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**Effective benchmarking calls for
harmonization and use of accounting
principles leading to a robust accounting
model**

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ABSTRACT

Benchmarking and comparisons of costs and performance measures have become important tools to improve community services and to make sure that monopoly enterprises are efficiently run. If the comparisons are to be useful, it is important that cost data and measures are comparable and consistent. Accounting data are often used in this kind of comparison. A harmonized model of accounting applied across compared enterprises is therefore important. However, harmonization is not enough. This paper aims to show that any principles applied must also lead to robustness in the accounting model used, so that the resulting accounting data are reliable and comparable regardless of any differences in the conditions of the various organizations.

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1. Introduction

Cross-sectional comparisons of costs and performance measures have become more and more common in the municipal sector (e. g., Coe, 1999). Benchmarking has become an important tool to improve community services, and comparisons are also a way for different interested parties to make sure that monopoly enterprises are efficiently run. The fact that the enterprises are monopolies facilitates the use of benchmarking; the enterprises do not have to worry about handing over confidential information to a potential competitor.

A lot of emphasis has been put on criteria for selection and definition of measures (Harty, Blair, Fisk, Greiner, Hall and Schaenman, 1992; Ammons, 1996; Foltin, 1999). These questions are important, but there are other problems to be solved if the benchmarking and comparisons are to be relevant and fair. Problems that make comparisons difficult include differences in organizational solutions and in how activities are categorized (Andersson, 1998; Coe, 1999). Another problem, which will be the focus of this paper, is in the differences in budgeting and accounting systems. The increased use of benchmarking and comparisons within the municipal sector indicates a need for harmonized and comparable accounting practices.

Accounting data are built upon more or less subjective assumptions. This can make the comparability less relevant than it may seem to be at first sight. If fair and relevant comparisons are to be made, it is essential that there be harmonized approaches to accounting in the enterprises that are compared. There must be harmonization in regard to the accounting principles applied and the estimates and judgements made. However this is not enough. The aim of this paper, besides proving the importance of harmonized accounting, is also to prove that the principles applied must also lead to robustness (e.g., Gupta and Rosenhead, 1968; Yard, 2000) in the accounting model so that differences in various organizations' conditions do not impact the comparability of the accounted cost data.

A robust model is a model that produces consistent data. The following metaphor might help to clarify the meaning of robustness. I have two machines that are exactly alike (harmonized). If the machines are robust, the outputs should be exactly the same as long as the inputs are the same, no matter which of the two machines is used or in which period the production is compared. Any differences that occur can then be assignable to the inputs. If the machines used were not robust, differences in the output could be explained not only by differences in

the input but also by differences in the production of the output. If we then chose to compare the quality of the output when using different input material, it would of course be a difficult task. If the machines do not show any robustness at all, the output quality could sometimes be better with one input material and sometimes better with another input material, and vice versa.

To sum up, if benchmarking and comparisons are to be fair and relevant, several criteria must be fulfilled. Those criteria are summarized in Figure 1.

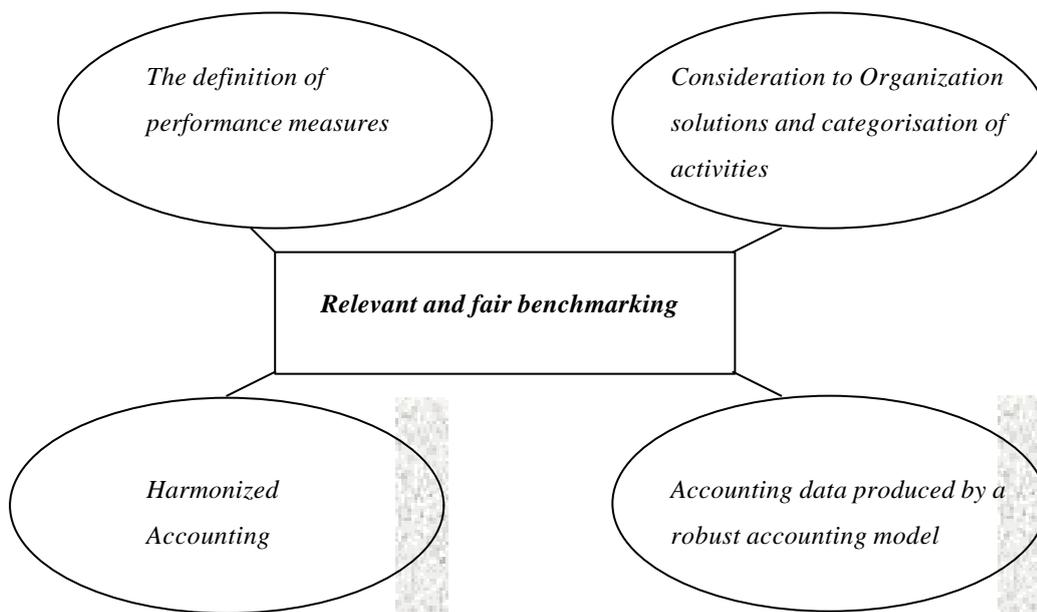


Fig. 1 Criteria that must be fulfilled if benchmarking is to be fair and relevant

The need for relevant and well-defined measures, consideration of organizational solutions and categorization of activities have been investigated and described by various researchers. Researchers have also given attention to the need for harmonized accounting (e.g., Van der Tas, 1988; Hermann and Thomas, 1995; Murphy, 2000). The focus of these studies has, however, more been on implementation of international accounting standards than on the use of accounting data in a benchmarking context. Little attention has been given to the need for robustness in the accounting models applied when performance measurements including accounting data are used for benchmarking purposes.

In this paper, in order to show the effect of different principles when calculating and accounting for depreciation and capital costs, simulations of two hypothetical examples are made. The applied principles and the estimates and judgements made in the hypothetical examples are based upon information from an earlier survey study of Swedish water and sewage enterprises (Tagesson, 2001). The reason for choosing depreciation and capital costs is that these costs are an essential part of total costs for water and sewage enterprises. The analysis consists of two parts. First, the effects of different principles and estimates and judgements will be analysed for each example, to show the need for harmonized accounting in order to make relevant comparisons. Second, data from the two examples will be compared and analysed to show that harmonized accounting is not enough to produce comparable accounting data and that applied accounting principles must also lead to robustness of the accounting model; furthermore, that the principles must be used correctly in a true and fair way, if the accounting data from different time periods or organizations are to be comparable.

This paper is organized as follows. Part 2 describes the theoretical framework and the basis of my analysis. Part 3 describes GAAP and findings from an earlier survey study. Part 4 presents the underlying assumptions and the results from the two simulations as well as an analysis of the effect of the different principles applied and different estimates and judgements made in the two simulated enterprises when various organizational conditions are compared. Part 5 presents concluding remarks.

2. Theoretical framework

The term *benchmarking* is borrowed from land surveying (Ammons, 1999). If a surveyor can mark a known position and altitude on a certain landmark, this landmark can be used as a reference point for measuring and determination of other objects (ibid.). One formal definition of benchmarking is as follows:

Benchmarking is the continuous process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders. (David T. Kearns, chief executive officer, Xerox Corporation, cited in Camp, 1989, page 10)

Spendolini (1992) has a similar definition of the idea:

... the comparison of products, services, work processes, and other measures against “best practices” in the field (Spendolini, 1992, page 9)

A logical beginning in a benchmarking process is, according to Nyhan and Martin (1999), to begin comparing and contrasting the performance of one's own activity with the performance of other similar activities. These comparisons should help one to identify best-practice providers. By using these providers as references and models it should be possible to improve one's own activity. (Spendolini, 1992; Martin and Ketter, 1996; Nyhan and Martin, 1999). A common approach of authors in the literature of benchmarking, according to Andersson (1998), is that they look at benchmarking as a structured method of learning from others. Benchmarking is a continuing process (Camp, 1989). A continuing update and collection of information and data is a part of the process (Foltin, 1999). To think of benchmarking as a continuing process is important. Unlike the surveyor's benchmark, which is a fixed landmark, organizations are dynamic. Best-practice providers will change over time, both in effectiveness and in rank.

The access to, and use of, data are important in a benchmarking project (e.g., Camp, 1989). Important sources of data are the different accounting reports. Accounting data are important for determining the current performance gap and for projecting future performance levels. The goals in a benchmarking project are often expressed in performance measures including terms like "revenues" and "costs." Accounting data will also play an important part when the actions resulting from the findings of the benchmarking project are evaluated, followed up, and re-evaluated. The accounting principles applied and the estimates and judgements made must therefore lead to robustness in the accounting model so that the output data from the accounting model are reliable and comparable. In other words, reliable and comparable accounting data are essential if the benchmarking is to be relevant and fair. If we are going to use accounting data as information, the accounting must have different benchmarks. The following illustrates some of the basic objectives of accounting and fundamental criteria for attaining those objectives.

That someone (an agent) is accountable to someone else (a principal) is the essence of accounting (Ijiri, 1975; Jönsson, 1985). Accountability demands that the subject of responsibility is clear, that sanctions are available, and that it is clear how the accounting should be carried out (cf. Jönsson, 1985). The method of accounting is usually determined through reference to generally accepted accounting principles. Besides the role of accountability, the basic objective of accounting is to provide information useful for economic decisions that enable efficient resource allocation (AICPA, 1973). These two objectives – to

be the basis of accountability and to provide information useful for economic decisions – do not contradict each other. On the contrary, the fundamental criteria for both objectives are comparability, relevance, and reliability (cf. FASB, 1998; IASC, 1988). Both relevance and reliability are primary qualities in FASB’s theoretical framework; and both those criteria are related to comparability (including consistency) (FASB, 1998). Comparability, in other words, is considered to be a prerequisite criterion for relevant and reliable accounting information.

Information about an enterprise gains greatly in usefulness if it can be compared with similar information about other enterprises and with similar information about the same enterprise for some other period some other point of time. The significance of information, especially quantitative information, depends to a great extent on the user’s ability to relate it to some benchmark. (FASB, 1998, p 65)

To sum up: for benchmarking to be fair and relevant, the data used in the analysis must fulfil the criteria for comparability and reliability. When using accounting data, it is thus important that the accounting is harmonized and that accounting principles applied lead to a robust accounting model in which differences in the conditions of various organizations will not impact the comparability, reliability, and consistency of accounting data (e.g., Gupta and Rosenhead, 1968; Yard, 2000).

3. Municipal accounting – empirical conditions

In this part of the paper I will give a brief description of municipal accounting in Sweden. This is necessary as the hypothetical examples used in the analysis are based on empirical findings from water and sewage enterprises, which in Sweden are run by the municipalities.

Even if municipal accounting in Sweden has increasingly come to resemble accounting in the private sector, the presumptions differ. While the primary goal for a commercial enterprise is to give a return to shareholders, in municipal and governmental enterprises there are other primary goals to be fulfilled. However, by means of comparisons with other similar enterprises, it is possible to get benchmarks to identify goals and evaluate effectiveness (Stahre, Adamsson and Eriksson, 2000).

An objective of financial statements for governmental and not-for-profit organizations is to provide information useful for evaluating the effectiveness of the management of resources in

achieving the organization's goals. Performance measures should be quantified in terms of identified goals. (AICPA, 1973, p. 51)

Comparability is consequently an important criterion for municipal accounting. Comparability is an important presumption if different comparisons are made as the basis both for accountability and control.

The basis of Swedish municipal accounting is that the accounting should be based on the accrual method and in line with generally accepted accounting principles (Brorström, Eriksson and Haglund, 2001). With these assumptions, I will proceed to illuminate different considerations that affect the allocation of investment expenditure (depreciation and capital charge) over time.

The different rule-making bodies are agreed upon valuation of assets based on historical acquisition value. The recommendation about depreciation periods and depreciation method is also very precise and clear. A majority of the water and sewage enterprises use nominal linear depreciation method, but when it comes to estimated depreciation period the judgements vary greatly (Tagesson, 2001).

Swedish water and sewage enterprises are financed by charges. Usually the subscribers pay an entrance fee and then periodical fees. If the entrance fee is expensive, the periodical fees will be lower, and vice versa. The fees are regulated by the water and sewage law (Va-lagen 1970:244), which stipulates that these charges may not exceed what is necessary to cover the essential costs (including capital charge) of the service. How income from entrance fees should be recorded in the accounts is, however, unclear. According to the Accounting Standards Board (BFN)¹ and the Accounting Council (RR)², the entrance fees, if the amounts are substantial, should be treated as deferred income. But a recommendation from the Reference Group for Municipal Accounting³ states that income from entrance fees should be

¹ The Accounting Standards Board was created in 1976 through a government mandate. Its main task is to contribute to the development of GAAP by producing recommendations and to advise companies how to fulfil the requirements of the accounting law.

² The Accounting Council was set up in 1989 through an agreement between government, business and the Swedish Institute of Authorised Public Accountants (FAR). The purpose of setting up the Accounting Council was to gather all standard-setting functions for public companies in one organization (Jönsson and Marton, 1994). The Accounting Council has more independence in relation to the government than the Accounting Standards Board (ibid.).

³ Municipal accounting was not regulated in law until 1998. The Swedish Association of Local Authorities

treated as revenue assignable to the accounting period when the fees are paid. In practice, many enterprises use net accounting, where income from entrance fees is subtracted from investment expenses (Tagesson, 2001).

Usually entrance fees or loans contribute to the financing of investments. Irrespective of the form of financing, the investment should be charged with an interest rate, a so-called capital charge. When the investments are financed by loans, the loan usually carries an interest rate. The problem is how to determine an interest rate when entrance fees finance the investments. One suggestion is that the rate of capital charge should equal the average rate for the total external debts of the municipalities or enterprises (Malmer, 1995). The most commonly used interest rate for capital charge is the interest rate recommended annually by the Swedish Association of Local Authorities, irrespective of how the investments are financed.

The problem of distinguishing between maintenance and investment is a matter of active discussion. According to the rule-making bodies and GAAP, actions that aim to maintain an investment's status and functionality during its economic life are to be considered as maintenance and treated as costs in the accounts; investments should be capitalized and successively debited through depreciation. In theory, the only problem of distinction between maintenance and investment should arise when an investment is improved in standard and capacity during its normal economic life. In practice this is a huge problem. In Swedish water and sewage enterprises, it is usual that reinvestments are treated as costs for maintenance in the accounts (Tagesson, 2001). In fact, the Swedish Water trade association recommends its members to treat reinvestments in water and sewage pipes as maintenance in their accounts. This treatment of re-investments as maintenance, however, is a practice that does not lead to robustness in the accounting model and consequently affects comparability in a negative sense. This will be demonstrated in the next part of this paper.

had voluntarily established a special group, the Reference Group for Municipal Accounting, to help in developing GAAP and to produce recommendations for municipal accounting. In the preparatory work of the law for municipal accounting that came into force in 1998, the Accounting Standards Board and the Accounting Council were identified as important rule-making bodies even for municipal accounting. A new board, the Board for Municipal Accounting, was founded to deal with questions with special application to municipal accounting. The Board for Municipal Accounting then replaced the Reference Group for Municipal Accounting, whose authority was repealed. However, the Board for Municipal Accounting has announced that recommendations issued by The Reference Group for Municipal Accounting are still valid until the new board has issued new recommendations.

4. Effect on accounted costs when different accounting principles are applied and various estimates and judgements made – two hypothetical examples

In this part of the paper the two hypothetical examples will be presented and analysed. In sections 4.1 and 4.2, the effects of different principles and estimates and judgements will be analysed for each example, to show the need for harmonized accounting in order to make relevant comparisons. Both examples will show that even if the conditions are exactly the same, the accounted costs can be very different if the accounting is not harmonized. In section 4.3, data from the two examples will be compared and analysed to show that harmonized accounting is not enough to produce comparable accounting data. The comparison of the two examples will show that even if the accounting is harmonized, the comparability of data is affected if the accounting model used is not robust.

4.1 Stagnated enterprise (Example 1)

Let us first analyse an enterprise with a stationary stock of tangible fixed assets that demand constant real reinvestment over time.

Initially the following assumption will be valid:

- Applied depreciation period of 20 years
- Annual reinvestment 1 000 000 SEK (in year 2001 monetary values)
- Income from annual entrance fees during the build-up period (1951 – 1970)
250 000 SEK (in year 2001 monetary values)
- Real rate of interest 4 %
- Rate of inflation 6 %
- Cost for maintenance and operation⁴ = Depreciation + capital charge
- Time period 1980 - 2000

In relation to those initial assumptions (GAAP accounting), the following variables have been changed:

Shorter depreciation period. Instead of the 20-year depreciation period, a 10-year depreciation period has been used. Costs of maintenance and operation are kept invariable compared to the initial assumptions.

⁴ In this example, costs of maintenance and operation *equal* total costs *minus* depreciation *minus* capital charge.

Direct write-off. Instead of capitalizing the expenditure on investments and successively debiting the result through depreciation, the investment expenditure has been directly written off in the accounts. The investment expenditure has been added together with the costs of maintenance and operation provided in the initial assumptions.

Higher interest rate. The real interest rate for capital charge has risen from 4% to 5%. Costs of maintenance and operation, however, are kept invariable compared to the initial assumptions.

Net accounting. Income from entrance fees has been subtracted from investment expenditures.

Direct write-off of reinvestments. The expenditures for reinvestments are written off instead of being capitalized. The expenditures for reinvestments are added together with the costs for maintenance and operation provided in the initial assumptions.

Shorter depreciation period from 1980 onward . A 20-year depreciation period is applied for investments made up to and including 1979, while only a 10-year depreciation period is used for investments made from 1980 onward.

Total costs (expressed in real terms) and their incidence in different years are shown in Figures 3 and 4.

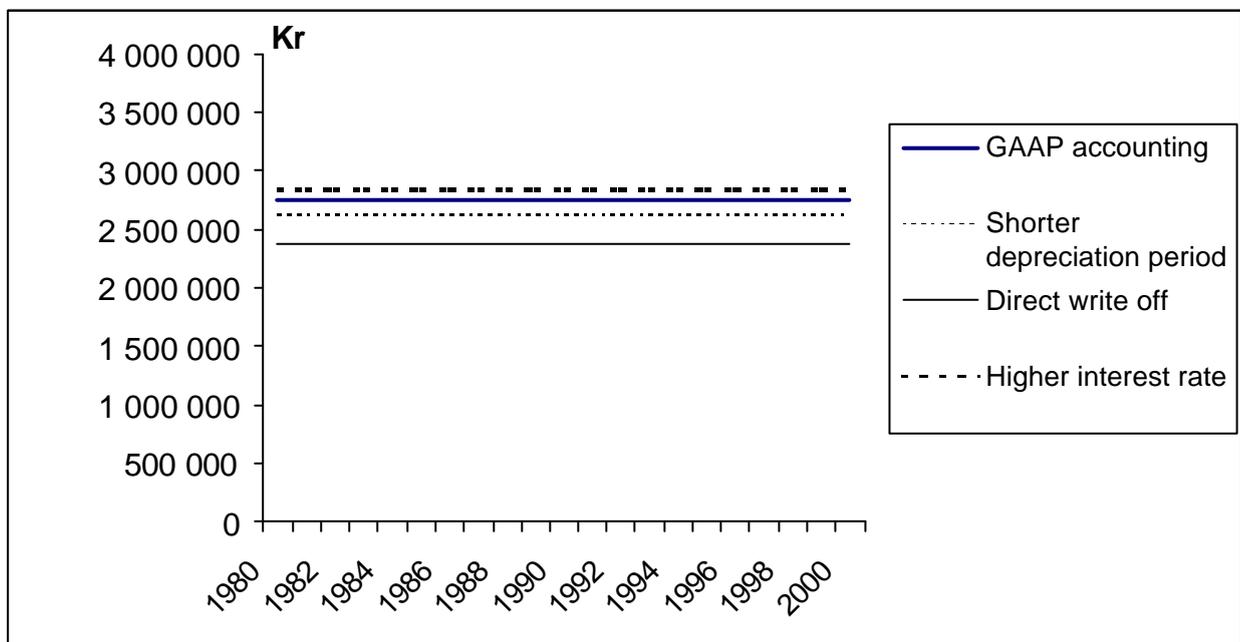


Fig. 3. Total costs (expressed in real terms) and their incidence in different years, when different accounting principles are applied and various estimates and judgements made.

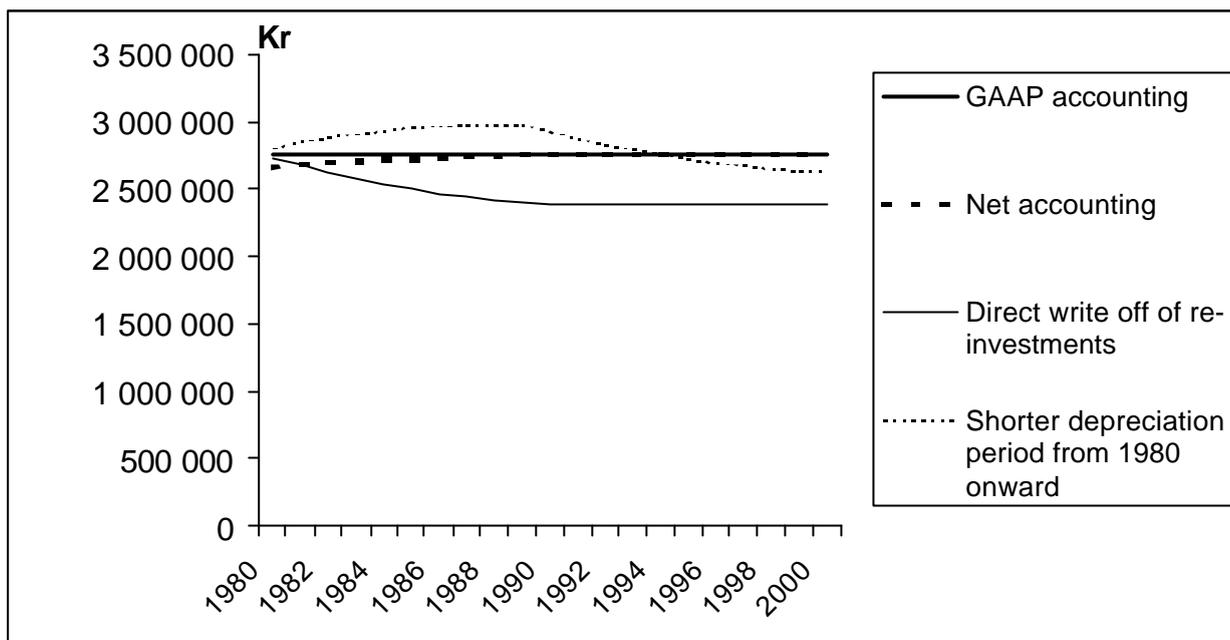


Fig. 4. The amount of total costs (expressed in real terms) and their incidence in different years, when different accounting principles are applied and various estimates and judgements made.

For an enterprise which has reached a steady state with a stationary stock of tangible fixed assets, a shorter depreciation period leads to lower accounted costs, since costs for depreciation and capital charge would have been higher in the build-up phase compared to a situation when a longer depreciation period had been used. High costs for depreciation and capital charge in an early phase leads to lower costs in a later phase.

Consistent direct write-off of investments, for an enterprise which has reached a steady state with a stationary stock of tangible fixed assets, leads to lower accounted costs, since the enterprise during the build-up phase would have had considerably higher accounted costs.

A higher rate of interest leads for obvious reasons to higher costs for capital charge. Of course this assumes that the enterprise has an asset base. If the enterprise consistently performs a direct write-off of investments, the rate of interest is accordingly unessential.

Net accounting leads to lower accounted costs as well as lower revenues. This effect, however, will disappear when the enterprise has reached a steady state with a stationary stock of tangible fixed assets and the last new investment has been written off.

Direct write-off of re-investments leads to total costs that initially become higher since, besides costs for depreciation and capital charge for earlier investments, the result is debited with the entire investment expenditures of the accounting period. Even if future reinvestments will be consistently written off directly, total costs will gradually reduce and later bottom out on a lower level, parallel with the level of the GAAP accounting.

Change to a shorter depreciation period leads to costs initially becoming a little higher than if GAAP accounting is used, but then the costs gradually bottom out on a lower level. For individual accounting periods, the use of various principles, estimates, and judgements can lead to considerable differences in accounted costs. Table 1 shows the effects on total accounted costs in relation to GAAP accounting (the initial assumptions) when various principles, estimates, and judgements are used in the foregoing example.

Table 1 Effects on total accounted costs in the example of a stagnated enterprise when different accounting principles are applied and various estimates and judgements made.

Principles, estimates, and judgements	Total accounted costs for 2000 (expressed in nominal terms)	Change in relation to GAAP accounting expressed as percentage
GAAP accounting	2 602 792 SEK	
Shorter depreciation period	2 487 950 SEK	-4.4 %
Direct write-off	2 244 792 SEK	-13.8 %
Higher interest rate	2 678 141 SEK	2.9 %
Net accounting	2 602 792 SEK	0.0 %
Direct write-off of re investments	2 244 792 SEK	-13.8 %
Shorter depreciation period from 1980 onward	2 487 950 SEK	-4.4 %

4.2 Expanding enterprise (Example 2)

Let us now study an enterprise which, at the beginning of 1980, had exactly the same conditions as the enterprise in the previous example (the stagnated enterprise), but then started to expand its activity. This example will be compared with the example of the stagnated enterprise with the purpose of showing that any principles applied must also lead to robustness in the accounting model if differences between conditions among various

organizations shall not impact the comparability of the accounted cost data.⁵ The comparison will be presented and analysed in section 4.3.

Initially the following assumptions will be valid:

- Applied depreciation period of 20 years
- Annual reinvestment 1 000 000 SEK (in year 2001 monetary values)
- From 1979 onward, annual new investment 100 000 SEK (in year 2000 monetary values).
- Income from annual entrance fees during the build-up period (1951 – 1970) 250 000 SEK. Income from annual entrance fees with 50 000 SEK from 1980 and forward. (all in year 2001 monetary values).
- Real rate of interest 4 %
- Rate of inflation 6 %
- Cost for maintenance and operation⁶ = Depreciation + capital charge
- Time period 1980 – 2000

In relation to those initial assumptions (GAAP accounting), the variables have been changed exactly as described for Example 1, in section 4.1 (that is: shorter depreciation period, direct write-off, higher interest rate, net accounting, direct write-off of reinvestments, shorter depreciation period from 1980 onward.)

Total costs (expressed in real terms) and their incidence in different years, are shown in Figures 5 and 6.

⁵ Instead of an expanding enterprise I could have provided a similar example of a declining enterprise. The only difference would have been that the cost curves would have been reversed. The result with reference to the applied principles effect on robustness would have been the same.

⁶ In this example, costs for maintenance and operation *equals* total costs *minus* depreciation *minus* capital charge.

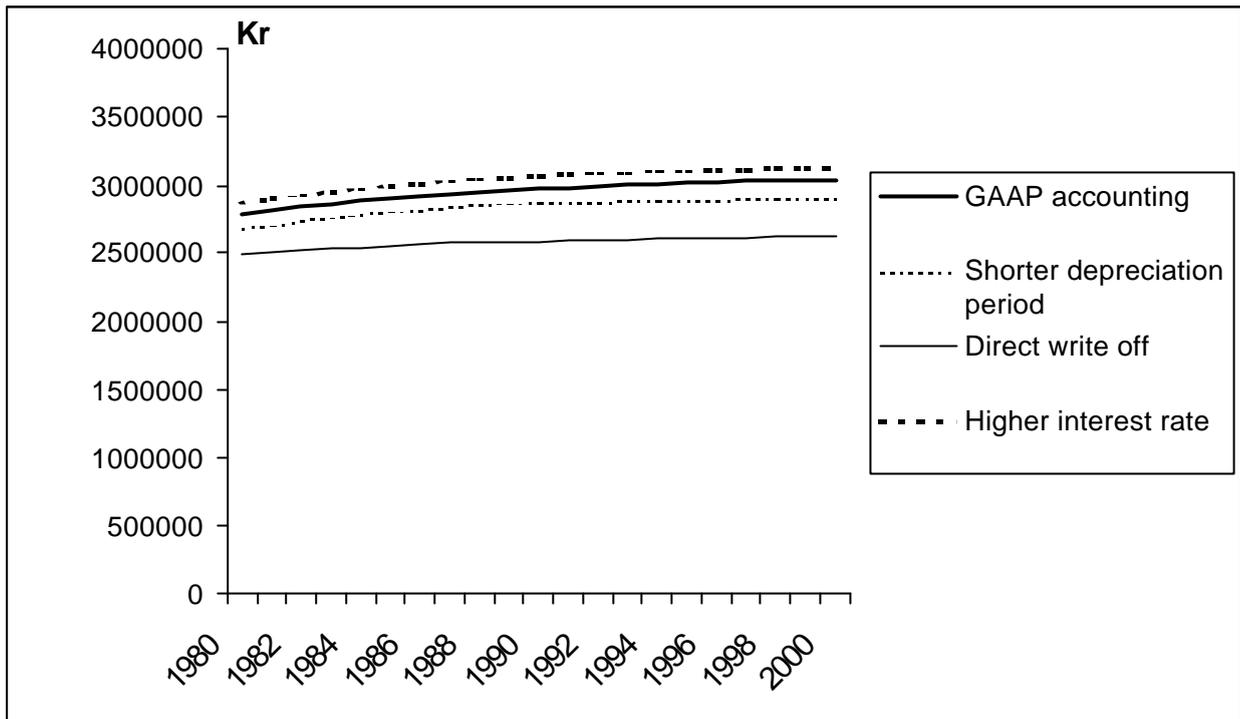


Fig. 5. A amount of total costs (expressed in real terms) and their incidence in different years, , when different accounting principles are applied and various estimates and judgements made.

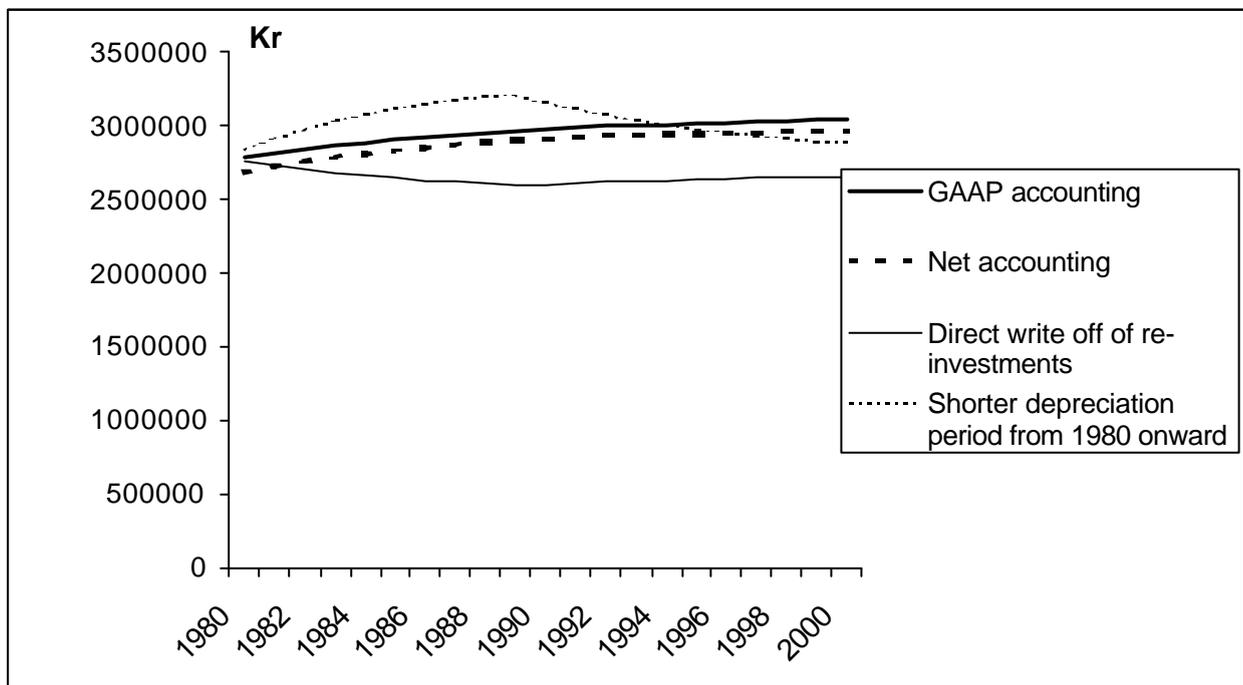


Fig. 6. The amount of total costs (expressed in real terms) and their incidence between different years, when different accounting principles are applied and various estimates and judgements made.

The pattern in this example is almost the same as in Example 1, the main difference being that all costs increases are compared to the previous example. The exceptions are in the use of net accounting and direct write-off of reinvestments. Table 2 shows the effects on total accounted costs in relation to GAAP accounting (the initial assumptions) when various principles, estimates, and judgements are used in the example of an expanding enterprise.

Table 2 Effects on total accounted costs in the example of an expanding enterprise when different accounting principles are applied and various estimates and judgements made.

Principles, estimates, and judgements	Total accounted costs for 2000 (expressed in nominal terms)	Change in relation to GAAP accounting expressed as percentage
GAAP accounting	2 863 071 SEK	
Shorter depreciation period	2 736 745 SEK	-4.4 %
Direct write-off	2 469 272 SEK	-13.8 %
Higher interest rate	2 945 955 SEK	2.9 %
Net accounting	2 798 002 SEK	-2.3 %
Direct write-off of re investments	2 505 072 SEK	-12.5 %
Shorter depreciation period from 1980 onward	2 736 745 SEK	-4.4 %

If net accounting is used, the accounted costs will consistently be lower than if GAAP accounting is used. The differences in accounted costs between GAAP accounting and the use of direct write-off of reinvestments becomes a little smaller in this example with an expanding enterprise than in the previous example with the stagnated enterprise. The comparison between the two examples will be developed and further analysed in section 4.3, following.

4.3. Comparison between the two examples – Analysis of the influence of different principles, estimates, and judgements on the robustness of accounting models.

The two examples show that accounted cost levels are affected by the accounting principles applied and the different estimates and judgements made. To make meaningful comparisons or to create benchmarks, a harmonized accounting approach is essential. However, harmonized accounting is not enough. The accounting principles applied must lead to a robust accounting model in which differences in the conditions in various organizations will not impact the comparability of the accounted costs (e.g., Gupta and Rosenhead, 1968; Yard, 2000). Net accounting and direct write-off of re-investments do not lead to robustness in the accounting model. If two organizations with different investment patterns are compared, net

accounting will lessen the differences in accounted costs, while direct write-off of reinvestments will increase those differences. The other principles, estimates, and judgements used in the analysis of the two examples may not give a true and fair view, but they do not affect the comparability between the two different organizations as long as the accounting approaches are harmonized. To illustrate this, Table 5 shows the differences in total costs for the two examples when different accounting principles are applied and various estimates and judgements made.

Table 5 Differences in accounted costs between the two enterprises with different investment patterns, when different accounting principles are applied and various estimates and judgements made.

Principles, estimates, and judgements	Total accounted costs for the accounting period of year 2000		The expanding enterprise's difference related to the stagnated enterprise
	The stagnated enterprise	The expanding enterprise	
GAAP accounting	2 602 792 SEK	2 863 071 SEK	10.0 %
Shorter depreciation period	2 487 950 SEK	2 736 745 SEK	10.0 %
Direct write-off	2 244 792 SEK	2 469 272 SEK	10.0 %
Higher interest rate	2 678 141 SEK	2 945 955 SEK	10.0 %
Net accounting	2 602 792 SEK	2 798 002 SEK	7.5 %
Direct write-off of reinvestments	2 244 792 SEK	2 505 072 SEK	11.6 %
Shorter depreciation period from 1980 onward	2 487 950 SEK	2 736 745 SEK	10.0 %

5. Conclusions

The simulations showed that some of the accounting principles applied did not lead to robustness (e.g., Gupta and Rosenhead, 1968; Yard, 2000) in the accounting model; differences in conditions in various organizations did not impact the comparability and consistency of the accounted cost data. For instance, if two organizations with different investment patterns are being compared, the use of net accounting will weaken differences in the accounted costs, while the use of direct write-off of reinvestments will strengthen differences in the accounted costs. That means that it would be difficult to make relevant and reliable comparisons between water and sewage enterprises in Sweden, unless the accounting approach is reconstructed and made comparable. At least, this is true for measures containing accounting data such as productivity and efficiency measures.

The lack of robustness in the accounting models used makes it very hard to do proper benchmarking. First, it is difficult if not impossible to identify a “best-practice provider.” Second, once a benchmark is identified, the accounting approach in the organizations being compared must be reconstructed, a task that is very laborious and difficult to execute. If the accounting approach is not comparable, a grave error could be made when any performance “gap” is determined. If the benchmarking process proceeds on the basis of an incorrect performance gap, the decisions made and the actions taken could be misleading, with resulting disastrous consequences.

The analysis shows that three criteria must be fulfilled for accounting data to be comparable: (i) accounting must be harmonized; (ii) applied accounting principles must lead to robustness of the accounting model; (iii) the principles must be used correctly, in a true and fair way.

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