There is a similar program called "Bookmark Me@UST Program" established by the Hong Kong University that might lend some insight on how to boost our Adopt-a-Journal program to a higher level of success. Instead of paying for a specific journal subscription, the public can donate HK$500 (around US$65) to adopt a book from their chosen subject area. Then, the Hong Kong University will print and place a certificate, with the name of the donor or the name of a selected person from the donor, on the inside cover of a book. This creates a greater incentive for the public to contribute to the program and gives them an alternative if they do not have enough funds to support a whole-year subscription. Many donors even consider the "Bookmark

Me@UST Program" a perfect gift to show their thankfulness to their parents and teachers.

There are many ways to tackle the journal allocation dilemma, and our project will try to make guided suggestions on how to move forward, combining internal policies with a larger conceptual shift to models that encourage departments to save and use alternative programs.

3. Theoretical Analysis

Our research project addresses two main problems and therefore requires two main economic theories. The University of Oregon Libraries faces yearly decreases in budget efficiency due to inflation and the rising costs of journal subscriptions. This problem presents us with both an internal problem of distributing a public good and an external problem of reducing demand for the perverse journal market that our project will attempt to address.

STATISTICAL MODEL

The Libraries are facing an internal problem of trying to distribute journal subscriptions efficiently and equitably across departments. Instead of considering the libraries as a single consumer, the Libraries should be thought of as a collection of multiple consumers—the departments—each with individual wants. The Libraries are responsible for taking these individual wants and developing a demand function. This is difficult because departments are removed from the budgeting process and the journals are a public good; meaning that after a journal is purchased, it is accessible to everyone regardless of department. The main problem with public good allocation is that the supplier of the good, i.e. the Libraries, cannot accurately assess the departmental demand because of the additional usage by third parties. So why doesn't the Libraries just ask the departments about their demand for journals? The truth is, departments have an incentive to inflate their demand under the status quo since they are removed from any monetary implications of using their entire appropriated budget amount. In order to understand how the Libraries distribute a public good, our research will use an approximation of the Lindahl method to reveal the true preferences of each department. We created a two-step formula, the first part is our regression estimation of demand that will include the variables mentioned in the

North Texas Study and the second part is a departmental preference revelation--actually giving the departments the ability to review and alter the appropriation from the libraries. These two estimates of demand combined; one based off demand proxies and the other based off of demand estimation will hopefully create an accurate estimate for departments that will provide the Libraries with a more stable starting point for allocation judgments.

LONG-RUN SUGGESTION MODEL

For the external problem of rising journal costs, our model will use the theory of demand for analysis. If we look at the Libraries as a consumer, their demand for journal subscriptions is influenced by the price of the journals, the department's preferences, the Libraries budget, and the prices of related goods. As the journal prices have increased, the Libraries' demand for journals has decreased, following the theory of demand. However, if this trend continues the Libraries' demand will be too low to function as a research institution. Our project suggests a long-run solution to this by moving away from the current structure of monopolistic control by journal publishers. Our project attempts to initiate this structural move by encouraging saving from the departments, which will then feed into increased support for the alternative programs already being explored by the library, and discussed in our literature review section.

4. Empirical Testing

As we have talked about throughout our project, we are tackling two parts of the journal allocation dilemma: internal allocation and long-run incentives. Below we will describe our project's two methods to solving these problems.

STATISTICAL MODEL

Developing the Regression Model

Our research project uses multiple regression analysis using both university library data, that together produce an estimate of allocations for each academic department at the University of Oregon. Since the first step in our empirical test is to develop a regression formula, we started this process by determining the factors that will play a part in the process. The regression components are: lower division school credit hours (LDcrsSCH), upper division school credit hours (UDcrsSCH), graduate division credit hours (GRcrsSCH), undergraduate degrees(UGdegs), graduate degrees (GRdegs), and Indirect Cost Credit Fund (ICCGen), provided by the Office of Institutional Research from 2004 to 2009, average serial costs (AVGSerCost) provided by the LJ Price Survey from 2005-2009 and the previous year's departmental library expenditures (%LibrariesSerialBudget(-1)) provided by the University of Oregon Libraries over the same time period. The following is the regression model that we first developed and used to estimate our variables, which will in turn be the weights that direct how the budget is allocated.

$$\%LibrariesSerialBudget = \beta_0 + \beta_1 (LDcrsSCH + UDcrsSCH + GRcrsSCH) + \beta_2 [GRdegs / (UGdegs + 1)] + \beta_3 [ICCGen(-1) / \%LibrariesSerialBudget(-1)] + \beta_4 \%LibrariesSerialBudget(-1) + \beta_5 AvgSerCost$$

The first step in developing our final regression including the variable weights was to gather all of our data. Luckily, either the university or libraries collect all the variables and their data components for our regression. Therefore, we were able to obtain the necessary data for the aforementioned categories from 2004-2009 for each department. However, there were a few modifications that our group needed to make in order to have a working data set that will produce a satisfactory regression formula. Before running the regression in Eviews statistical software, we filled in missing data points and matched up departments that didn't coincide between the libraries and the university data department classifications. Some of the data manipulations we made included: extrapolating 2009 university data that has not been prepared yet, extrapolating 2004 average serial costs from the LJ Price Survey that was not included in its reports, figuring out what interdisciplinary departments needed to be excluded from the regression, and deciding how to handle the departmental allocations which are made up of a combination of different departments; each hurdle and our solution is explained in more depth below.

Challenges

a. Missing 2009 ICC Data

Our data from the Office of Institutional Research had a gap in the 2009 data because the Indirect Cost Credit Funds has not yet been prepared. Therefore, we decided to use the average departmental growth rate from 2007 to 2008 as a proxy to calculate the 2009 data by multiplying the 2008 data with their corresponding average growth rate.

b. Missing 2004 Avg SerC Data

Ideally the University of Oregon libraries would have provided their average journal cost per department, but because they were unable to provide this data, proxies that give a more

generalized view of average serial costs were used. The average cost per title that we include in our regression model comes from the LJ Price Survey of 2009 with departments determined by Library of Congress subject areas. With this method, the departments provided by the University of Oregon were placed under the umbrella subject areas so the LJ average serial costs could be used. For instance, English went under Language and Literature, Ethnic Studies went under Anthropology and International Studies went under Political Science in order to get the closest fit for their serial costs. Furthermore, the LJ Price Survey only provided average serial cost data for the years 2005 to 2009, so we extrapolated average journal costs of 2004 by using the percentage change from 2005 to 2006 as a rough estimate of the change from 2004 to 2005 and applying it in reverse to arrive at the 2004 figures. For a reference, the subject comparison that we did between the library, OIR, and Library of Congress, is provided in the appendix.

c. Mis-Matching of Departmental Classifications

Some library department categories belong to two or more departments as defined by university data and vice-versa. This mis-match is a result of the different classification systems used by the Libraries and the Office of Institutional Research (OIR). These different systems cause two main problems: some departments as defined by the Libraries do not have specific university data, because it is not recorded as a department by the OIR. For example, half of the library category "Art Reference" expenditure belongs to the OIR's "Art Department" and half of the expenditure belongs to the "Architecture and Interior Architecture" Department. To solve this problem, we found the 10-year average percentage of each department's allocation that goes into half of the "Art Reference" expenditure. Then, we take this factor into our regression variable "previous year's departmental library expenditures ($DepExp_{-1}$)" and get the allocation budget from the regression model. From our result based on the 2000-2009 data, we found that the

average percentage for the Art Department contributing to Art Reference is 32.37% and that for the Architecture and Interior Architecture Department it is 15.71% that makes up Art Reference. Once we get the allocation budget for these departments, we will take 32.37% of the Art Department budget out and 15.71% of the Architecture and Interior Architecture budget out and credit this total amount to the "Art Reference" category. Additionally, some library categories have to map to a larger department because there is no OIR data. For example, both the library categories "Geography" and "Cartography" belong to the OIR's "Geography Department" because they do not keep student data on Cartography. Therefore, we added the total expenditures of these categories in order to run our regression model and find out the average percentage that each category contributes to the whole. From our calculation, we find that "Geography" takes 93.9% and "Cartography" takes 6.1% of the total Geography allocation with the combined expenditures. Once we get the budget allocation for the Geography department from the regression model, we will multiply that amount by the average rates to assign the proper allocation to the Geography and Cartography categories. One final issue we encountered with matching departments is that due to the interdisciplinary nature of the University of Oregon, some of the libraries departments that need an allocation are too interdisciplinary for our regression model. An example of this situation is the library's "DOCs" which is general support for social sciences, humanities, business fields and some science. Because we could not match this library department to any department(s) that we have data on, we had to decide that categories like these (there are only a few) will have to be budgeted using the currently used method of estimation.

d. Modifying for Eviews

Once our data set was complete and we organized the department mapping, we then

attempted to run our first regression analysis to see how our student data actually predicts departmental expenditure demand and how much each factor contributes. On our initial attempts to run the regression, we discovered that Eviews cannot read excel formulas and so once an excel document is imported into Eviews any values derived from formulas will appear as N/A. Our solution to this problem was to copy the excel spreadsheet and paste special into a new excel document, making sure that we paste the values and not the underlying formulas. Upon doing the regressions, Eviews then kept returning that non-positive logs were being taken; we worked around this problem by renaming the variables because it did not like variables with "l" is in their titles.

e. Adjustment of Constants

After we got the results from Eviews, we inputted data to forecast the outcome of the 2009 budget allocation. However, we found that our predicted percent allocations were not close to the actual percent allocations. This large difference was caused by specifying our regression to have "cross-section fixed" effects which turned out to take an average of each department's constant variable. Therefore, we calculated the difference between the actual percent expenditure and forecasted percent expenditure with the averaged constant, and added this difference to the original constant so that each department has its own best-fitted constant. This produced spot-on 2009 allocation estimates. We then also looked at this new constant by using data to forecast the 2008 percent allocation. This time, the forecasted results were much closer to the actual results. With the new departmental-specific constants, the predicted and actual percent expenditure produce differences averaging 9.07% with a median of 6.81%. Although the greatest difference is 38.47% and should be something to watch out for, 40% of the forecasted results fall within a

5% difference and 70% of the forecasted results fall within 10% difference between the actual and the forecasted.

f. Budget Balancing

Once we created a sound regression formula, we created a budgeting model utilizing our formula for the Libraries to use in future budgeting processes. One of the complications we ran into here is making sure that the total allocations balanced out to equal the total serials budget. To ensure our total allocations from each department were equal to the total available allocation, we divide each department's budget by the sum of all departments' budgets and multiply the number by the total available allocation. By doing this, we are trying to average and spread the difference fairly among departments. Another benefit to this strategy is that if the Libraries choose to manipulate the weights that our regression predicted in order to alter allocations, no matter how the Libraries adjusts the coefficients, the budget will still come out balanced and equal to the available amount. This adjustment further strengthens the flexibility of our allocation model.

Statistical Model Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019242	0.003399	5.660433	0.0000
AVGSERCOST	3.81E-07	2.76E-06	0.137963	0.8904
GRDEGS/(UGDEGS+1)	2.87E-05	5.83E-06	4.926917	0.0000
ICCGEN(-1)/PERCENTEXPEND(-1)	1.77E-11	1.73E-11	1.022056	0.3082
PERCENTEXPEND(-1)	0.044047	0.104536	0.421361	0.6740
EASYCRSSCH+GRCRSSCH+UDCRSSCH	2.69E-08	9.30E-08	0.289084	0.7729

After dealing with all of the obstacles in Eviews, the regression was run and the above results were produced (the full regression results can be found in the appendix). By including the

constant in the regression we determine a base percentage of the budget that all departments receive. The results suggest that all departments receive about 2% of the budget automatically without taking into account any other factors; though after the adjustment of the constant discussed above, each department has a unique constant that they will use as a basis for allocations every year. For average serial costs, our regression determines a value of 0.000000381, which means that for every dollar increase in the average serial cost as determined by the LJ price survey, the department receives a .000000381 increase in its percentage allocation. For the ratio of graduate degrees to undergrad degrees per department the regression determines a value of 0.0000287; for every increase in the ratio of graduate degrees to undergraduate degrees, the department receives a 0.00000287 increase in its percentage allocation. For the ratio of indirect cost credits to previous expenditures, which measures the ICC generated per dollar of allocation, the regression determines a value of 0.0000000000177. For a unit increase in the ICC ratio; the department receives a 0.0000000000177 increase in its percentage allocation. For the percent of previous year's percent expenditures the regression determines a value of 0.044047; for every percent increase in the previous year's allocation the department receives a 0.044047 increase in the current year's percentage allocation. For the total number of credit hours offered by a department, including lower division, upper division and graduate credit hours offered, the regression determines a value of 0.0000000269; for every one unit increase in credit hours offered by a department, it receives a 0.0000000269 increase in its percentage allocation. Because these values are estimates used to produce "best fitting" estimates, whether they are significant or not is not important for our purposes, only that they have good fit (i.e. high R squared) and low standard errors. With an R^2 value of 0.998, this formula has an exceptionally high fit; the variables included in the regression explain 99.8% of

the actual percent expenditures, and low standard errors for all the variables the regression succeeds at providing usable estimates for the library.

LONG-RUN SUGGESTION MODEL

Incentive Plan

As we have indicated before, one of the contributing factors to the University of Oregon Libraries' predicament is the overall dependency on journal publishers. We hope that the University of Oregon Libraries will continue their emphasis and development of alternative programs; we also recognize that not only do the Libraries need to offer such alternatives, but they also need to encourage their use. Our project suggests that rewarding departments for spending under their allocation could encourage alternative usage. Under our suggested approach, departments will have some discretion when it comes to spending their allocation from our formula output. Giving departments options for spending their allocation paired with the incentive to save money will move the libraries away from depending on journal publishers and take away the constant upward price pressure in the long-run. Our idea for this long-run shift starts with determining departmental budget allocations through the use of our model and then communicating to each individual department their allocation amount and the following three options: 1) spend exactly the amount allocated; 2) spend over the amount allocated by up to 4%; or 3) spend less than the appropriated amount. Under the first option, the departments receive their predicted appropriated amount--end of story. If the department chooses the third option, the dollar amount that is saved will be put into the specific department's own "discretionary pot" where the saved money can be spent on other library expenses that year or the department could bank it for the next academic year. With the second option, overspending, the next academic years' allocation amount will be reduced by the amount overspent in the previous period. Also

note that overspending should be restricted to somewhere around 3-5%, but this detail can be left up to the libraries discretion.

5. Conclusions

STATISTICAL MODEL CONCLUSIONS

Implementation Model

The regression output described in our empirical testing section produced weights for each of the variables that make up our formula, which once filled-in with university data, produces a percent allocation for each department as classified by the University of Oregon Libraries. In order to make these results of any use to the Libraries, we structured a Google document spreadsheet (much like an Excel sheet, but multiple people can work on it at the same time) that will allow the Libraries to input data and forecast departmental allocations for years to come. The sheet takes our regression variables and applies our regression-determined weights and produces departmental allocations linked to individual departmental print-outs, allowing each department to see exactly how their budget was determined, which will preempt any complaints they might have about their allocation. The nice things about the Excel sheet is that it gives the Libraries flexibility in determining weights on the variables to fit their needs and expectations and it is also built into the formula to self balance. The Google sheet was created to be easy to use, intuitive, and will work over the next five to ten years with the Libraries' oversight of course.

Suggestions for Implementation

In order for the libraries to use our model there are a few key observations that should be addressed as well as a brief order of operations:

OBSERVATIONS

- What this formula does is explain, using a statistical model, the trend of how the Libraries has been predicting budget allocations. It is based off of how the Libraries has been allocating budgets, and because of this, no department will receive an allocation very far from what it has been for the last ten years. However, paired with this underlying structure is the ability for the Libraries to tweak the weights according to what they think should be emphasized when determining an allocation. This will allow the Libraries to move away from the old structure of allocating and into a habit of determining true departmental demand. This flexibility does come at a cost though. If you increase or emphasize one variable, it has to come out of somewhere because the budget spreadsheet is self-balancing

- The formula is not meant to be the final word. Economics is not a perfect science and we do not claim to have found the end all be all solution to budget allocation problems. However, what we did create is a sound starting point for professional judgment that takes into account important factors. Because there are some departments whose demand and journal budget need cannot be captured by student data alone (the sciences in particular), it is important to note that library professionals should look over each individual allocation to make sure it is sensible and on target.

ORDER OF OPERATIONS FOR FUTURE USE

- Set up working structure/accounts for department "discretionary pots"

- Get relevant university data for the 2009-2010 school year from the Office of Institutional Research
- On the "Allocation Amt" sheet in the Library Model Google Doc, plug in serial budget numbers and calculate off the top expenses and interdisciplinary department allocations to arrive at a final amount to be distributed using our statistical model
- Plug the OIR data into our Library Model sheet entitled "Data Enter"
- Review the weights on variables and decide if they are appropriate. Change them to place more or less importance on certain variables.
- Review each department's allocation amount to make sure it is plausible
- Decide on what amount departments can overspend (the default included on the department print outs is 4%)
- Send to each department their allocation amount with directions on how to respond
- Once departments respond, review their decisions
- Allocate the funds based on demand!

Improvements

As we have indicated above, our regression results are not perfect; however, there were a few steps that could have been smoother had there been different circumstances. One of the problems with our estimates is that they do not take into account the actual average prices of journals purchased by the University of Oregon Libraries; instead they are a rough proxy provided by the LJ price survey of 2009. The LJ price survey takes into account all journals in a particular field, but the Libraries will only purchase a fraction of those journals, and if one department purchases the less expensive or more expensive journals in their field than their average serial cost will be skewed and the formula will not be an actual reflection of their needs.

As it now stands the average serial prices are 5-year averages and are therefore an underestimation of the actual average serial costs, but because this is a problem for all departments it should return fairly reasonable results. This potential problem can be averted if the Libraries tracks and keeps data for the journals they purchase and their cost, so that the average cost per journal would be accurate for the actual basket that they purchase and their departmental demand could be more accurately determined. If this information is indeed available, we suggest using the appropriate prices in the spreadsheet.

One of the biggest obstacles that we faced with the data was matching up departments between the University of Oregon Libraries and the data provided by the Office of Institutional Research. Figuring out how classifications from the OIR corresponded to the departments from the Libraries and then trying to determine under what category of subject area they fell under for the average serial costs took quite a bit of time and effort. The OIR and the Libraries could greatly simplify this process in the future by using the same department classifications, which would make determining allocations in the future a simple process of plugging in the data provided by OIR, not to mention more accurate since there would not need to be so many departmental mapping exercises.

In an ideal world the University of Oregon Libraries would have usage statistics on their journals, which would help them in determining cost per use. Having this information would help determine what journals to cut because true departmental demand would be revealed. Unfortunately it would be difficult to measure the usage of print journals and would therefore be highly unlikely to ever be fully implemented to a point where separate journals could be compared against each other.

LONG-RUN ALTERNATIVE CONCLUSIONS

While the formula that we have determined will work for the library in the short run and help efficiently determine equal budget cuts, or more accurately, distribution, for serials, in the long run we believe that other methods for controlling serial costs need to be considered and implemented. As touched on in the Literature Review, the University of Oregon is already implementing alternative programs. We advocate the need to keep on developing these programs and to seek out ways to improve what already exists. It is highly unlikely that the increase in serial costs will ever subside, as it is lucrative for publishers. Our allocation formula and complimentary spreadsheet will help determine allocations in the face of diminishing budget efficiency, but we strongly believe that this is only a short-term solution and the alternative ideas should be expanded on in the long-run to control escalating costs. Which is why we advocate for the implementation of a savings incentive as outlined in our Empirical Testing section; the encouragement of saving will encourage the use of alternatives which will build up the demand and reach of the current projects.

To test our long-run incentive program, we contacted five select departments all with varying budget allocations and spending habits to see what they thought of our flexible spending incentive program. Two out of the five departments responded with their thoughts. One department indicated that their program is an interdisciplinary program where students are fed into it from larger departments and that these departments do not tend to support the interdisciplinary department by their own accord. Our model will help solve this problem by giving this particular department their own allocation based off of student data mapped with the feeder departments. However, since this small department only supports one journal and does so through their academic budget, they could not comment heavily on our incentive program. Yet,

the other departmental response gave us some very encouraging feedback. The following excerpt shows this particular departments' responses:

QUESTION: The current method for allocating funds for journal subscriptions is based on annual incremental increases (or decreases) to a base established decades ago. What do you think is the greatest positive or negative aspect to this method?

RESPONSE: "This is terrible, as [department name omitted] initially had no allocation whatsoever. It's hardly been improved; we have 6 tenure-track faculty, nearly 300 undergraduate majors, about 30 graduate students, and an annual budget allocation of [about] $2300. It took us a decade to get anything...Seems it should be tied to a formula of faculty FTE and student credit hours as books are tied to both to research and to course needs."

QUESTION: Do you think the library accurately predicts your department's needs for journals? Why/why not?

RESPONSE: "Thus far, yes, within our limited budget. We had to cancel one subscription in the last round of cuts."

QUESTION: What are the most important factors that you think should be considered when determining a department's allocation?

RESPONSE: "...tenure track faculty research needs (perhaps based on FTE), graduate student needs (enrolled graduate students?) and SCHs as each course has needs beyond required readings."

QUESTION: Would some flexibility in under or overspending your annual allocation each year be helpful to you or not? Why/why not?

RESPONSE: "We've never had that privilege, given our low budget!"

QUESTION: Would it be beneficial to your department if the library offered a "discretionary pot" used only for library expenditures if your department spent UNDER the amount appropriated?

RESPONSE: "Sure--but again, only if the total amount available was a reasonable amount and not all pre-allocated."

After this questionnaire was received, we realized that there is a demand for a change in the status quo and that we were on the right track to base allocations off of student and departmental data. Our long-run incentive plan hinges upon departmental review and from the above departmental feedback, however little, we can see that the departments do want to get involved and will probably use our incentive to save program. With this project we are starting conversations about the short-run and long-run stability of journal allocations that bring together faculty and library staff in the search for an equitable and sustainable solution.

SUMMARY

While our regression estimates and resulting model sheet are not flawless, they provide the library with a good tool with which to develop future budget allocations that are flexible, defend-able, intuitive, and will be an excellent addition to the library's arsenal.

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7. Appendix

Category Comparison Chart

UO Library Department Classification	Library of Congress Subject proxie	Monroe Data Categories
AAA Prod Des.-S	Art & Architecture	Off the top
Anthro - S	anthropology	Anthropology Department
Architecture - S	Art & Architecture	Architecture & Interior Architecture
Art Hist - S	Art & Architecture	Art History
Art Refe - S	Art & Architecture	Architecture & Interior Architecture, Art
Arts & Admin - S	Art & Architecture	Arts and Administration
Biol - S	Biology	Biology Department (Includes OIMB)
Busi Ad - S	Business and Economics	Lundquist College of Business
Cart - S	Geography	Geography Department
Chem - S	Chemistry	Chemistry Department*
Cinema St - S	Language and Literature	Art, English, Journalism
Class - S	Language and Literature	Classics Department (includes Humanities Instruction)
Comp Lit - S	Language and Literature	Comparative Literature Department
Comp Sci - S	Math and Computer Science	Computer Information Science Department
Dance - S	Recreation	Dance Department
Docs - S	Library and Information Science	Off the top
Ea As Lang - S	Language and Literature	East Asian Language and Literature
East Asian St - S	anthropology	International Studies
Econ - S	Business and Economics	Economics Department
Educ - S	Education	Educational Leadership, Special Education, Teacher Education, Counciling, Family, & Human Services, Communication Disorders, Counseling Psychology, Early Intervention, Education (EDUC), Education Studies, School Psychology, Teaching and Learning
Engl - S	Language and Literature	English Department, Creative Writing Dept, Folklore Department

Environ St - S	General Science	Environmental Studies Program
Ethnic St - S	Anthropology	Ethnic Studies Department
Exch	Library and Information Science	Off the top
Fine Arts - S	Art & Architecture	Art
Geog - S	Geography	Geography Department
Geol - S	Geology	Geological Science Department
German - S	Language and Literature	German Department
Hist Pres - S	Art & Architecture	Historic Preservation
Hist - S	History	History Department
Human Physiology -S	Health Sciences	Human Physiology
Inter Arch - S	Art & Architecture	Architecture & Interior Architecture
Intl Stud- S	Political Science	International Studies Department
Jour - S	Language and Literature	School of Journalism and Communication
Juda St - S	Philosophy and Religion	Judaic Studies
Land Arch - S	Art & Architecture	Landscape Architecture
Lib Gen - S	Library and Information Science	Off the top
Lib Sci - S	Library and Information Science	Off the top
Ling - S	Language and Literature	Linguistics Department (includes AEIS and SELT)
Math - S	Math and Computer Science	Mathematics Department*
Medieval St - S	History	History
Mtotausic - S	Music	Music Department
Music Ref - S	Library and Information Science	Music
Neuro - S	Biology	Biology and Psychology
News - S	Library and Information Science	Off the top
OIMB - S	Biology	Biology Department (Includes OIMB)
Ore Col - S	Library and Information Science	English, History
Paci Is St - S	Anthropology	International Studies
Phil - S	Philosophy and Religion	Philosophy Department
Phys - S	Physics	Physics Department*
Poli Sci - S	Political Science	Political Science Department
PPPM - S	General Works	Planning, Public Policy & Management
Processing - S	Library and Information Science	Off the Top

Psyc - S	Psychology	Psychology Department
REESC - S	anthropology	Russian Department and REES
Refere - S	Library and Information Science	Off the Top
Relig St - S	Philosophy and Religion	Religious Studies Department
Roma Lang - S	Language and Literature	Romance Languages Department
Sci Gen - S	General Science	General Science
SE Asian St - S	Anthropology	International Studies
Slides - S	Library and Information Science	Off the top
Sociol - S	Sociology	Sociology Department
Theater Arts - S	Art & Architecture	Theatre Arts Department
Urban Plan - S	General Works	Planning, Public Policy & Management
Women's St - S	General Works	Women and Gender Studies

Regression Outputs

Dependent Variable: PERCENTEXPEND
Method: Panel Least Squares
Date: 05/31/10 Time: 12:49
Sample (adjusted): 2005 2009
Periods included: 5
Cross-sections included: 43
Total panel (balanced) observations: 215
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019242	0.003399	5.660433	0.0000
AVGSERCOST	3.81E-07	2.76E-06	0.137963	0.8904
GRDEGS/(UGDEGS+1)	2.87E-05	5.83E-06	4.926917	0.0000
ICCGEN(-1)/PERCENTEXPEND(-1)	1.77E-11	1.73E-11	1.022056	0.3082
PERCENTEXPEND(-1)	0.044047	0.104536	0.421361	0.6740
EASYCRSSCH+GRCRSSCH+UDCRSSCH	2.69E-08	9.30E-08	0.289084	0.7729

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.998504	Mean dependent var	0.021057
Adjusted R-squared	0.998083	S.D. dependent var	0.035375
S.E. of regression	0.001549	Akaike info criterion	-9.908876
Sum squared resid	0.000401	Schwarz criterion	-9.156361
Log likelihood	1113.204	Hannan-Quinn criter.	-9.604825
F-statistic	2371.857	Durbin-Watson stat	1.798231
Prob(F-statistic)	0.000000		