Tilburg University

The missing link in budget models of nonprofit institutions

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Publication date:
1995

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):

Verheyen, P. A. (1995). *The missing link in budget models of nonprofit institutions: Two practical Dutch applications*. (CentER Discussion Paper; Vol. 1995-106). Unknown Publisher.

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Discussion paper

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**THE MISSING LINK IN BUDGET MODELS OF
NONPROFIT INSTITUTIONS; TWO
PRACTICAL DUTCH APPLICATIONS**

By P. Verheyen

November 1995

R34

Nonprofit Organizations
The Netherlands
Budgetting
Health Services
Education

ISSN 0924-7815

The missing link in budget models of nonprofit institutions; two practical Dutch applications.

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Abstract

The Dutch government, health insurance associations, and research boards allocate budgets to nonprofit institutions (hospitals, universities), based on general indicators (inhabitants, admissions, or students). With these budgets, the top management of each institution allocates the funds, using general indicators to distribute the money further down to the base. At the base of the nonprofit institutions, the professionals (agents) perform a spectrum of specific tasks.

Tension around the budgetting process exists between top management and professionals. This paper resolves the tension along the research lines of Burton and Obel (1995) by measuring the specific tasks of the professionals at the base in money terms. The study also develops the missing link in an integral external and internal budget system by integrating the managerial and professional decisions in the budget approach. Finally, practical applications of the model are described at Dutch universities and hospitals.

(nonprofit organizations; budget; professional tasks; health services, education.)

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1 Introduction

During the last decade independent nonprofit institutions have been of growing importance for the western economy, due to decentralization of government tasks, leading both to new institutions and to the greater independence of old institutions, such as universities and hospitals. Until 1980, the latter institutions were financed by cost-based reimbursement systems, resulting in a supply-induced demand. Since that time, other systems have been introduced in various countries, with the common element that the final responsibility for the financial results lies within the institution itself: good examples are the market-oriented Prospective Payment System (PPS) of Medicare in the USA and the budget-oriented system of universities, hospitals, and municipalities in the Netherlands.

I distinguish three main sectors in the total economy, namely the market economy, the government administration and the nonprofit sector (Verheyen 1993). Within the nonprofit sector, the level of services delivered by the independent nonprofit institutions is maximized in quality under the condition of "non-profit and no loss." "These nonprofit organizations comprise a vast and growing sector of the national economy, and are a vital partner, with the government, in the provision of a wide range of social and human services" (Kearns 1994). The sectors in which these institutions are most common – education, research, health care, media, and arts – are vital elements in a modern economy (Hansmann 1986).

This article deals with the relationship between the budget of the nonprofit institution and the internal regulation of its services. Before Section 5 and 6 present the details of the budget-model, Section 2 looks at the essence of the three sectors, and Section 3 describes a few fundamental characteristics of nonprofit institutions. Section 4 introduces the external budget system of the Dutch universities and hospitals. Section 5 roughly explains the new tasks-measuring internal model, and Section 6 describes in detail how prices measure the educational tasks of faculty-members in universities and of patient treatments with "DRGs" in hospitals. In these last two Sections the conclusion will be that the measurement of tasks with prices is the missing link of an integral budget system.

2 Allocation in the three sectors of the economy

Allocation of goods and services in the market sector is directed by the price system. In a pure exchange economy we know that for each pair of products the marginal rate of substitution is equal to both the marginal rate of transformation and to the price rate of the two products. This means that the production of goods is regulated by the prices on the market in such a manner that the producers choose the optimal production levels out of the most efficient technical possibilities, i.e. that production level requiring the lowest costs, and the consumers choose – given the preferences – the optimal baskets of goods. Hence, we get technical and allocative efficiency and thus a Pareto-optimal allocation.

The allocation of goods and services is also evident in the government bureaucracy. As a result of a Parliamentary decision, a budget is allocated to a certain department and next, within the budget, the responsible Minister will decide about the necessary expenditures. According to Weber, all members of the Public Service give their optimal support to render the correct services. Decisions within the Public Service are made by top management, the minister, and executed within the organization itself.

This ideal picture of how goods and services are allocated is lacking in the third sector of the economy. Nonprofit institutions derive their tasks from the task of the government, as these institutions are active in the field of services with a large public good component. The services are appointed to these nonprofit institutions instead of to public production because of the tradition of the institutions or the cost and efficiency advantages.

Parliament will allocate a budget to a nonprofit institution according to the decisions made by the government bureaucracy. We would also see an ideal picture here if the activities within the institution could be judged according to Weber's hierarchical bureaucratic model. However, the particular nature of the institution makes its process of decision-making highly specific, implying that such judgement is impossible. "In contrast to hierarchical public agencies, large nonprofit organizations are frequently more complex and difficult to characterize. Consider, for example, such large nonprofit institutions as universities, hospitals, opera companies and social welfare agencies. The lack of clear lines of hierarchy is especially striking." (James and Rose-Ackerman 1986).

Neither does the market economy concept work in such nonprofit organizations: prices do not regulate the demand because "in the health market (and other markets) consumers delegate health decisions to physicians" or other specialists (Birgaman, Frank, and Billy 1993 and Mirmirani and Spivack 1993).

Hence, other allocation rules must be found for this third sector of an economy (Section 4 etc.). First, however, Section 3 will analyze the main characteristics of nonprofit institutions.

3 The characteristics of independent nonprofit institutions

Nonprofit institutions are characterized by a multilevel decision structure, a principal-agent problem and a high degree of specialization of the professionals at the operational level.

3.1 Multilevel decisions

Many organizations operate with a multilevel decision system, in which general decisions are made at the top and professional work is done at the base. In the relevant O.R. literature, the multilevel hierarchical approach is common. The problem is that "the headquarters of a divisionalized firm must coordinate divisions, and an evaluation and reward system must be designed which induces divisions to participate honestly in the organizational decision-making process" (Jennergren 1980 and Burton and Obel 1995a). This decision structure has been formalized in the following model.

$$\begin{array}{ll}
 \text{maximize} & p_1 x_1 + p_2 x_2 \text{ with respect } x_1, x_2 \\
 \text{subject to} & A_1 x_1 + A_2 x_2 \leq a \\
 & Q_1 x_1 \leq q_1 \\
 & Q_2 x_2 \leq q_2 \\
 & x_1 \geq 0 \\
 & x_2 \geq 0
 \end{array}$$

where x_1, x_2 = output of departments 1 and 2;

p_1, p_2 = price of output of departments 1 and 2;

A_i = matrices of technology of common resources

Q_i = matrices of divisional technology

a, q_i = constrained inputs such as manpower, money, capacity etc.

The model represents an overall planning problem in a divisionalized organization. The

inequalities $A_1x_1 + A_2x_2 \leq a$ and $Q_ix_i \leq q_i$ represent the overall and divisional constraints of the organization; $Q_ix_i \leq q_i$ is associated with the decentralized department i and $A_1x_1 + A_2x_2 \leq a$ reflects the interdependencies between the units. Furthermore, a central unit exists at the top level of the organization, which is aware of these interdependencies but has incomplete information about the divisional technology, i.e. the specialization of the professionals (A_i, Q_i) and the two constraints (q_i). Therefore, top management must implement a planning procedure in order to gather information (Meijboom 1987) to make "the critical decision of the actual allocation of the common resources" (a) (Burton and Obel 1995a).

In fact, it is possible to solve this planning problem in three ways (Obel 1981):

- * use market prices: the departments sell the products (x_i) on the market at price p_i and buy their resources a_j from the top of the organization at a price π_j per unit. In this approach, the nonprofit economy operates as a market economy with the cash in cash out equality $\sum x_i p_i = \sum a_j \pi_j$;

- * use central planning: this approach formulates a pure mathematical optimization problem, in which a decisionmaker at the top with unlimited knowledge and computation ability is assumed to make decisions by maximizing a well-defined objective function. Mathematically speaking, the decisionmaker solves the total model. In my three-sector economy, the nonprofit organization would then act as a central bureaucratic organization;

- * use budgeting: the available common resources (a_j) are allocated to the units. In mathematical terms, top management solves: $A_1x_1 \leq a_1, A_2x_2 \leq a_2$ with $a_1 + a_2 = a$, and the professional groups of the nonprofit units themselves maximize the sub-problems within their budget a_j .

The advantages and the disadvantages of the three representations are well known. Using market prices leads to higher efficiency, but, due to (local) monopolies, also to higher prices and to indirect external effects. In the governmental bureaucracy the central planning department can weigh the importance of the different alternatives, but lacks the knowledge of the local technologies (A_i and Q_i), and the lower levels have an incentive to cheat (Jennergren 1980). The nonprofit institutions with their own budgets can take into account both economic and other goals (health care, education, etc.), but their departments will maximize the budgets and minimize their efforts, e.g. by directing a budget-intensive patient into another hospital.

3.2 The tension in the principal-agent approach

The relationship between the top level of such nonprofit organizations as (hospitals) and the professionals at the base level (medical specialists, physicians or nurses) is a principal-agent relation. The head of the organization (the principal, the manager) makes decisions about the means, such as the financial budget, the buildings, and the research possibilities. The professional, the agent, accentuating his professional possibilities, performs some tasks and decides how to cope with the goals of the principal. Because of his contribution to the goal of the organization, the agent can apply a lot of pressure. The principal cannot observe the effort level of the agent; the agent can therefore claim that (potentially) resulting high costs were due to the bad state of the world (e.g., the specific illness of a patient) instead of to a too-high amount of professional work. This is the essence of the standard moral hazard idea (Jennergren 1980). The observable result x depends both on the effort of the agent (e) and the state of nature (Φ), so $x = f(e, \Phi)$, where both e and Φ are not observable. The agent can now undertake certain actions that affect the principal's valuation in situations in which the principal cannot monitor him perfectly. In terms of the decomposition model of subsection 3.1: the headquarters have no insight into the local technologies A_i and Q_i , and the local authority, the agent, has an incentive to cheat because of his professional overorientation. In this way information asymmetry causes allocative inefficiencies (Rose-Ackerman 1986). Ben-Ner (1986) and Hammack and Young (1993) consider another aspect of this asymmetric information set-up in nonprofit institutions: when sellers know more about the quality and quantity of the goods than the buyers do, this can cause departures from social optimality in competitive markets. Hence, one of the main reasons for the existence of nonprofit organizations is that they are less likely than are the for-profit organizations to take advantage of consumer ignorance in cases of asymmetric information.

3.3 The professionals at the base

The services delivered by various nonprofit institutions are provided by professionals at the base of these organizations. The main task of these institutions (such as hospitals, universities, and museums) lies in providing specialized services. The objectives of these professionals are, however, also based on their professional status: judgements of colleagues and professional status are essential in their functioning and a maximum turnover or profit is not their main aim. They mainly consider themselves be part of the

international professional group, rather than merely part of their own organization. In view of their professional attitude and expertise this group of professionals must maintain a certain autonomy in order to be able to deliver a high quality of services. Hence, the administration and top management are not in a position to pass judgement about professional ability and to react to the professional "rationality". The result is that the problems of multilevel decisions making and the principal-agent problem, as described before, are typical for many nonprofit institutions. These elements should thus be taken into account when designing their decision structure, "since for principal-agent relationship the top- and the base-level constitute separate decision centres" (Schneeweiss 1995). To summarize, the central issue is that different types of organizations, such as universities and hospitals, are managed by relative outsiders, compared to the professional qualities of the people working at the base of these institutes. This implies that top-management must motivate the professionals at the base without monitoring them excessively (if that would be possible at all!).

4 Two practical cases

Before developing the link between the internal budget- and performance model, as a solution of the problem described above with practical application in universities and hospitals in the Netherlands, I will first describe the external budget model of these Dutch institutions.

4.1 Universities

Universities in the Netherlands receive 90% of their funds directly or indirectly from the government by a budget system. University budgets are based on a funding formula with several parameters, but the funds themselves are allocated to the universities as a single block-budget, a so-called lump-sum.

The determining parameters are the following:

- * the number of first-, second-, third-, and fourth-year students, plus the number of the assigned diplomas for undergraduates, multiplied by a standard price. There are two standard prices: a lower one (Dfl. 5,000) for students of the humanities and social sciences, and a higher price (Dfl. 7,500) for students of sciences, medicine, and engineering;
- * a plus factor for education-related research: 13% of the total amount, mentioned before;
- * fees for Ph.D. theses of Dfl. 60,000 or Dfl. 120,000 per thesis in humanities and social

sciences, and in sciences, medicine and engineering, respectively;

* the regular research budget, the most substantial part of the total budget, which is based on historical budgets.

Universities also have their own revenues (such as tuition fees and interest).

Consider as an example table 1.

TABLE 1. THE BUDGET OF TILBURG UNIVERSITY

PARAMETER	RATE	SCORE	BUDGET (IN Dfl. 1,000)
students and diplomas	Dfl. 5,000	6,980 students	34,900
related research	13%	Dfl. 34,900	4,500
fees for Ph.D. theses	Dfl. 60,000	40 theses	2,400
regular research			39,200
tuition fees	Dfl. 2,000	8,500 students	17,000
interest and other revenues			3,000
total budget			101,000

The allocation of the budget to the universities is only one side of the system, namely the side of the financial means. The other one is the output side: what is the output of the universities, i.e. what is their quantity and quality of education and research? The Association of Universities in The Netherlands presents this side of the system as follows (Protocol 1994):

In the second half of the 1980s the Dutch universities

- a) set up an assessment system for research, and
- b) developed an education program review system

With regard to a), the assessments take place at the aggregate level of the research programs. Faculties submit a description of the results that have been achieved per research program during the previous five years. At the same time, they submit a short outline of the "mission" of every research program and developments, anticipated in the light of their research profile. This outline, together with certain quantitative data about time spent by personnel, five key publications, and a total list of publications, forms the basic material on which the review committees form their first impression. After interviews and site visits, the committees independently assess each program, assigning at a single score on a five-point scale covering the scientific quality, the scientific productivity, the scientific and, where appropriate, the societal technological relevance, and the long-term viability. The outline of this system of quality care in university research is described

in "Protocol 1994, Quality Assessment of Research of the Association of Universities in the Netherlands (VSNU)".

With regards to b), the system of periodic education program reviews has meanwhile become a routine matter. The universities have built up extensive experience in this respect since 1988. On the basis of faculty-based self studies and two-day site visits, committees of experts assess the educational situation in a certain discipline with emphasis on the quality improvement processes.

With regards to a) and b), this responsibility for quality care in education and research is anchored in the Law of Higher Education and Scientific Research (WHW, 1.18). The board of the institution undertakes actions to ensure that, as far as possible in cooperation with other institutions, provision is made for regular evaluation, through independent experts, of the quality of the activities of the institution. Because this evaluation is done by independent experts, the results are published. This article forms the basis of the quality care system for education and for research (Protocol, 1994).

Top management of Tilburg University allocates its budget of Dfl. 101 million via its faculties downwards to the scientific groups, the departments. The starting point here is that this allocation mechanism is as much as possible parallel to the external system, not only with the intention to keep a closed budget, but also to stimulate the professionals to increase the total external budget. In this way professionals are stimulated to cooperate within the total goal of the university, since the incentives of the budget allocation mechanism of the departments are equal to the external parameters.

To explain this idea in more detail, I will continue using the example of Tilburg University by looking at the budget of the specific department of econometrics in table 2.

TABLE 2. THE BUDGET OF THE DEPARTMENT OF ECONOMETRICS.

PARAMETER	RATE	SCORE	BUDGET (IN Dfl. 1,000)
education: fixed amount			500
related to students	Dfl. 2,000	300 students	600
related to diplomas	Dfl. 5,000	60 dipl.	300
related research	13%	Dfl. 1,400	182
fees for Ph.D. theses	Dfl. 45,000	9 theses	405
regular research	Dfl. 113,000	10 persons	1,130
other internal funds			<u>583</u>
total internal funds			3,700
external funds			300
total budget			4,000

Now, notice five differences between the budget of the university and the figures of the department:

- some rates are lower as a result of deductions, because of partial allocation of budget to the central services such as administration, energy department;
- the educational budget is based on a fixed amount per semester-course and has, by the difference in the rate of students and diplomas, an incentive for output efficiency;
- the budget "regular research" is not based on general keys, but is specifically allocated to longer-term research programs for five-year periods;
- "other internal funds" refer to incentives given to undertake specific activities, e.g., to attract external scholarships for Ph.D. students;
- the external funds are received out of applied research activities.

4.2 Hospitals

The budgets of Dutch hospitals depend on three budget components (Maarse 1993): an availability component (the inhabitants of the clinical catchment area of the hospital), a capacity component (number of authorized beds and medical specialist units), and a production component (agreed-upon number of hospital admissions, patient days, out-patient visits, and day-care visits). Maarse (1993) gives an example in table 3.

TABLE 3. THE BUDGET OF A SPECIFIC DUTCH HOSPITAL

PARAMETER	RATE (IN Dfl.)	SCORE	BUDGET (IN Dfl. 1,000)
catchment areas	130	78,000	10,140
beds	11,000	350	350
specialist units	350,000	35	12,250
admissions	900	7,500	6,750
patient days	45	89,500	4,028
outpatient visits	115	28,000	3,220
day-care visits	115	3,500	402
total budget			40,640

Hence, the total budget is based on general indicators and is available to the institution as a lump-sum budget. If the total expenditures of a hospital exceed its budget, expenditure cuts in subsequent years must compensate for these negative results, because of the limits of the total national budget. The institutions have a high level of autonomy in allocating this budget to their departments.

For measuring the performance, the hospitals (as do the universities also) developed their own quality-control system, which is founded in legislation. One law (Tweede Kamer 21678) contains the rules of quality assessment of the institutions of health research, which are similar to the rules of the universities. The other law (Tweede Kamer 23633) is the law of quality of health care institutions. Because of the decentralization of the governmental decisions and the institutions' own responsibility, the main rule of the law is that "the health institutions offer correct care and cure." The inspector of health care of the Ministry of Health reports every year to the Minister. This report is based on information that every hospital is obliged to send to the inspector. The inspector also visits each year every hospital. The law contains specific articles about the intervention in case of mismanagement. The Dutch hospitals are now together active to formulate rules of quality assessment.

The budget of the hospital above (table 3) of Dfl. 40,64 million is allocated to its departments. Here, the availability component (not influenced by actions of the hospital) is used for the general service departments (25% of the budget). The capacity and production components are passed on to the direct patient-care related departments to give them the incentives to increase the budget of the hospital. The patient-care related

departments, in turn, pay the services of the indirect patient-care related departments (such as laboratory, pharmacy, ECG, etc) at prices based on the internal costs of these departments. Long-term appointments are made for the deliveries of these services.

Note that the incentives work: professionals and administration cooperate in increasing the parameters of the external budget, as indicated in Maarse (1993): "the growth of the outpatient visits (1982:100, 1990:600) and of the day-care visits (1982:100, 1990:340) is effectuated by new developments in medical diagnostics and treatments, but also by the introduction of hospital budgeting in 1983, which gave hospitals an incentive to expand outpatient care and day care."

5 Measurement of internal performance

Thus far I have analyzed the budgets of institutions and their departments, in combination with their performance. This can be summarized using figure 1.

FIGURE 1 The relation between budgets and tasks

The main question is now how to measure the tasks within an organization.

These tasks are executed in universities as well as in hospitals by the professionals operating at the base. Hence, a model must be developed to link these professional tasks to the financial income.

Holmstrom (1982) develops some rules for measuring the production in such a set-up: in situations with production as a collective activity, aggregate measures may often provide

sufficient information about common uncertainties and, as a consequence, procedures that compare different teams of professionals with such aggregate measures, will be efficient. Since the work of the professionals in hospitals and universities mainly consists of group work, this link of budget and tasks can best be laid at the level of a department: the professional group itself. Top management, thus, contracts the group for performance-evaluation (Kaplan and Atkinson 1989). After each budget year, management can determine whether the group has achieved the given tasks.

As can be seen in the practical applications, by predetermining the tasks of the team "we internalize the professional standards of performance. The group, the people who work in it, take professional responsibility for identifying and interpreting standards of acceptable practice" (Kearn 1994).

Review of the principal-agent problem, introduced in Section 3, makes the problem for a nonprofit institution clear: the group of professionals has at its disposal detailed knowledge and skills and can, therefore, cheat because of imperfect monitoring by the top of the institution (e.g. the professionals could refer to complicated diseases, fast developments of science, unmotivated students, etc.). For example, in universities the professional group can put in a smaller educating effort than the budget prescribes. The group can achieve this by offering fewer subjects (little differentiation in the curriculum) or by presenting all teaching duties in mass lectures (no study groups, fewer papers per student). In this way it is possible to use more manpower for research, meaning that the group will be able to perform better in this field, which is an advantage in the open competition for new research positions. Therefore, the professionals could benefit from the nonprofit situation by choosing a research task instead of an educational task. The result is that the advantages will be gained by the professionals of the institutions and that the budgets will not be used for their corresponding tasks (Herzlinger and Krasker 1987). These are the so-called "slack budgets": subordinates may build slacks into budgets by strategies that understate revenues and overstate costs (Dunk 1993). To prevent the educational effort of the group from being too low in this sense, educational tasks have to be measured.

In the next section, and Section 7 and we will show such a measurement system, used in Dutch universities and hospitals, will consider the consequences of too-low performance.

6 Professional tasks, measured in the Dutch practice

6.1 Universities

So far, we have described the way in which the department, i.e. the professional group, receives its money. However the tasks of this group should also be formulated. Because of the lack of monitoring, these tasks are measured in general terms, and should not be based on very detailed individual tasks, such as "giving lectures in Management Science" or "the examination of student Smith," "because the information must be condensed as it moves up the hierarchy, given the limited information-processing capacity and non-professional orientation of top management." (Sabatier, Loomis and McCarthy 1995). In general, educational work at a university consists of several hours of lecturing, supervision of paper writing, and provision of assistance during periods of traineeship and thesis writing. The model used by the Faculty of Economics at Tilburg University for measuring the educational tasks is based on these work elements. It proceeds as follows.

Educational tasks of a professional group = $\{[\text{number of lecture hours} \times 0_i + \text{number of students} \times 1.5 + \text{number of trainees} \times 68 + \text{number of papers} \times 15] : 1200\} \times \text{GPL}$

Explanation:

$0_i (i = 1, 2)$ = time factor for teaching hours, with:

0_1 = factor for the first lecture = 5.5; that is, 1 lecture hour + 4.5 hours of preparation;

0_2 = factor for parallel lectures = 3.25; that is, 1 lecture hour + $\frac{1}{2} \times 4.5$ (half the preparation time);

1.5 = assigned hours for (re)exams, corrections, and consultation time;

68 = hours for provision of assistance during traineeships;

15 = hours for supervising the writing of a paper;

1200 = average number of teaching hours for all faculty members per year (after subtracting 600 hours for research and administration);

GPL = average personnel costs of faculty members per year.

Example: a one-semester lecture (2 hours, 13 weeks) with 100 students:

$$2 \times 13 \times 5,5 = 143 \text{ hours}$$

$$100 \times 1,5 = \underline{150} \text{ hours}$$

$$\text{total} \quad \quad 293 \text{ hours}$$

$293 : 1200 = 0.24 \text{ fte (full time equivalents); in money terms } 0.24 \times \text{Dfl. } 105,000 =$

Dfl. 25,200,-.

6.2 Hospitals

As described in 4.2, the direct-patient care-related departments receive a budget, based on capacity and production components of the hospital, and they pay the indirect departments by transfer prices. The tasks of the care-related departments have to be measured in such a way (because of the monitoring problem) that they become clear enough for the specialists to identify the diseases and their treatments, and, in addition, general enough for management to distinguish a certain group of treatments and the demand for the required products from the supporting department (Groot 1987; Kumar, Ow, and Prietula 1993).

The so-called DRG-system, developed by Fetter (1981; also Fetter, Averill, Lichtenstein, and Freeman 1984) makes this possible. Fetter (1991) states: "Diagnosis-Related Groups (DRGs), originally developed to provide product definitions for the output of hospitals, can serve as a basis for budgeting, cost control and quality control in hospitals." DRGs start to group patient-treatments in diagnostic groups (e.g., ear, nose and throat complaints put together in the same group) and next divide these groups into subgroups with relatively homogeneous resource use. "DRGs are distinguished based on whether or not a surgical procedure is performed, on principal diagnosis, on complications and on comorbidity, on discharge status, and (until recently) on age" (Shwartz and Lenard 1994). Multiplication of the required products in each subgroup (average units per patient) with the transfer price (in Dfl.) of these products next determines the unit costs for a certain DRG. Examples are shown in table 4 (Verheyen and Nederstigt 1992):

TABLE 4. PROFILES OF THREE DRGs

	mastoidectomy (59 patients)		sinus procedures (85 patients)		laryngoscopy (141 patients)	
	unit	price	unit	price	unit	price
ECG,EKG,audiogram	0.34	10	0.46	12	0.70	20
diagnostic endoscopy					0.01	1
phys. function test	0.05	2	0.07	2	0.03	1
clinical chemistry	4.51	44	3.85	33	3.66	35
haematology	0.68	9	0.21	3	0.13	1
microbiology	1.17	15	0.19	4		
toxicology					0.01	1
pathology	0.12	5	0.59	28	0.66	32
radiography	0.43	32	0.96	59	0.60	33
contrast-radiography	0.03	2			0.08	6
CAT			0.06	22	0.11	30
OR	1.31	1038	1.20	565	1.07	353
pharmacy	19.90	101	12.62	58	4.70	23
ER	0.052	3			0.02	1
surgical supplies	0.03	1				
respiration	0.02	11				
patient days	10.61	2035	6.87	1318	2.74	527
total		3308		2204		1064

Remark 1. In the USA the basis for external budgeting is a patient's DRG. This system involves maximization of output (Shwartz and Lenard 1994, Maarse et.al. 1993). Here, however, we opt for global external budgeting with a predetermined annual lump sum and we use DRGs only for measuring internal tasks.

Remark 2. In table 4 the transfer prices of the DRGs are determined by the unit costs of the required products. In an extended Dutch research-project, these products are combined in packages (e.g., treatment, one patient day, one outpatient visit, etc.) and, hence, the total cost of a DRG can be given in package-costs. This is preferable, because these packages are more appealing than are the separate products to the physicians.

7 The link between budget and tasks

The results of Section 6 reveal that we are in fact dealing with a price system, which can be formulated as follows: first, the various detailed tasks at the base of the non-profit organization (e.g., the lectures in Management Science or the treatment of specific patient Smith) are transformed to a generally formulated task (a lecture or a DRG) and second, for this task a price is determined. Thus, all tasks of a professional group can be summarized in one figure: their value in money terms. If the value of the professional tasks is less than the amount budgeted, then the tasks have to be extended. Consider the following example.

Example:

For the department of Fiscal Economy of Tilburg University the following data are available (in Dfl. 1,000):

	1994	1995	1996	1997
budget	534	562	558	547
total value of tasks	341	336	323	314

Hence, there is a persisting surplus of about Dfl. 200,000. Apparently, the number of the lectures of the department is too low in comparison with the allocated budget and the dean of the faculty will now order an extension of the program to attain a closer correspondence between budget and tasks. Therefore, the group proposes intensifying the instruction classes in fiscal subjects and introducing some extra lectures in business economics, especially for fiscal students (see "Besluit van de Faculteit FR 94.017").

The starting point of this model is that the budget of a specific department is derived from the total budget of the university in exactly the same way as this total amount is determined. Therefore, this departmental budget is given. Within this fixed budget of the department the faculty maximizes the quality of services by maximizing the educational support. If the value of the executed tasks is too low, the program has to be intensified. If, on the other hand, the tasks are too extensive in relation to the budget, the dean will order some parts of the program deleted. The top of the organization will delegate this deletion process to the professional group itself "since we can assume that the central unit is not interested in the detailed actions of each division but rather in aggregate performance" (Jornsten and Leisten 1994). Hence, this system makes it possible to express the concrete tasks of the base in terms of money and on the faculty level in

order to compare them with the given budget. The global standards of the budget model and the concrete tasks will now be balanced. If the faculty decreases the budget, the department is supposed to ask: which tasks must be deleted now? It goes without saying that the professionals themselves will be called in to assist in choosing the elements that are to be deleted.

Analogously, the global budget of the hospital will be compared with the DRGs, which are also expressed in money. In comparison with the other departments, a certain department may now appear underloaded or another department may offer so few services that it can render more.

8 Conclusion

In the literature of budget models we can distinguish the macroeconomic orientation of the national budget (see for instance the references in Evans 1989) and the microeconomic approach of institutions (see references in Fetter 1991). In practice, we lack the bridge between the two approaches. The top of the nonprofit organization has to grapple with the problem of allocating scarce resources. These resources are allocated mainly on the basis of general indicators, without measurement of performance.

This article analyzed the multilevel decision structure, as it explicitly prevails in nonprofit institutions. The friction between the total external budget, based on general indicators, and the specific tasks at the basis of the institutions can be removed by decentralizing the total budget to the groups of professionals, and by combining this with a system of prices for the professional tasks. The practical experience with the allocation system of Dutch universities and hospitals supports the theoretical arguments: research groups and departments can at the same time manage this decentralized budget and take responsibility for their tasks. Consequently, this budget/price approach promotes the quality of the nonprofit organization. The approach combines an external financial system with an internal allocation approach, or pairs centralized funding with decentralized services, or a managerial and professional approach in one system. Also, we combine the budget decision of top management and the professional decisions of the base. In a price-based reimbursement system "money follows the output (tasks) of professionals", in a pure budget system "output follows the money of management" and in a budget/price approach, both, top management and professionals work together with one goal: the core process of the non profit organization i.e. care of cure of patients or education of students.

Acknowledgements

The author has benefitted from comments of colleagues of management science (Bert Meijboom), of management of universities (Ruud de Moor, Jef van de Riet, Frida van de Maagdenberg), of hospitals (Guus van Montfort, Locks van der Veen, Jos van Aert), and of the "anonymous" referee of CentER Henk Oosterhout and also from discussions during conferences in Berlin (DGOR 1994) and Singapore (panel by Adolf Stefan, INFORMS 1995).

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