

Strategic Management of College Resources

A Hypothetical Walkthrough

by **Vernon B. Harper, Jr.**

“Straight answers to tough questions inside the black box of academic finance [using] a hypothetical institution as way to show the consequences of the tough answers to those questions.”

One residual of the Great Recession is a combative fiscal, monetary, and legislative environment that continues to reshape postsecondary education. College leaders are being directed to improve the academic performance of students and the financial performance of the entire enterprise. It is a challenging climate in which the traditional tactics of increasing both tuition and financial aid offer diminishing returns. Those who choose to lead in this climate will require more than courage to succeed; they will need reliable tools to manage and optimize institutional resources. This type of resource planning must be able to capture the complex financial relationships between academic units while being easily comprehensible to campus stakeholders. In the pages that follow, a model for optimizing resources is presented as a “walkthrough.” The walkthrough takes advantage of fabricated data from a small independent college (SIC), and the exercise is based on the assumption that external resources are not forthcoming. The primary vehicle for understanding SIC’s structural problems and its attendant solutions is the contribution margin income statement that is presented as an appendix to this article. Of the many financial statements, the income statement “is relevant to decision making because it specifies how alternative choices impact income” (Horngren et al. 2011, p. 181). In addition, the contribution margin income statement differs from year-end audited statements in that it eschews the NACUBO (National Association of College and University Business Officers) functional classifications that hide managerially relevant information, such as the relationship between expenses and revenues.

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This hypothetical institution is conceptualized as an independent urban institution with a small population of only undergraduate students (2,741 FTE) who largely commute. The leadership’s goal is to build a pool of strategic resources, or operating reserves, from within the financial boundaries of the institution. These strategic resources would be reinvested into academic capital and programming; although building reserves is a strategic objective, the preservation of academic programs is the highest priority. Importantly, SIC’s small endowment (\$10,975,500) provides little to the unrestricted operating budget. This institution is highly tuition dependent (94 percent), based on its tuition dependence ratio (see income statement: $D6 / E7 + E12 + C32$). Organizationally, the institution is comprised of three academic divisions. The School of Art and Social Science is the exclusive steward of the general education program. Over time, two professional schools have been added to the academic portfolio: the School of Technology and the School of Business. Importantly, the college has no graduate programs or any appreciable overhead recovery from sponsored research.

FINANCIAL ASSESSMENT

For SIC, the -13 percent net income ratio (see the income statement: C33 / C24) indicates that the institution is operating with a deficit of \$2,948,517 (C33). Due to soaring expenses, the institution has consistently raised its nominal tuition, which is now \$33,000 per academic year for first-time full-time freshman (\$1,100 per credit hour), and fees. As shown on the income statement, the institution has a total credit production of 82,233 (C5). As with many institutions, intense competition has led to extensive tuition discounting. In figure 1, the relationship among enrollment, credit production, gross tuition revenue, and discounting is depicted by school so as to determine the percentage of student financial aid awarded by each school.

Figure 1 **Financial Aid by School**

Division	Incoming Student FTE	Current Student FTE	Credits	Gross Tuition Revenue	% of Student Financial Aid	Net Tuition Revenue (NTR)	NTR Per Credit Hour
School of Art and Social Science	222	1,108	33,235	\$36,558,500	50.6%	\$18,059,899	\$543
School of Technology	171	856	25,675	\$28,242,500	54.4%	\$12,878,580	\$501
School of Business	155	777	23,323	\$25,655,300	54%	\$11,801,438	\$506
Total	548	2,741	82,233	\$90,456,300	53%*	\$42,739,917	\$516*

*These values represent the column averages, not the column totals.

In order to determine the amount of financial aid a student receives, institutions often build enrollment matrices based on the two dimensions of financial need and academic merit, with the cells suggesting an average aid amount for each respective student. In this way, financial aid is leveraged to maximize net tuition revenue (NTR) from an entering class. Useful as this approach may be, it fails to describe the patterns or clusters of discounting by school. As can be seen in figure 1, the overall discount rate of 53 percent hides the underlying variance among academic divisions, where it is apparent that the highest-discount students are pooling in the School of Technology and the School of Business. Importantly, the pools of discounted student revenue should be coupled with expense structures to offer a complete picture of financial performance by school. Contribution margin is one statistic to link NTR to instructional expense.

In the world of commerce, contribution margin is a common tool used to estimate the performance of multiple products or services. In postsecondary education, it is often overlooked managerially. In the simplest terms, contribution margin for a nonprofit organization is the amount that a given activity produces to cover overhead costs. For this exercise, contribution margin is derived by subtracting direct expenses (operating budgets, equipment, salaries, and benefits) and those expenses allocated to each school by credit hour (library, media services, and academic administration) from the NTR generated by students within a school (see Whalen 1991 for revenue attribution and cost allocation methods).⁵ Townsley (1993) writes that small independent colleges and universities are successful when their leaders are “aware of the central role that contribution margins have upon programs and upon the scale of the administration and student services” (p. 61).

⁵ Importantly, long-term liabilities (leases, bond debt, etc.) are not included in the contribution margin calculation.

Importantly, Stuart, Erkel, and Shull (2010, p. 201) describe the computational challenge of a contribution margin analysis when they write that it is necessary to

compare costs and revenues across programs, and consider the complexity and variability of faculty workloads and salaries, plans of study and credits per course, numbers and proportions of students enrolled full-time and part-time in different programs, and percentages of tuition dollars returned to the college by type of student.

Even with these challenges, an institution that is able to craft a contribution margin framework will be rewarded with data indicating the relative productivity of different academic activities.

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OVERHEAD COVERAGE AND EFFICIENCY RATIOS

The underlying logic of the overhead coverage matrix (figure 2) is that the delivery of each academic credit produces a linear amount of institutional overhead. Admittedly, the relationship between academic credits and overhead could in fact be stepwise or even curvilinear; however, the overhead coverage matrix offers a solid starting point for more detailed analysis. Moreover, the concept of overhead coverage is strongly related to the notion of cost absorption, in which overhead costs are apportioned and then absorbed by a revenue-generating unit based on a particular variable, in this case, credit hours (see Rumble 1997).

Figure 2 **Overhead Coverage Matrix**

Division	Credit Hours	Credit Hours % of Total	Contrib. Margin \$	Contrib. Margin % of Total	Overhead Coverage %	95% Expected Overhead Coverage	Overhead Coverage Variance
School of Art and Social Science	33,235	40%	\$11,848,278	52%	45%	\$10,083,499	\$1,764,779
School of Technology	25,675	31%	\$4,544,475	20%	17%	\$7,789,795	-\$3,245,320
School of Business	23,323	28%	\$6,577,086	28%	25%	\$7,076,198	-\$499,112
Total	82,233	100%	\$22,969,839	100%	87%	\$24,949,492	-\$1,979,653

Note: Total overhead = \$26,265,445; per credit overhead rate at 95% = \$303.40.

As shown in figure 2, the first comparison is among credit hours, credit hours percent-of-total, and contribution margin percent-of-total. The assumption is that an academic division should produce a contribution margin percent-of-total that is equal to or greater than the credit hours percent-of-total. In the SIC example, the School of Art and Social Science produces 40 percent of the credits (33,235) yet 52 percent of SIC's contribution margin (\$11,848,278). By taking total overhead (\$26,265,445) into account from the income statement, it is easy to determine that the School of Art and Social Science is actually covering 45 percent of the college overhead. On the other hand, the School of Technology accounts for

31 percent of the credit hours yet only 20 percent of the contribution margin and covers only 17 percent of the overhead. Lastly, the School of Business accounts for 28 percent of credit hours and contribution margin with 25 percent overhead coverage. In total, the academic divisions cover only 87 percent of the total college overhead (\$22,969,839 / \$26,265,445), which means that 13 percent of the college overhead must be carried, or cut, for the institution to achieve financial balance.

In truth, few institutions couple their revenue-generating activities (academic divisions) and overhead in this way, for there are sizable political and practical barriers to setting contribution margin expectations. Yet, this approach reveals how the schools' financial contribution relates to the performance of other revenue-generating activities such as auxiliaries. For this exercise, the SIC leadership has already traversed these barriers, meaning that the SIC academic divisions are expected to carry 95 percent of the institutional overhead largely due to a lack of auxiliary revenue.⁶ The expected coverage rate of 95 percent equates to a per credit hour rate of \$303 ($[\$26,265,445 / 82,233] \times .95$), so the School of Art and Social Science is expected to cover \$10,083,499 of the college overhead ($33,235 \times \$303$). Similarly, the School of Technology is expected to cover \$7,789,795, while the School of Business should be covering \$7,076,198.

A further inspection of figure 2 reveals the overhead coverage variance, which is the difference between the expected overhead coverage and the actual contribution margin. For example, the School of Art and Social Science performs \$1,764,779 above its 95 percent expected coverage. On the other hand, the School of Technology and the School of Business underperform by \$3,245,320 and \$499,112, respectively, for a combined \$3,744,432. The notion of subsidy is infrequently raised in postsecondary education, yet its financial impact is felt across entire institutions as resource scarcity. In the SIC example, the School of Art and Social Science is essentially funding the overhead created by the other schools with its \$1,764,779 excess. Even with the School of Art and Social Science surplus, the remaining uncovered overhead is \$1,992,947 ($\$3,744,432 - \$1,751,485$). Since auxiliary revenue falls short of covering this \$1,992,947, the ongoing structural problem is quite clear.

SIC leadership also can take advantage of efficiency ratios (figure 3) to further diagnose the structural problems within each school. In short, an efficiency ratio reveals the ability of an academic division to convert revenue into contribution margin (direct expense / net revenue). As with any ratios, efficiency ratios must be treated with caution, for they aggregate underlying information, which could prove to create a distortion.

⁶ It is unlikely that an institution would expect 100 percent coverage of overhead by the academic divisions. In using this method, an institution must consider carefully the expected percentage of overhead to be carried by the various revenue-generating units.

Figure 3 **Efficiency Ratios**

Division	Direct Expense	Net Tuition Revenue (NTR)	Efficiency Ratio
School of Art and Social Science	\$5,413,981	\$18,059,899	30%
School of Technology	\$7,717,905	\$12,878,580	60%
School of Business	\$4,664,600	\$11,801,438	40%
Total	\$17,796,486	\$42,739,917	42%*
		Spread (High/Low)	30%

*This value represents the column average, not the column total.

As seen in figure 3, the School of Art and Social Science requires 30 cents of expense (30 percent) to generate one dollar of revenue, while the School of Technology and the School of Business possess 60 percent and 40 percent ratios respectively. Importantly, the 30 percent spread is a useful derivative statistic that indicates the variance in efficiency between the schools, and it can be used by administrators to track the efficacy of cost management initiatives. In the end, the efficiency ratios simply confirm what has been observed in the contribution margin data, which is the fact that the School of Art and Social Science is a more financially efficient entity.

RESOURCE MANAGEMENT

Planning and managing the financial resources of a college requires a sustained commitment from its institutional leadership. This small independent college exercise captures many of the difficult challenges currently facing actual institutions, and it naturally leads to potential remedies and solutions. Moreover, the solutions described herein are intended to be structural, taking advantage of SIC's current financial resources rather than anticipating new revenue. In reality, any efforts to restructure academic and administrative activities like those described in figure 4 would require multiple years and intensive consensus building among campus coalitions in order to be successful. In addition, figure 4 also conveys that the pursuit of each tactic carries significant risks to be managed by the college leadership.

Figure 4 SIC Tactical Planning Matrix

	Tactic	Revenue Impact	Expense Impact	Risks(s)
1	Cap discount rate for new enrollees in the School of Technology and School of Business at 45%	School of Technology + \$530,442 School of Business + \$460,350	None	High net cost to students may reduce enrollment
2	Use efficiency ratios to determine school-level reductions in direct expense	None	School of Technology – \$540,253 School of Business – \$186,584 School of Art and Social Science – \$108,279	Reductions may negatively impact the ability of academic divisions to deliver high-quality programs
3	Reduce allocated expenses by 5%	None	– \$98,000	Reductions could decrease effectiveness of operations and support programs
4	Reduce overhead expenses by 7%		– \$1,838,581	
Sub-total Impact		+ \$990,792	– \$2,771,697	
Grand Total Impact		\$3,762,489 in new resources		

The first tactic is to differentiate tuition by capping discount rates by school. In this way, the cost of comparatively expensive academic programs is borne by those who are the direct beneficiaries. For example, the 171 entering students in the School of Technology represent \$5,643,000 of gross tuition revenue (171 x \$33,000), and a 9 percent drop in the discount rate (45 percent versus 54 percent) for those students would increase the NTR in the School of Technology by \$530,442. A similar calculation for the 155 entering students in the School of Business would yield \$460,350. All other things being equal, the positive revenue impact of \$990,792 from the School of Technology and the School of Business should cut the SIC deficit by a third. However, the higher cost of attendance due to capping the discount rate poses a real financial risk to the college because the lack of aid may affect students’ propensity to enroll. Of equal importance, the 54.4 percent and 54 percent discount rates suggest that these students are highly desirable, likely because of their high quality (SAT score and GPA). If these students fail to enroll, then there may be a steep decline in institutional prestige. To diminish this risk, the college could reallocate projected reserves to enhanced marketing of its programs in order to broaden the pool of prospective enrollees. A full discussion of the management of these types of risks is beyond the scope of this article; however, authors write that higher education institutions should “manage their strategic risks within the context of implementing strategic initiatives” (Tahey et al. 2010, p. 10).

While most of SIC’s deficit is addressed through revenue increases, the college’s expense drivers must be addressed in order to fill the remaining portion of the gap. For many institutions, across-the-board reductions are the favored approach; however, this approach merely rescales the problem. Dickeson (2010) describes how colleges and universities tend to “make necessary budget cuts across the board so that all programs suffer equally . . . , which is politically expedient” (p. 23). Dickeson goes further to state that reductions need to be targeted in order to ultimately alter the balance of institutional subsidies. At the same time, it is important to acknowledge that academic programs possess inherently different expense structures due to varying types of pedagogy. An attempt to forcibly equalize instructional

costs would impair and eventually terminate higher-expense programs. The reduction plan described below is intended to address the underlying institutional subsidies but would not eradicate this type of cross-divisional support.

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By providing empirical support, efficiency ratios can point toward both the location and magnitude of reductions. For example, the 60 percent efficiency ratio for the School of Technology shown in figure 3 must be improved in order to address the underlying subsidy. A \$540,253 (7 percent) expense budget cut to the School of Technology (as described in figure 4) would improve its ratio by 5 percent to 55 percent efficiency, as shown in the updated efficiency ratios presented in figure 5. Since the School of Business is more efficient (40 percent ratio), its lesser 4 percent expense reduction equals \$186,584, which drops its efficiency ratio to 38 percent. Lastly, the School of Art and Social Science would see a reduction of \$108,279 to its total budget (2 percent), dropping the school’s ratio from 30 percent to 29 percent. In sum, the reductions to the academic enterprise amount to \$835,116 and potentially include a reduction in force. When combined with revenue enhancements (\$990,792), the total increase in resources from the academic divisions is \$1,825,908. The impact of the revenue and expense tactics can be seen in figure 5, which shows that the overall institutional efficiency ratio improved from 42 percent to 39 percent and the efficiency spread ratio also improved from 30 percent to 26 percent.

Figure 5 **Efficiency Ratios after Revenue Increases and Expense Reductions**

Division	Direct Expense	Net Tuition Revenue (NTR)	Efficiency Ratio
School of Art and Social Science	\$5,305,702	\$18,059,899	29%
School of Technology	\$7,177,652	\$13,409,022	55%
School of Business	\$4,478,016	\$12,261,788	38%
Total	\$16,961,370	\$43,730,709	39%*
		Spread (High/Low)	26%

*This value represents the column average, not the column total.

It is of major importance to note that the ability of academic leaders to continue to deliver high-quality programming is questionable with reductions of this magnitude. If the institution’s prestige is ultimately harmed by reductions, then the long-term impact on enrollment would destroy any gains achieved on the expense side. The college could mitigate this risk by ensuring that a robust student learning outcomes assessment system is in place so that any drop in academic quality could quickly be addressed by the academic leadership.

To create operating reserves for SIC, the administrative enterprise (allocated expense and overhead) also must endure a disruptive level of reduction. Accordingly, figure 4 shows both 5 percent and 7 percent reductions in allocated expense and overhead respectively, which would yield a combined \$1,936,581. Regarding allocated expense, a 5 percent cut in library, media services, and academic administration may be very visible to current students, and thus it poses a serious risk to

retention. A 7 percent reduction in overhead would yield the largest dollar value of savings, yet deep cuts in overhead may reduce the service quality of many functional units. The risks related to reductions in allocated expense and overhead could be mitigated through quality control monitoring of service levels in the areas subject to reductions. Again, reductions on this scale are likely to induce retrenchment, which would be painful. A robust communication plan is also recommended to make the objectives of the reductions clear to constituents. The total actions taken to address SIC's structural deficit of \$2,948,517 would include a combination of increases to revenue and reductions in overall expense and generate operating reserves of \$813,972 ($\$3,762,489 - \$2,948,517$). SIC administration can use this pool of operating reserves to support the achievement of strategic initiatives, as well as new programming.

In the end, this exercise is an over-simplification of the complex and challenging process of resource management. Yet, the exercise shows that strategic resource management is exceedingly difficult and politically perilous, for no institution would welcome dramatic increases in student tuition or reductions in expenses. However, most postsecondary institutions now exist in an environment where external funding sources are increasingly competitive and scarce. And, ultimately, it is this environment that will push colleges and universities to consider the dramatic restructuring of existing resources. Thus, success will in part be based on possessing reliable and valid tools such as the overhead cover matrix, as well as courage.

APPENDIX: SMALL INDEPENDENT COLLEGE (SIC) CONTRIBUTION MARGIN INCOME STATEMENT

	Credit Hours	Net Tuition Revenue (NTR) and Fees	Direct Expense
School of Art and Social Science	33,235	\$18,059,899	\$5,413,981
School of Technology	25,675	\$12,878,580	\$7,717,905
School of Business	23,323	\$11,801,438	\$4,664,600
Total	82,233	\$42,739,917	\$17,796,486

	Academic Affairs Allocated Expense	Library and Media Allocated Expense	Total
School of Art and Social Science	\$365,585	\$432,055	\$797,640
School of Technology	\$282,425	\$333,775	\$616,200
School of Business	\$256,553	\$303,199	\$559,752
Total	\$904,563	\$1,069,029	\$1,973,592

	Contribution Margin	Contribution Margin % of NTR	Contribution Margin % of Total
School of Art and Social Science	\$11,848,278	66%	52%
School of Technology	\$4,544,475	35%	20%
School of Business	\$6,577,086	55%	28%
Total	\$22,969,839	54%	

	Other Revenue	Other Revenue % of Total
Net Auxiliary Income	\$121,445	35%
Net Endowment Income	\$109,755	32%
Net Grant Income	\$67,090	19%
Net Misc. Revenue	\$48,799	14%
Subtotal Other Revenue	\$347,089	100%
Total Net Revenue	\$23,316,928	

	Overhead	Overhead % of Total
Administration	\$12,045,435	46%
Student Services	\$3,469,969	13%
Facilities/Space	\$3,769,514	14%
Athletics	\$2,257,864	9%
Information Technology	\$2,289,320	9%
Debt Service	\$2,433,343	9%
Total Overhead	\$26,265,445	100%
Change in Net Assets	(\$2,948,517)	

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