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Source: *Social Research*, Vol. 68, No. 2, Numbers (SUMMER 2001), pp. 379-396
Published by: The New School
Stable URL: http://www.jstor.org/stable/40971463
Accessed: 01/10/2013 07:55



# Governing by Numbers: Why Calculative Practices Matter

BY PETER MILLER

SOCIOLOGISTS are busy rediscovering the economy (Callon, 1998; Fligstein, 1990; Granovetter, 1985). The roles of networks that connect and form agents figure large in this revival of interest in the market as a social institution (Callon, 1998: 8). Until recently, however, little attention has been devoted in the sociological literature to the calculative practices that make the economy visible and measurable qua economy (Callon, 1998; Hopwood and Miller, 1994; Miller, 1998). In particular, the emergence and roles of the calculative practices of accounting have been overlooked or marginalized in the sociological literature. This paper calls for greater attention to these practices, and argues that it is important to examine their emergence, and the ways in which new calculative practices alter the capacities of agents, organizations, and the connections among them. It also examines how they alter the power relations that they shape and are embedded within, and how particular calculative practices enable new ways of acting upon and influencing the actions of individuals. Calculative practices, in other words, should be analyzed as "technologies of government" (Rose and Miller, 1992: 183)—as the mechanisms through which programs of government are articulated and made operable. Rather than focusing on the ways in which the economy is shaped by economics, attention is directed at the ways in which accounting shapes social and economic relations.

**SOCIAL RESEARCH, Vol. 68, No. 2 (Summer 2001)**

The concern here is not with the whole of accounting, but with that less visible aspect that is labeled managerial or cost accounting in Anglo-American contexts. This includes a variety of techniques for calculating costs, identifying deviations from standards, producing budgets and comparing these with the actual results attained, calculating rates of return for investments, setting transfer prices for intrafirm transactions, and much else besides. As a set of calculative practices, management accounting is a practice deployed not just in manufacturing and service industries, but also in areas as diverse as health, education, and social services. Management accounting today appears to offer a universal set of tools with which to manage an organization as an enterprise, and to act upon individuals and subunits as standardized entities for producing specified rates of return.

As a technology of government, one of the principal achievements of management accounting is to link together responsibility and calculation: to create the responsible and calculating individual. In its concern with individualizing performance, through its attempts to induce individuals to think of themselves as calculating selves, and through its endeavors to enroll individuals in the pursuit of prescribed and often standardized targets, accounting has become a body of expertise focused on exacting responsibility from individuals rendered calculable and comparable. Management accounting seeks to affect the conduct of individuals in such a way that they act freely, yet in accordance with specified economic norms. As a technology of power, management accounting is thus a mode of action that does not act directly and immediately on others. Instead, it acts upon the actions of others, and presupposes the freedom to act in one way or another. The agent who is acted upon thus remains an agent faced with a whole field of possible responses and reactions. Rather than tell individual managers which investments to choose, why not specify a percentage return to be earned on all investments and leave managers "free" to make the decisions as to which investments to choose? A similar attitude holds for budgets.

Rather than confront individuals daily over the allocation of resources, why not provide funds to an individual who will have both the responsibility and the freedom to spend the money as they see fit? Why not, in other words, seek to produce an individual who comes to act as a self-regulating calculating person, albeit one located within asymmetrical networks of influence and control? And why not generalize this technology of government to as many spheres of social life as possible? Not only can the manager of a global corporation be governed in this manner, but so too can a doctor, a schoolteacher, or a social worker.

The image of accounting as a purely technical practice is thus displaced by an image of calculative practices as a key resource for a certain "liberal" form of government. Accounting helps to fabricate and extend practices of individualization and responsibility, and it also serves to establish a mutuality or reciprocity between forms of personal identity and the realm of economic calculation. The calculative practices of accounting thus help to create the calculating self as a resource and an end to be striven for. No longer an abstract entity entrapped within economic theory, the rationally calculating self is made operable by the mundane routines and practices of management accounting. To modify a phrase of Hirschman's (1977), management accounting provides a way of "harnessing the interests" of individuals, of utilizing their autonomy rather than seeking to suppress it. And, most important, this can now be achieved within the formally private domain of the large corporation as well as a range of not-for-profit organizations. The management of almost any organization can be transformed into a complex of incessant calculations. The political and the economic imperatives of liberalism are satisfied simultaneously.

The calculative practices of accountancy have one defining feature that sets them apart from other forms of quantification: their ability to translate diverse and complex processes into a *single financial figure.* Whether the processes are automobile manufacture, the assembly of electrical goods, or the administration of

health care, management accounting can reduce them to a single figure, thus making comparable activities and processes whose physical characteristics and geographical location are widely dispersed. The labor efficiency variance, the return on investment of a division, and the net present value of an investment opportunity all share this elegance of the single figure. The objectivity and neutrality widely accorded to numbers achieves its most developed form (Porter, 1995). The single figure provided by the calculative practices of accounting appears to be set apart from political interests and disputes, above the world of intrigue, and beyond debate. Of course, this is not to say that the single figure provided by diverse calculating machines answers the specifics of the problems it is called on to solve, or that it is always or even typically up to the task. But what is counted usually counts. The avalanche of numbers produced by management accounting links agents and activities into a functioning calculative network.

Sociology's neglect of the calculative practices of accounting is curious in view of its centrality to the sociological enterprise at its outset.[1] It is as if sociologists have been put off by a territory populated by apparently complex techniques; as if they have been too accepting of the view that these are neutral techniques and thus of little sociological significance; as if they have been more generally reluctant to enter the inner sanctum of the capitalist economy. Weber placed accounting at the heart of "rational" capitalistic economic activity. He argued that

> the modern rational organization of the capitalistic enterprise would not have been possible without two other important factors in its development: the separation of business from the household, which completely dominates modern economic life, and closely connected with it, rational book-keeping (Weber, 1992 [1930]: 21-22).

To the extent that Weber's overriding concern was with the multidimensional rationalization of the conduct of life, or *Lebensfuhrung*, accounting in the sense of both budgetary management

and capital accounting was central to the spread of the "specifically modern calculating attitude" (Weber, 1978 [1956]: 86). If one pairs Weber's concerns with the stronger formulations of Sombart (1979 [1919]), according to whom double entry bookkeeping gave rise to capitalism, then one sees at least the rudiments of a sociology of calculative practices. Rather than relegating accounting to a subordinate and reflective role in economic processes, it becomes a constitutive and formative part of them, a legitimate object of investigation in its own right.

Marx also drew attention to the role of bookkeeping in the development of capitalism. In his ironic description of the activities of Robinson Crusoe on his desert island, he commented on Crusoe's need to divide his time between different activities:

> This our friend Robinson soon learns by experience, and having rescued a watch, ledger, and pen and ink from the wreck, commences, like a true-born Briton, to keep a set of books (Marx, 1974 [1887]: 81).

These pronouncements at the beginning of the sociological endeavor were followed by virtual silence on the part of sociologists for approximately half a century. It was not until the 1950s that a sociological interest in accounting resurfaced, at which point the focus was particularly on the group and its dynamics (Argyris, 1952; Dalton, 1959; Whyte, 1955). And when "behavioral accounting" developed in the 1960s, and specialist journals examining accounting in its social context began in the mid-1970s, this took place largely outside the discipline and institutions of sociology.[2] A sociology of calculative practices was begun, or re-commenced, by those academics who were closer to the practices, although they drew in a variety of different ways from the available sociological toolkit.[3]

To illustrate what is meant by a sociology of calculative practices, and how this might be conducted for those practices that go under the label of management accounting, two examples will suffice. The first will examine the emergence of standard costing

in the early decades of the twentieth century. The second will address the introduction into accounting during the interwar and post-World War II years of net present value techniques for evaluating investment decisions.

## *A Standardizing Ambition*

An early and decisive moment in the formation of that set of practices that now goes under the name of management accounting was the reformulation of cost accountancy in the first three decades of the twentieth century. Across these years, the vocabulary and techniques of cost accounting changed fundamentally. The notion of a "standard cost," which meant a cost determined in advance and against which "normal" or "actual" costs could be compared, was central to this transformation. Along with the related techniques of variance analysis and budgetary control, standard costing made it possible to apply an economic norm to every individual within the firm. Standard costing made it possible to specify in advance the normal or average cost of a particular operation, and to calculate how far actual costs had departed from this "standard cost." Variance analysis is the term that came to be applied to the various calculations that would enable one to say how and why there had been departures from the predetermined standards.

At the heart of standard costing was the ambition to shape the future. The actions of individuals, and the costs of those actions, were to be subject to a type and level of scrutiny previously unavailable. Cost accounting existed long before 1900, but before then it had only been possible to ascertain costs *after* they were incurred. With standard costing it became possible to predetermine costs by setting standards for the accomplishment of specified tasks. Standard costing supplemented the traditional concerns of accounting with the fidelity or honesty of the person (and with an eye toward making the individual governable by

reference to prescribed norms of performance). It made it possible to calculate and analyze variances of actual from standard costs. As one of the principal exponents of standard costing expressed it, instead of leaving the "average man" to the mercy of his own inclinations, "we have set before him carefully determined standards of accomplishment rendered possible by standardization of conditions, and have given him scientific training supplemented by an efficiency reward" (Harrison, 1930: 27-8). The calculative practice of standard costing made it possible to govern the future actions of the individual according to prescribed standards and deviation from an economic norm. Efficiency was now individualized.

The standardizing ambition in the costing literature, and its interest in governing the actions and outputs of individuals, was linked to other complementary initiatives. It owed much to the "scientific management" movement that originated in the United States. Taylor's writings (1913) contained many of the elements of what would later become standard costing. These, combined with the costing framework elaborated by Emerson (1919), an American efficiency engineer, helped shape subsequent formulations of a fully integrated standard costing and budgeting system. Together, these related initiatives sought to attack what were seen as the vast and largely invisible wastes that inhered in the daily actions of every individual. By making these wastes visible, and by giving them a financial form, engineers and accountants could collaborate in the common goal of detecting, measuring, analyzing, and removing inefficiencies. Standard costing made the engineering concept of scientific management visible and calculable in financial terms.

The calculation and predetermination of costs not only provides a mechanism through which the achievements of individuals may be compared with norms or standards. The calculation of costs is closely linked to the development and spread of a vocabulary of costs and costliness. This vocabulary helps to establish as legitimate and self-evident the importance of knowing and calcu-

lating the costs of activities and individuals. This in turn fuels the call for further calculations. The costly should be compared with the less costly, and product costs should be known more accurately (Hopwood, 1987). The vocabulary of costs can operate as an organizing rationale around which debates can take place concerning individual product lines, organizational strategies, or the future of services such as education and health care.

In the United Kingdom, an increasing preoccupation with the calculative practice of costing developed during World War I out of the government's attempts to control prices and profits (Loft, 1986). Because of the difficulties in determining a "fair market price" for many of the items required for the war, in early 1916 a new clause concerning price was added to the Defense of the Realm Act. This clause stipulated that in determining the price to be paid, "regard need not be had to the market price, but shall be had to the *cost* of production of the output so requisitioned and to the rate of profit usually earned in respect to the output of such factory or workshop before the war" (quoted in Lloyd, 1924: 58; emphasis added). A general clause bestowed the power to examine manufacturers' figures. Three basic methods could be used to verify and ascertain costs: technical costing (the estimation of costs by engineering experts); accountancy costing (which entailed ascertaining a contractor's actual cost of production by examining his books); and finally, use of the cost returns from national factories where similar articles were being produced. The last of these methods was widely used in an attempt to reduce the prices paid for munitions, drawing upon often sophisticated costing systems in place in the national factories.

The World War I experience thus expanded the calculable domain within the enterprise and endowed accountancy with a much broader legitimacy. As this expansion occurred, the calculative practices of accountancy moved up the organizational hierarchy and helped to transform the figure of the manager. Now it was not only possible to calculate the performance of workers; the activities of managers could also be subjected to the scrutiny of

accountancy. And this was to take place in the name of acting upon the manager as a very particular type of person. Accounting was to take as its object the person of bounded rationality, a figure given clearest expression in the writings of Chester Barnard (1938). Seeking to install responsibility and to remedy deficiencies in rationality on the part of the manager, accounting would help transform the individual manager into a "decision maker" and in the process constitute management as a body of expertise defined essentially by this activity. With the subsequent development of such techniques as return on investment, the linking of managing and calculating was strengthened to the point where they have become almost indissociable.

As accounting has moved up the corporate hierarchy, the enterprise has increasingly come to be known through the calculative practices that have made it measurable and visible. Executive compensation plans, based on accountancy's ideal of summarizing the individual in a single financial figure, make possible comparisons with an economic norm. The manager can be represented as an object, evaluated and acted upon by others as a result of the visibility, calculability, and comparability that accounting provides. And the actions of managers can be linked with the calculations of others, whether these are financial analysts seeking to advise on optimal investment strategies for their clients, governments concerned with national economic performance, or boards of management keen to weed out loss-making divisions of an enterprise and those managers who do not deliver the economic returns sought.

### *Discounting the Future*

If the actions of workers can be made calculable and governed according to an economic norm embedded in a standard cost, so too should it be possible to achieve something similar with respect to the actions of managers, and their investment decisions in par-

ticular. Where subjectivity and intuition once reigned, the calculative practices of accounting were to impose objectivity and neutrality. Such was the way in which the debate concerning the use of net present value calculations in investment evaluation came to be posed.[4]

In the 1930s in the United Kingdom, a calculative practice hitherto not part of the repertoire of accountants was urged upon them. The notion of the time value of money (the idea that a given sum of money is worth more today than at some point in the future) was held to be a decisive and neglected aspect of investment decisions. Methods such as payback, which consisted simply in counting the number of years over which the original investment would be paid back, were held to be crude and inaccurate since they ignored the time at which future returns would occur. Discounting methods, it was argued, would bring science and objectivity into the investment process by demonstrating that a specified amount of revenue generated at the end of year one was worth more than an equivalent amount generated at the end of year two. As one of the key proponents of discounted cash flow argued in the late 1930s, "the influence of time must be eliminated and this is effected by discounting all receipts to their worth at a given date, say the date of the investment" (Edwards, 1938: 14).

Applied to investment decisions, this principle suggested that the timing of future cash returns and the cost of capital were crucial. If one could routinely incorporate such factors within investment decisions made by individual managers, those decisions would no longer be guided, it was hoped, by impulse or subjective considerations, but would be based on a rigorous and calculable financial rationale.

Principles of compound interest had existed long before they were used for investment decisions within the enterprise. They had been firmly established in actuarial practice as early as the sixteenth century, and by the late seventeenth century relatively standard annuity tables had been constructed. Moreover, the use of

discounting and net present value had been articulated by developments in engineering and political economy in the late nineteenth and early twentieth centuries. But despite these previous developments, considerable hostility could be found in the United Kingdom as late as the 1930s to the suggestion that discounting might form part of accounting and aid the investment decision making of managers. And yet, by 1965 views had changed substantially. Drawing on American experience and studies, a wide range of bodies, including government agencies, influential figures working for key firms, television programs, and the accounting profession were proclaiming the advantages to be gained from using discounting techniques for investment decisions. In an extremely influential article written in the *Harvard Business Review* in 1954, Joel Dean argued that discounting techniques offered a novel theoretical framework for managers to understand investment decisions (Dean, 1954). Economic reasoning, especially with respect to the time value of money, should be reflected in all investment decisions, he argued. The discounted cash flow method is "demonstrably superior to existing alternatives in accuracy, realism, relevance, and sensitivity" (129).

The machinery of net present value calculations gave a particular visibility and calculability to investment opportunities, rendering them comparable and offering the promise that the subjective element of decision making could be curtailed if not eliminated. The individual manager would be transformed by the calculative practice of discounting, which imposed an injunction to think in terms of the twin concepts of the time value of money and the notion of capital productivity. The headquarters of private firms, or the Treasury in the case of the nationalized industries, would influence the decisions of individual managers by stipulating the precise discount rate to be applied to future cash flows.

In the United Kingdom, the promotion of discounting techniques for investment decisions was linked to a wider debate concerning economic growth and the means to achieve it. Britain was

seen to be falling behind in the growth "league" constructed out of the vast international statistical apparatuses of bodies such as the Organization for European Economic Cooperation and Political and Economic Planning in the United Kingdom, and discounting techniques were appealed to as an important mechanism that would help to deliver a higher rate of economic growth. Calculations at one level (within the firm) would be linked to calculations at another level (those for the economy as a whole). The calculative practice of discounting was to be a key device through which this economic revitalization would be operationalized. By encouraging or requiring managers to use discounting techniques rather than supposedly less sophisticated methods, the investment decisions of individual firms would be improved, and the entire economy would benefit. The United Kingdom could once again take its place alongside other successful industrialized nations.

The appeal of discounting techniques was not only that they held out the promise of replacing subjectivity with science, but that they also provided a simple way of governing the actions of managers. Net present value methods are based on a simple rule: only those projects with a positive net present value are acceptable. This is based on the reasoning that a project is preferable insofar as the returns to it exceed the cost of capital, or the return available by investing the capital elsewhere. The "productivity of capital" was to be the decisive test, a supposedly objective measure of the economic worth of individual investment proposals. Of course there are many ways in which managers can influence the inputs to the final figure that results from net present value calculations to achieve the result they seek, but this does not alter the role that this calculative practice plays in installing an economic norm within the firm. With the introduction of net present value, decisions and projects were given a visibility, calculability, and comparability that had been absent. The actions of managers could henceforth be tied to the calculations of others. In due course, this economic norm was to become a central ingredient in what Flig-

stein (1990) has termed the "finance conception of control"; that is, a conception of the corporation as a collection of assets to be evaluated by financial criteria alone that began to emerge in the mid-1950s. By the mid-1960s this finance conception of control had become the dominant model for the largest firms in the United States.

As with standard costing, net present value calculations sought to render the future knowable, calculable, and amenable to control. In different ways, they sought to bring the future into the present. Techniques of discounting applied to predicted future cash flows are the clearest expression of this capacity of accountancy to calculate and act upon the future. As a political technology, it not only links calculation and responsibility, but provides a tool by which the decisions of managers within firms can be made comparable to those taken outside the firm in the capital markets. A dense network of calculative practices can thus begin to form.

## *Conclusion*

Even those most distant from the vast pedagogic and professional machine of accountancy are likely to be familiar with many of its concepts and calculative practices today. Terms such as budgets, costs, return on investment, and so forth are no longer the preserve of the specialist. The calculative practices and language of accountancy have seeped into everyday life to an extent that would have seemed improbable to an observer of economic and social life half a century ago. The preceding discussion has sought only to examine two of the principal events in the process by which the ascendancy of accountancy has occurred in a number of Western societies. Other moments in this process could have served equally well to illustrate this process, such as the invention of return on investment and its link to the emergence of the multidivisional firm. Significant also is the development of a range of cost concepts drawn from economics in the interwar years that provided man-

agerial tools, such as cost-volume-profit calculations and break-even graphs. Concepts drawn from economics appealed to the importance of marginal cost and sought to link this concept firmly to that of decision, thereby helping instate a particular managerial vision of the role of accounting. More recently, developments such as activity-based costing have added to the repertoire of calculative practices available to accountants and would-be accountants.

Also of importance are the ways in which innovations in the calculative practices of accountancy are linked to transformations within firms, such as the design of new factory spaces, and how the development of new ways of calculating is linked to new forms of work organization and ideal images of new modes of economic citizenship (Miller and O'Leary, 1994). The rearranging of persons and things on the factory floor—in accordance with the proponents of cellular manufacturing, just-in-time systems, and customer-driven manufacturing—calls forth new ways of calculating and new ways of governing individuals. The factory is a veritable laboratory, a site for invention and intervention in much the same way as the laboratory inhabited by physicists and chemists. New realities are created in the factory out of the dreams and schemes of diverse agents based in a multiplicity of locales. We need studies to unravel the complex networks that form within and between firms, and the wide range of related actors beyond their boundaries. We need studies that explore the roles particular calculative practices play in making operable the assemblage of ideas, practices, and people that forms from time to time.

As we enter the twenty-first century, the calculative practices of accountancy are intrinsic to and constitutive of social relations, rather than secondary and derivative. Accounting today exerts an influence on, and is influenced by, a multiplicity of agents, agencies, institutions, and processes. As a calculative practice, accounting represents one of the preeminent devices for acting upon individuals and intervening in their lives in an attempt to ensure that they behave in accordance with specified economic objectives. Accounting affects the type of social reality we inhabit, the

way we understand the choices open to individuals and business undertakings, and even how we assess ways of maintaining the nation's health and education. It is fundamental to the manner in which we administer the lives of others and ourselves. Yet, the calculative practices of accounting are largely invisible to the public eye, and have been neglected by sociologists.

Contrary to the popular phrase "cooking the books," accounting practices do much more than distort or modify results after the event. Studies of the misuse and abuse of accounting numbers are nontrivial, but they are secondary to the study of the constitutive role of calculative practices. Accounting practices create a particular way of understanding, representing, and acting upon events and processes. Accounting practices create the costs and the returns that can then become the basis for rewards and penalties, and define the profits and losses to which various parties react. They make up the financial flows that have come to achieve such a vital significance in contemporary society. And in so doing they provide a means for acting upon activities, individuals, and objects in such a way that they may be transformed. As one of the preeminent means of quantification in certain Western societies, accounting accords a specific type of visibility to events and processes, and in so doing helps transform them. By calculating and recording the costs of an activity, one alters the way in which it is thought about and made amenable to intervention. Accounting practices require and inspire particular organization forms. Entities such as profit centers, cost centers, investment centers, and strategic business units are unthinkable without the calculative practices of accounting. Equally, much performance measurement would be inoperable without accounting. Incentive structures based on specified rates of return, cost-reduction strategies devised by benchmarking costs against those of a key competitor, or simply a requirement to operate according to a budget are just some of the ways in which the calculative practices of accounting enable the government of individuals. Even when individuals seek to subvert or avoid the calculations made of

them, their actions still take place in reference to an economic norm based on accounting numbers.

The calculative practices of accounting are always intrinsically linked to a particular strategic or programmatic ambition. Accounting practices are endowed with a significance that goes beyond the task for which they are deployed. Accounting practices are called upon not just to calculate costs or evaluate a particular investment opportunity but to increase efficiency, to promote economic growth, to encourage responsibility, to improve decision making, to enhance competitiveness. These rationales are assembled at various collective levels, including the firm, the nation-state, and a range of transnational as well as local entities and forums. They vary geographically, and over time. To understand the calculative practices of accounting as a technology of government, it is important to address these rationales, for it is through them that accounting is mobilized and appealed to. It is through them that conceptions of proper modes of governing persons and populations are elaborated. And it is through them that accounting comes to appear essential to the government of social and economic life.

Insofar as accounting makes up the financial flows into which organizations come to be transformed, it actually constitutes the economic domain. It is through the calculative practices of accountancy that the disparate ways of producing and providing goods are made visible in economic terms. Accountancy makes the abstract concepts of economic theory operable at the level of the firm, the organization, the department, the division, and the person. These entities can be construed as streams of discounted cash flows, costs of varying types, and collections of assets with varying rates of return. Rather than begin from the assumption that beyond social relations there exists a realm of irreducible economic events, the perspective is inverted. Economic events and processes are seen to be the outcome of the calculative practices of accountancy. Attention is thus drawn to the reciprocal relations between accountancy and the social relations it forms

and seeks to manage. The calculative practices of accounting are intrinsically and irredeemably social.

## Notes

[1]For a more extended discussion of these issues, see Miller (2000).

[2]The first journal dedicated to the sociological and organizational analysis of accounting was *Accounting, Organizations and Society,* founded in 1976.

[3]For a review of the emergence of a sociology of accounting from approximately 1980 onward, see Miller (1994).

[4]For a more extended discussion of these issues, see Miller (1991).

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