



Cost Allocation— From the Simple to the Sublime

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SPREADSHEET TOOLS ADD EFFICIENCY AND ACCURACY.

Organizational units generally can be categorized as *production departments*, which are directly involved in producing and distributing outputs, and *service departments*, whose primary activity is providing service to other organizational units. Service departments generate costs that must be covered by the production departments. They do not produce revenues or profits directly because their outputs are not sold outside the organization. Examples of service activities include information technology, maintenance, utilities, human resources, housekeeping, and administration. Service departments often provide support to other service departments as well as to production departments. For example, a maintenance department might maintain housekeeping department equipment.

Although they often are considered to be costly activities that reduce income, service departments are just as necessary to the production of final outputs as those departments directly involved in revenue generation. A good budgeting and accounting system should provide incentives for the efficient and effective use of service department activities by managers of production departments. It also should provide performance incentives for service department managers.

Typically, the charges for the use of service activities are based on the budgeted or actual costs of these

departments. Such a cost-based system allows service department costs to be included in the costing and pricing decisions for the final product. Organizations that establish prices on a cost-plus basis should include both direct and service activities in the cost of their output. Otherwise, profit margins will be overstated, and the relative profitability of final products that use differing amounts of service department activities will be distorted.

Service department costs are allocated to other departments based on some measure that represents the usage of the service activity. Ideally, a direct measure of service department output could be used. Examples include actual time incurred by maintenance department personnel, actual computer time provided, and actual kilowatt-hours of electrical power. In most instances, however, a less direct surrogate measure must suffice. For example, square footage would result in a less accurate but more cost effective allocation than an actual measure of the amount of time spent in production departments by the housekeeping staff. Similarly, the additional accuracy achieved by measuring the actual time expended by the human resources staff most likely would not be worth the incremental cost above that of a simple allocation based on the number of production employees served.

Once the various allocation bases have been deter-

mined, a method to apportion service department costs must be selected. Three common methods are: (1) the direct method, (2) the step (or sequential) method, and (3) the reciprocal method. The direct method is the simplest, the step method sacrifices some simplicity but offers an opportunity for improved accuracy, and the reciprocal method is the most accurate but also the most complex.

The purpose of this article is to illustrate how standard spreadsheet application software (Microsoft Excel for Windows in particular) can assist with all three methods of cost allocation. First, computational errors that often occur with manual calculations can be avoided. Second, spreadsheets afford greater efficiency by eliminating the need to reenter repetitive information (e.g., allocation bases, allocation formulas, labels, titles, etc.) when allocations are performed regularly for the preparation of periodic financial statements. Third, spreadsheets can quickly perform what otherwise could be a prohibitively cumbersome set of computations

when the number of allocations is large. Finally, because matrix algebra is required, the reciprocal method is not practical without computer assistance. Fortunately, spreadsheet software handles matrix manipulations quite nicely.

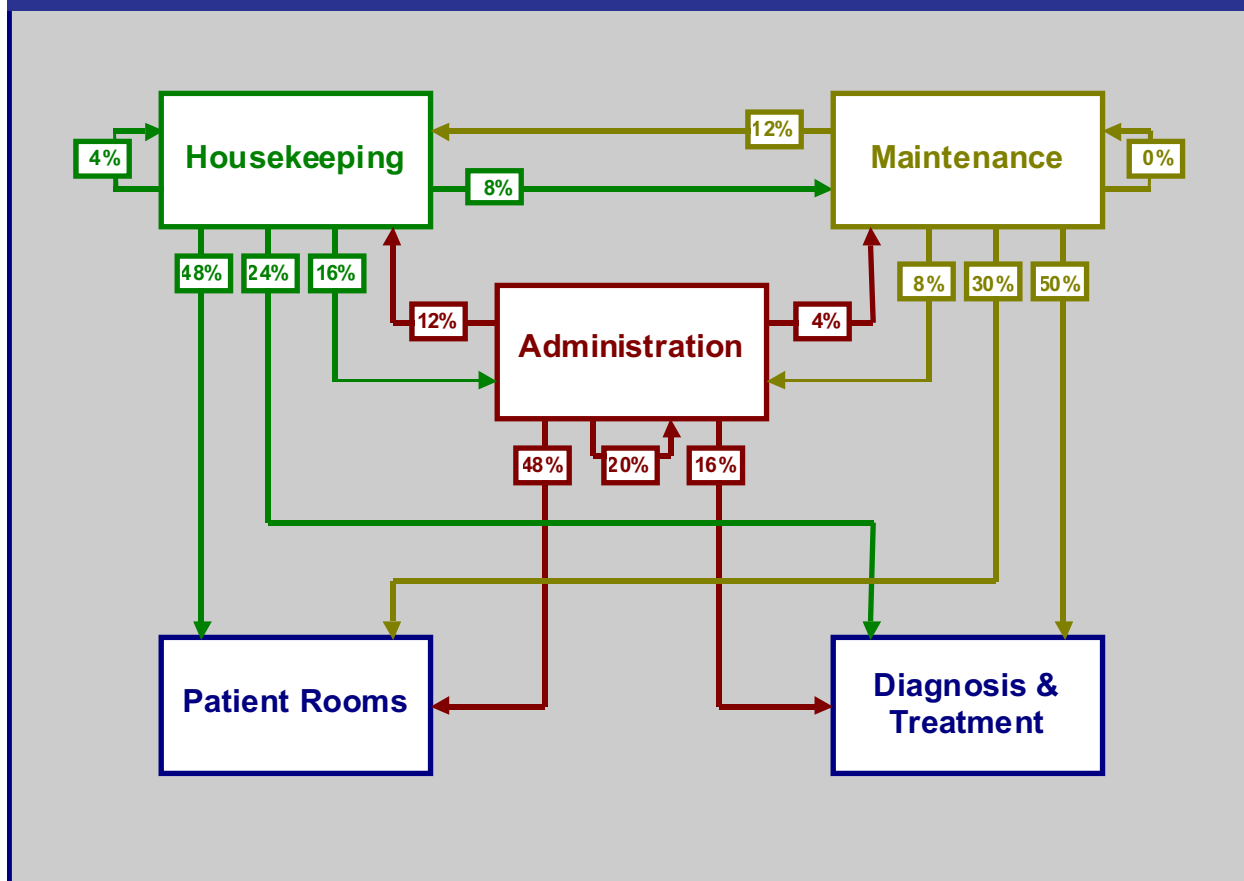
EXAMPLE DATA

The examples of each allocation method that follow are presented using data from a hypothetical healthcare facility. Enterprise Memorial Hospital (EMH) has two production departments and three service departments. Because the example data are based on a healthcare facility, production departments are called patient care departments, and service departments are called support departments. The patient care departments are patient rooms, diagnosis, and treatment. The support departments are administration, housekeeping, and maintenance. Cost and service data are shown in Table 1. These data will be used to apportion the costs of the support departments to the patient care departments

Table 1: Cost and Service Data

		<u>Costs</u>					
<u>Department</u>		<u>Costs</u>		<u>Allocation Base</u>			
Administration		\$ 2,000,000		Average number of employees			
Housekeeping		900,000		Area (square feet)			
Maintenance		400,000		Number of requisitions			
Patient Rooms		5,000,000		—			
Diagnosis & Treatment		<u>9,000,000</u>		—			
Total		<u>\$17,300,000</u>					
		<u>Activity</u>					
<u>Department</u>	<u>Average Number of Employees</u>		<u>Area (square feet)</u>		<u>Number of Requisitions</u>		
Administration	50	20%	40,000	16%	80	8%	
Housekeeping	30	12	10,000	4	120	12	
Maintenance	10	4	20,000	8	0	0	
Patient Rooms	120	48	120,000	48	500	50	
Diagnosis & Treatment	<u>40</u>	<u>16</u>	<u>60,000</u>	<u>24</u>	<u>300</u>	<u>30</u>	
Total	<u>250</u>	<u>100%</u>	<u>250,000</u>	<u>100%</u>	<u>1,000</u>	<u>100%</u>	

Figure 1: Relationships Between Revenue- and Nonrevenue-Producing Departments



using all three allocation techniques.

The objective is to arrive at a more complete and accurate set of costs for the patient care areas by allocating the costs of the three support departments to them. In this example, EMH can use the direct method of allocation for internal management and control purposes but must select either the step method or the reciprocal method for Medicare reimbursement as required by law.

As shown in Table 1, administrative costs are allocated based on the average number of employees working in each department, housekeeping costs are allocated based on the area of each department, and maintenance costs are allocated based on the number of requisitions submitted by each department. Regardless of the method used, the costs of the patient rooms plus diagnostics and treatment should total \$17.3 million after the allocations.

The relationships among the patient care and sup-

port departments are shown in Figure 1. Outgoing arrows represent service provided by the support departments to other areas. Incoming arrows represent service received. Percentages of service provided are indicated in the boxes on each outgoing arrow. Notice that the sum of the percentages for arrows leaving each support department equals 100%. Also, administration and housekeeping self-consume a portion of their own services as indicated by the arrows that both exit and enter the same box. In this example, housekeeping and administration self-consume, but maintenance does not.

THE DIRECT METHOD: KEEPING IT SIMPLE

The direct method of allocation is the simplest. As the name implies, the costs associated with each support department are allocated directly to the two patient care departments without regard for reciprocal services and self-consumption. For example, the entire \$2,000,000 of

administrative cost is added directly to the costs for patient rooms and diagnosis and treatment. None of the administrative cost is allocated to housekeeping or maintenance, even though administrative services are provided to both. Also, self-consumption is not included in the calculations. Likewise, the costs of housekeeping and maintenance are added only to the costs of the two patient care departments.

The spreadsheet for the direct method is shown in Table 2. The variable data for allocation bases and costs are entered in the top section. These data are arranged together because they are likely to change from period to period, and they are referenced by the allocation calculations below. The average number of employees, the number of requisitions, and, of course, costs incurred during the period are particularly susceptible to change. Department areas also could change due to rearrangements and additions.

The bottom section contains the cost allocations. The first row of data in this section repeats the costs by referencing the cells in column I. This is for presentation purposes only. The next three lines contain the cost allocations. Notice the simplicity of the direct method. The \$2,000,000 administrative costs, \$900,000 housekeeping costs, and \$400,000 maintenance costs are split directly between the two patient care departments. Using the average number of employees as the

allocation base, \$1,500,000 of the administrative cost is allocated to patient rooms and \$500,000 to diagnosis and treatment. The calculations are $120/(120+40) \times \$2,000,000 = \$1,500,000$ and $40/(120+40) \times \$2,000,000 = \$500,000$.

The cell formulas access information contained in the data section and perform the necessary calculations. The formula in cell E14 is $=C6/(C6+C7)*I3$. The formula in cell F14 is $=C7/(C6+C7)*I3$. Cell B14 is for presentation purposes only. It contains $=I3*-1$ to show that the entire \$2,000,000 of administrative cost has been allocated. As a check, cell G14 is a sum of cells B14 through F14 and must equal zero.

Housekeeping costs are allocated in the same manner, using area as the allocation base. The calculations are $120,000/(120,000+60,000) \times \$900,000 = \$600,000$ and $60,000/(120,000+60,000) \times \$900,000 = \$300,000$. The formula in cell E15 is $=E6/(E6+E7)*I4$. The formula in cell F15 is $=E7/(E6+E7)*I4$. Again, cell C15 is for presentation, and row 15 must sum to zero.

Likewise, maintenance costs are allocated using the number of requisitions as the allocation base. The calculations are $500/(500+300) \times \$400,000 = \$250,000$ and $300/(500+300) \times \$400,000 = \$150,000$. The formula in cell E16 is $=G6/(G6+G7)*I5$. The formula in F16 is $=G7/(G6+G7)*I5$. Cell D16 is for presentation, and row 16 must sum to zero. Row 17 shows that the patient

Table 2: Spreadsheet for the Direct Method of Cost Allocation

	A	B	C	D	E	F	G	H	I
1	DATA								
			Employees		Area		Requisitions		
2	Department		Avg. No.	Percent	Ft.2	Percent	No.	Percent	Costs
3	Administration		50	20%	40,000	16%	80	8%	\$ 2,000,000
4	Housekeeping		30	12%	10,000	4%	120	12%	900,000
5	Maintenance		10	4%	20,000	8%	0	0%	400,000
6	Patient Rooms		120	48%	120,000	48%	500	50%	5,000,000
7	Diagnosis & Treatment		40	16%	60,000	24%	300	30%	9,000,000
8	Totals		250	100%	250,000	100%	1,000	100%	\$ 17,300,000
9									
11	ALLOCATIONS								
					Diagnosis				
12		Administration	Housekeeping	Maintenance	Patient Rooms	& Treatment	Totals		
13	Costs	\$ 2,000,000	\$ 900,000	\$ 400,000	\$ 5,000,000	\$ 9,000,000	\$ 17,300,000		
14	Allocations	(2,000,000)			1,500,000	500,000	-		
15			(900,000)		600,000	300,000	-		
16				(400,000)	250,000	150,000	-		
17	Totals	\$ -	\$ -	\$ -	\$ 7,350,000	\$ 9,950,000	\$ 17,300,000		

Table 3: The Step Method of Cost Allocation

A	B	C	D	E	F	G	H	I
1	DATA	Employees		Area		Requisitions		
2	Department	Avg. No.	Percent	Ft.2	Percent	No.	Percent	Costs
3	Administration	50	20%	40,000	16%	80	8%	\$ 2,000,000
4	Housekeeping	30	12%	10,000	4%	120	12%	900,000
5	Maintenance	10	4%	20,000	8%	0	0%	400,000
6	Patient Rooms	120	48%	120,000	48%	500	50%	5,000,000
7	Diagnosis & Treatment	40	16%	60,000	24%	300	30%	9,000,000
8	Totals	250	100%	250,000	100%	1,000	100%	\$ 17,300,000
9								
11	ALLOCATIONS	Diagnosis						
12		Administration	Housekeeping	Maintenance	Patient Rooms	& Treatment	Totals	
13	Costs	\$ 2,000,000	\$ 900,000	\$ 400,000	\$ 5,000,000	\$ 9,000,000	\$ 17,300,000	
14	Allocations	(2,000,000)	300,000	100,000	1,200,000	400,000	-	
15			(1,200,000)	120,000	720,000	360,000	-	
16				(620,000)	387,500	232,500	-	
17	Totals	\$ -	\$ -	\$ -	\$ 7,307,500	\$ 9,992,500	\$ 17,300,000	

care areas contain the entire \$17,300,000 after the allocation. The cost associated with patient rooms is \$7,350,000, and the cost associated with diagnosis and treatment is \$9,950,000.

To summarize, the major advantage of the direct method is its simplicity. Formulas in spreadsheet cells can easily access the basic data to perform the necessary allocation calculations and information presentations. The major disadvantage is that the direct method does not include consideration of reciprocal services and self-consumption.

THE STEP METHOD: INCLUDING RECIPROCAL SERVICES

The step method is a more accurate approach because it includes at least partial consideration of reciprocal services. It is slightly more complicated because it requires a sequence of allocations and reallocations conducted in a stepwise fashion. The order usually is based on the level of service provided by the service departments to each other, starting with the department that provides the most service to the others. An alternative is to allocate costs in descending order based on the amount.

Unlike the direct method, service department costs are allocated to other service departments. Once costs are allocated, however, none are allocated back in sub-

sequent steps. Thus, the step method only partially recognizes the reciprocal relationships among service departments. Also, it ignores self-consumption.

The spreadsheet for the step method is shown in Table 3. The data section is identical to the direct method spreadsheet (Table 2). The allocation section is very similar to the direct method but includes one important difference—allocations among service departments. As in this example, often it is difficult to compare services provided (i.e., square feet of area compared with number of requisitions). The approach taken by EMH is to use costs to determine the order of allocation from most to least. Administrative costs are allocated first, followed by housekeeping and maintenance. Notice that the spreadsheet has been organized so that the allocation sequence proceeds from left to right. Although not required, it does make the steps easier to follow.

In the first step, administrative costs are allocated to both the housekeeping and maintenance departments, as well as to patient rooms and diagnosis and treatment. The new total for housekeeping includes costs unique to housekeeping plus the allocation of administrative costs received in the first step. This new total (\$1,200,000) is then allocated to maintenance, patient rooms, and diagnosis and treatment in the second step.

Table 4: Step Method Allocation Calculations and Cell Formulas

Administration costs are allocated in the first step based on average number of employees:

Calculations

To housekeeping:	$30/(30+10+120+40) \times \$2,000,000 = \$ 300,000$
To maintenance:	$10/(30+10+120+40) \times \$2,000,000 = \$ 100,000$
To patient rooms:	$120/(30+10+120+40) \times \$2,000,000 = \$1,200,000$
To diagnosis & treatment:	$40/(30+10+120+40) \times \$2,000,000 = \$ 400,000$

Cell formulas

To housekeeping:	$C14: =C4/(C4+C5+C6+C7) * I3$
To maintenance:	$D14: =C5/(C4+C5+C6+C7) * I3$
To patient rooms:	$E14: =C6/(C4+C5+C6+C7) * I3$
To diagnosis & treatment:	$F14: =C7/(C4+C5+C6+C7) * I3$

Housekeeping costs are allocated in the second step based on area served:

Calculations

To maintenance:	$20K/(20K+120K+60K) \times \$1,200,000 = \$120,000$
To patient rooms:	$120K/(20K+120K+60K) \times \$1,200,000 = \$720,000$
To diagnosis & treatment:	$60K/(20K+120K+60K) \times \$1,200,000 = \$360,000$

Cell formulas

To maintenance:	$D15: =E5/(E5+E6+E7)*C15*-1$
To patient rooms:	$E15: =E6/(E5+E6+E7)*C15*-1$
To diagnosis & treatment:	$F15: =E7/(E5+E6+E7)*C15*-1$

Maintenance costs are allocated in the third and final step based on the number of requisitions:

Calculations

To patient rooms:	$500/(500+300) \times \$620,000 = \$387,500$
To diagnosis & treatment:	$300/(500+300) \times \$620,000 = \$232,500$

Cell formulas

To patient rooms:	$E16: =G6/(G6+G7)*D16*-1$
To diagnosis & treatment:	$F16: =G7/(G6+G7)*D16*-1$

Likewise, the final step allocates the new maintenance cost total (\$620,000) to patient rooms and diagnosis and treatment. Calculations and cell formulas are shown in Table 4.

Notice that costs are not allocated back to previous departments. For example, housekeeping costs are not allocated back to administration even though house-keeping provides service to administration. To do so

Table 5: Spreadsheet for the Reciprocal Method

A	B	C	D	E	F	G	H	I
1	DATA	Employees		Area		Requisitions		
2	Department	Avg. No.	Percent	Ft.2	Percent	No.	Percent	Costs
3	Administration	50	20%	40,000	16%	80	8%	\$ 2,000,000
4	Housekeeping	30	12%	10,000	4%	120	12%	900,000
5	Maintenance	10	4%	20,000	8%	0	0%	400,000
6	Patient Rooms	120	48%	120,000	48%	500	50%	5,000,000
7	Diagnosis & Treatment	40	16%	60,000	24%	300	30%	9,000,000
8	Totals	250	100%	250,000	100%	1,000	100%	\$ 17,300,000
9								
10								
11	ALLOCATIONS							
12	Identity Matrix (I)			Service Matrix (A)				From
13				To	Admin	House	Maint	
14	1	0	0	Admin	20%	16%	8%	
15	0	1	0	House	12%	4%	12%	
16	0	0	1	Maint	4%	8%	0%	
17								
18	I - A			(I - A) ⁻¹			B	
19	0.80	-0.16	-0.08	1.29	0.23	0.13	\$ 2,000,000	
20	-0.12	0.96	-0.12	0.17	1.08	0.14	\$ 900,000	
21	-0.04	-0.08	1.00	0.07	0.10	1.02	\$ 400,000	
22								
23	P			(I-A) ⁻¹ x B = S		P x S = C		
24	48%	48%	50%	2,836,288	\$ 2,330,501			
25	16%	24%	30%	1,369,917	\$ 969,499			
26				623,045				
27								
28	POST ALLOCATION TOTALS							
29	Patient Rooms	\$ 5,000,000	+	2,330,501	=	\$ 7,330,501		
30	Diagnosis & Treatment	\$ 9,000,000	+	969,499	=	\$ 9,969,499		
31	Totals	\$ 14,000,000	+	3,300,000	=	\$ 17,300,000		

would result in a continuous loop of allocations. Notice also that the procedure for the final step of a step method allocation is the same as for a direct method allocation.

While the step method offers improved accuracy over the direct method, it includes only partial consideration of reciprocal services and no consideration of self-consumption. The reciprocal method solves both shortcomings.

THE RECIPROCAL METHOD

The reciprocal method includes consideration of both reciprocal services among service departments and self-

consumption of services by the same department. Allowing for these complexities requires the application of more sophisticated allocation techniques, such as matrix algebra. In fact, the allocation of any reasonably realistic number of service departments is not at all practical without the assistance of the computer. Fortunately, most spreadsheet software packages include user-friendly matrix manipulation tools. This section provides a relatively simple and straightforward reciprocal allocation procedure that requires only a basic understanding of matrix manipulations. The computer will do the rest.

The spreadsheet for the reciprocal method is shown

in Table 5. The data section is the same as for the direct and step methods. The allocation section is substantially different. The initial objective is to solve $S = (I - A)^{-1} \times B$, where S is the matrix of support department costs after reciprocal allocations, I is the identity matrix, A is the matrix of services provided among the support departments, and B is the matrix of service costs to be allocated. Then P, the matrix of service percentages provided to the patient care departments, will be multiplied by S to arrive at C, the final matrix of support department costs allocated to the patient care areas. While this may appear formidable, it is very easy with the help of the computer. Here's how.

- The first step is to construct I, the identity matrix. An identity matrix is nothing more than a grid with ones entered along the upper left to lower right diagonal and zeroes everywhere else, as shown in Table 5. The identity matrix always is square and of the size $D \times D$, where D equals the number of service departments. The identity matrix for EMH is 3×3 because there are three support departments (administration, housekeeping, maintenance) providing service to the patient care areas.

- The second step is to create A, the matrix of service department percentages, by referencing the data in the first section of the spreadsheet. Notice that the A matrix contains percentages provided from the support departments to each other, including self-consumption, to provide a common measure of service. It is very important to place the percentages in the proper cells in order to represent the correct to/from relationships. This can easily be accomplished by referencing the first three rows of percentages in each column of the data (i.e., average number of employees represents the service provided by administration, square feet of area represents the service provided by housekeeping, and number of requisitions represents the service provided by maintenance). Thus, the cell formulas in the A matrix are F14: =D3, F15: =D4, F16: =D5; G14: =F3, G15: =F4, G16: =F5; and H14: =H3, H15: =H4, and H16: =H5.

- Next name the matrices. To name a matrix, first highlight the cells of the matrix. For example, highlight cells A14:C16 for the identity matrix. Then click Insert on the Excel menu, then Name, then Define. A text

box will appear. Enter a name of your choice (e.g., I, Identity, Identity Matrix, etc.). Click Add, then OK. Repeat the process for the service matrix. In this example, the identity matrix is named I, and the service matrix is named A.

- The third step is to subtract the A matrix from the I matrix. Again, this is simple with the help of the computer. First, highlight a range of cells to receive the results. As these are 3×3 matrices, the range also should be 3×3 in size. In our example, cells A19:C21 will receive the results of the subtraction. With the recipient cell range highlighted, enter the two ranges of cells that are to be subtracted into the formula bar. In our example, the entry is =I-A (an alternative is to omit naming the matrices and use cell ranges instead: =A14:C16-G14:H16). Then press Ctrl+Shift+Enter (simply pressing Enter will not suffice because ranges of cells are being subtracted rather than individual cells). The results of the I-A subtraction appear in cells A19:C21.

- The fourth step is to invert the I-A matrix to create the inverse of I-A, or $(I-A)^{-1}$. Again, no math skills are required because the computer will do it for you. First, using the procedure described above, name the I-A matrix. The name used in this example is IminusA (According to the Excel naming rules, "I-A" is not acceptable because of the minus sign). Next, select the range of cells to receive the results. As the I-A matrix is 3×3 in size, the inverse of I-A also will be 3×3 in size. In our example, cells E19:G21 receive the results. To perform the inversion, enter =MINVERSE(IminusA) into the formula bar and then press Ctrl+Shift+Enter. The results of the inversion appear as shown in Table 5.

- The fifth step is to perform the multiplication $(I-A)^{-1} \times B = S$. Begin by naming cells E19:G21 IminusAinverse. Then create B, the matrix of service costs to be allocated, by referencing the costs in column I of the data section at the top of the spreadsheet (I19: =I3, I20: =I4, I21: =I5), and name it B. Highlight the cells to receive the results, enter =MMULT(IminusAinverse,B), and press Ctrl+Shift+Enter. The =MMULT function multiplies the two cell ranges in the parentheses.

The results of the multiplication will appear, provided some simple rules of matrix algebra are followed.

Table 6: A Quick Guide to Reciprocal Allocation with Microsoft Excel

1. Create a $D \times D$ identity matrix, I .
 - a) D = number of service departments.
 - b) Ones along the left-to-right-down diagonal, zeroes everywhere else.
 - c) Optional: name I and all subsequent matrices using Insert, Name, Define, Add, OK.
2. Create the A matrix of service percentages provided among the service departments.
 - a) Reference the allocation data.
 - b) Observe correct from/to relationships.
3. Create the $I-A$ matrix by subtracting the service matrix from the identity matrix.
 - a) Select the cells to receive the results.
 - b) Type $=I-A$, then press Ctrl+Shift+Enter.
4. Create the $(I - A)^{-1}$ matrix by using the spreadsheet matrix inverse function.
 - a) Select the cells to receive the results.
 - b) Type $=MINVERSE(I-A)$, then press Ctrl+Shift+Enter.
5. Create the B matrix of service costs to be allocated.
 - a) Reference the allocation data.
 - b) Observe proper row x column arrangement.
6. Create the S matrix: $(I - A)^{-1} \times B = S$.
 - a) Select the cells to receive the results.
 - b) Type $=MMULT(MINVERSE(I-A),B)$, then press Ctrl+Shift+Enter.
 - c) Order is important.
7. Create the P matrix of service percentages provided to the production departments.
 - a) Reference the allocation data.
 - b) Observe proper row x column arrangement.
8. Calculate the C matrix of final cost allocations: $P \times S = C$.
 - a) Select the cells to receive the results.
 - b) Type $=MMULT(P,S)$, then press Ctrl+Shift+Enter.
 - c) Order is important.
9. Add the final cost allocations to the production department costs.

Matrices are described as having size $r \times c$, where r is the number of rows and c is the number of columns. Make sure to observe matrix multiplication rules, which

require that the number of columns in the first matrix equals the number of rows in the second matrix. The $(I-A)^{-1}$ matrix is a 3×3 matrix with three rows and three

columns, and B is a 3 x 1 matrix with three rows and one column. The multiplication $(I-A)^{-1} \times B = S$ will result in a 3 x 1 matrix: $(3 \times 3)(3 \times 1) = (3 \times 1)$. The multiplication is possible because the middle two numbers are the same. Multiplying $B \times (I-A)^{-1}$ is not possible because the middle two numbers of $(3 \times 1)(3 \times 3)$ are not the same. Order is important!

- The final step is the calculation of the allocated costs. This requires a P matrix (which stands for production) of services provided to the patient care departments by the support departments. Again, creating the P matrix is a simple matter of referencing the appropriate cells in the data section of the spreadsheet. The cell formulas are A24: =D6, A25: =D7, B24: =F6, B25: =F7, C24: =H6, and C25: =H7. Name the matrix P, and then multiply it by S to arrive at the final C matrix of allocated service department costs. Note again that $P \times S = C$ is possible because the middle numbers of $(2 \times 3)(3 \times 1)$ are the same. The resulting dimensions of the C matrix will be $(2 \times 3)(3 \times 1) = (2 \times 1)$. A multiplication of $S \times P$ is not possible because the middle numbers of $(3 \times 1)(2 \times 3)$ are not the same. As before, highlight the cells to receive the results (G24:G25), enter =MMULT(P,S), and press Ctrl+Shift+Enter.

As shown in Table 5, patient rooms receive \$2,330,501 of allocated support department cost, and diagnosis and treatment receives \$969,499. These allocations include consideration for both reciprocal and self-consumed support services.

The bottom section of Table 5 summarizes the costs for the two patient care departments. Included are the costs unique to each department and those allocated from the support areas. This section of the spreadsheet references cells in the data and allocation sections to provide the final cost totals. It also provides a convenient check of the allocation procedure by summing the allocated costs $(\$2,330,501 + \$969,499 = \$3,300,000)$, which should equal the sum of the costs to be allocated $(\$2,000,000 + \$900,000 + \$400,000 = \$3,300,000)$. Also, the total costs of the five departments before the allocation must equal the sum of the costs of the two patient care departments after the allocation $(\$2,000,000 + \$900,000 + \$400,000 + \$5,000,000 + \$9,000,000 = \$17,300,000 = \$7,330,501 + \$9,969,499)$.

Table 6 provides a quick summary of the steps

required to perform a reciprocal method cost allocation using the matrix manipulation capabilities of Microsoft Excel. Although the basic steps will be the same, the specific procedures required to perform the mathematical manipulations may differ with other spreadsheet software. If you are using software other than Microsoft Excel, consult the application manual and/or the help feature.

THREE CHOICES: FROM THE SIMPLE TO THE SUBLIME

The three methods of cost allocation range from the relatively simple to what many would consider quite complex. If simplicity is your goal, then the direct method is your best bet. It is both the simplest to perform and the easiest to explain. If the greatest possible accuracy is required, then use the reciprocal method, although it is somewhat more difficult to perform than the other methods, and it is much harder to explain. The step method offers something of a compromise. It is more accurate than the direct method because it includes partial consideration of reciprocal services. Remember, however, that it ignores self-consumption.

Regardless of the method you select, make sure to choose allocation bases with an eye toward appropriate, accurate, and readily available data. Also, remember to give your spreadsheet a thorough quality check before putting it into production. ■

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