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Does legislation or form of association influence the harmonization of accounting?

**A study of accounting in the Swedish water and
sewage sector**

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ABSTRACT

Accounting information is widely used in benchmarking projects and for other comparative purposes. However, if comparability is low, the information from such comparisons can give incorrect information which in turn can lead to erroneous conclusions and decision making. In the past the level of harmonization of accounting practices as well as their comparability has been very low in the Swedish water and sewage sector. One explanation for this might be that most of the water and sewage operations were run by municipal administration and that until 1998 municipal accounting was only regulated on a voluntary basis. Through comparisons of survey data from the year before and five years after the 1997 legislation, this study analyzes whether the legislation has affected the level of harmonization. Even though municipal accounting now is regulated by law, the requirements for aspects such as auditing are still much lower for municipals than for companies; the requirements for accountability are much lower for municipal agents than for companies. The study also analyzes whether there is any relationship between form of association and level of harmonization. The results did not indicate any effect of legislation on harmonization. Surprisingly, the results did not show any significant relationship between form of association and level of harmonization.

Key words: accounting; harmonization; form of association; legislation

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Introduction

To measure how effectively municipal operations are run, it is of interest to be able to make comparisons with similar operations located elsewhere. Accounting data are usually included in performance measures used in such comparisons, so it is important that the data used in the comparisons are consistent in form and generated in a similar way; otherwise the comparisons could be misleading and result in erroneous decisions or conclusions. Some kind of regulation in the accounting field is necessary, therefore, to harmonize accounting and make such valid comparisons possible.

The use and application of accounting methods and accounting standards develops through negotiation and agreement between agents and organizational stakeholders (Watts and Zimmerman, 1978; Hussein, 1981). Information, communicative qualifications and access to sanctions are important factors that affect the possibility of receiving respect for one's position (Hussein, 1981; Jönsson, 1985). Legislation and auditing are important tools in the process of influencing and changing accounting practice. According to Flower (1997), legislation is the aspect that has the strongest influence on accounting harmonization.

The regulation of Swedish municipal accounting has gone through fundamental changes over recent decades. From a more or less voluntary regulation, municipal accounting moved after 1998 to one regulated by law. This law, the Municipal Accounting Act (KRL 1997:617), is only framework legislation, but the referencing to standard setting bodies in the wording of the law and in the preparatory legislative work has increased the importance of standards, decrees, and guidelines from regulatory bodies. According to the Municipal Accounting Act, generally accepted accounting principles (GAAP) should be followed. GAAP is defined both through practice and standard setting.

The implementation of the Municipal Accounting Act has thus brought the business practices used in municipal accounting closer to those used in the private sector. However, some essential differences in accounting and regulation between the private and municipal sectors still remain. One fundamental difference is in the requirements for auditing. Corporations (owned privately or by a municipality) must be audited by an independent external auditor, while municipal administrations merely have to be checked by politically appointed auditors. Politically appointed auditors cannot be considered as external or independent (Cassel, 2000)

but rather as a group of internal auditors whose responsibility it is to make sure that the municipal officials implement decisions actually made by politicians. This lack of external audit can have a negative effect on the harmonization of municipal accounting. Research (e.g. Jönsson, 1985) has shown that external auditors, as a group, strongly affect the implementation and institutionalization of accounting standards.

Theoretical framework

An important step in the work of improving the commensurability of data between different operations is to increase the level of harmonization in accounting: "... [H]armonization is concerned with reducing the diversity that exists between accounting practices in order to improve comparability..." (Murphy, 2000). Much research has been conducted in the field of accounting harmonization during the last two decades. Most of these studies have considered the harmonization of international accounting standards (Nair and Frank, 1980; Tas, 1988, 1992; Emenyonu and Gray, 1992, 1996; Archer, Delvaile and McLeay, 1995; Herrmann och Thomas, 1995; Nobes, 1995; Emenyonu. and Adhikari, 1998; Murphy, 2000; Peill, 2000; Nobes and Parker, 2002). These studies have dealt empirically with commercial corporations, their focus being on the usefulness of accounting information for investors' decision making. Even though the empirical field of the present study is somewhat different, much could be learned theoretically and methodologically from these previous studies.

Harmonization may be defined as a process that aims to decrease the variation of different accounting practices and attain a higher extent of harmony (Tay and Parker, 1990; Nobes, 1995; Murphy, 2000). Tay and Parker (1990) define harmony as

a state indicated by a clustering of companies around one or a few available methods ... any point on the continuum between the two states of total diversity and uniformity excluding these two extremes.

Murphy (2000) clearly summarizes the meaning of harmonization:

... harmonization is a process. Harmony is a state, which will also be referred to as a level. When the degree of concentration for an accounting method increases, the state of harmony increases and harmonization has occurred.

According to Herrmann and Thomas (1995), there are three primary questions of interest within the research field of accounting harmonization:

- Is there a need for harmonized accounting?
- Which factors support or obstruct the process of harmonization?
- To what extent are today's practices harmonized?

Is there a need for harmonized accounting? Increased harmony in accounting also increases commensurability. In the private sector, increased comparability, for example, leads to a more efficient capital market (Nobes, 1995) and thereby to a better allocation of resources. However, it is not only investors on the capital market who gain from comparable, harmonized accounting; other stakeholders such as creditors, labor unions, bookkeeping agencies, and auditors gain from harmonization because information costs will decrease (Herrmann and Thomas, 1995).

Similarly, in the municipal sector, with which this study is empirically concerned, there is an interest in information that will facilitate decisions about resource allocation. However, here the purpose of resource allocation is different from the purpose of resource allocation held by investors. While investors want to allocate their resources to investments that maximize return on investment, the (internal and external) stakeholders of municipalities want to allocate resources to activities that most politically benefit them. Except for Central government, the stakeholders of a municipality do not have the option of allocating their resources to any municipal agent other than local government (e.g. Cassel, 2000). Central government, on the other hand, does not have the power to influence the appointment of municipal leaders. In the private sector, by contrast, investors both appoint management and decide whether or not they should delegate resources to the agent. This makes investors primary stakeholders, so-called principals. In municipalities, stakeholders like central government can decide whether to delegate resources or not, but they cannot appoint management; generally, however, municipal citizens and subscribers have the power to appoint management through elections every four years, but cannot make decisions on resource allocation.¹ This makes accounting in municipalities more accountability-based than decision-based (e.g. Ijiri, 1983). Accordingly, the main object of accounting information in municipalities is not allocation of resources but the evaluation of organizational performance.

¹ Since no one municipal stakeholder can both delegate resources by choice and appoint management, I prefer not to apply the concept of "principal" to any of the primary municipal stakeholders.

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, page 51)

Comparable accounting practices lead to more relevant and accurate performance measures which can be used to facilitate the evaluation of efficiency in an organization (e.g. Nobes, 1995). Today many municipal stakeholders, internal as well as external, use comparisons of performance measures, often expressed as key ratios, to follow up and control the efficiency of Swedish municipal operations (SOU 2001:75; Avgiftsgruppen, 2001). If these comparisons are to be meaningful and relevant, it is necessary that the data used in the performance measures are generated in a consistent and similar way for each of the operations under comparison. Otherwise, there is a risk that the information from the comparisons is misleading and could result in erroneous decisions or conclusions.

Which factors then support or obstruct the process of harmonization? Nobes (2002) offers a list of factors that explain differences in accounting practices within various countries. These factors are (i) legal system, (ii) provider of finance, (iii) taxation, (iv) the profession, (v) inflation, (vi) theory, and (vii) accidents and external influences. Even though Nobes intends to explain factors that affect differences in accounting among countries, some of these factors could also help to explain differences in accounting practices among operations run under different legal forms of association and to explain why the level of harmonization changes for the same population from one point of time to another.

The implementation of the Municipal Accounting Act signals that the legal system and thereby the regulation of municipal accounting have changed. At the same time, many people assert that the introduction of the Act has also led to a strengthening of municipal auditing (e.g. Tengdelius, 2002; "Revisorer har blivit tuffare", 2002). Consequently, the level of regulation as well as the strength of the profession has changed during recent years—these being two factors that are supposed to affect the conditions for accounting harmonization in a positive way (e.g. Flower, 1997; Jönsson, 1995). This indicates that the empirical testing of the following hypothesis will be of interest:

Hypothesis 1

Regulation through legislation increases the level of harmonization.

The numbers of municipal operations that are run through limited companies have increased in recent years. Company operations are more strictly regulated than operations run by municipal administration, while sanctions are more evident for operations run within this form of association (e.g. Cassel 2000). Instead of being regulated by the Municipal Act and the Municipal Accounting Act, which are fundamental laws for municipal activities, these companies and, in consequence, their accounting practices are regulated by a different legal framework. Limited companies, regardless of ownership, have to act in accordance with the Bookkeeping Act (1999:1078), the Annual Accounts Act (1995:1554), and the Companies Act (1975:1385). In addition, companies must be scrutinized by professional external auditors (ibid.). Earlier research has shown that external auditors are a group that strongly affects the implementation and institutionalization of accounting standards (e.g. Jönsson, 1985, Whalen et al. 1999; Nobes, 2002). Even if municipal auditing has been strengthened in recent years, one cannot ignore the fact that formal demands on auditing still differ substantially among companies and municipalities. The accounting profession still has to be considered as stronger in the private (company) sector than in the municipal sector (e.g. Cassel, 2000). Beyond those differences lie other factors (such as taxation) that can affect the harmonization process (Nobes, 2002). The foregoing reasoning leads to the expectation that operations run by limited companies should have a higher level of harmonization than operations run by municipal administrations. Empirical testing of the following hypothesis will therefore be of interest:

Hypothesis 2

The level of harmonization is higher among operations run within the legal form of a company than operations that are run by a municipal administration.

Method

To be able to test hypothesis 1, that *regulation through legislation increases the level of harmonization*, it was necessary to obtain comparative data that referred to the financial year before the Municipal Accounting Act was in force, is needed. Since data (from 1998) were available from an earlier study (to be referred to in this paper as the “reference survey” or “reference study”) about the use of accounting practices and estimates when accounting for depreciation, capital charge, and connection fees within water and sewage operations (Tagesson, 1999, 2002a), this made it possible to design a comparative study (to be referred to in this paper as “the present survey” or “present study”) to investigate the level of harmonization before and after the Municipal Accounting Act came into force.² A new and similar survey was then conducted during 2002 (i.e. after the implementation of the Act). Respondents to the questionnaire were asked to state which accounting practice they used and to provide information on used depreciation time and appreciated economic lifetime for different kinds of assets, as well as their opinion on what the connection fee was intended to cover.

The questionnaire was sent to all water and sewage operators in Sweden. The response rate for the survey was 84% of the whole population. The response rate for the reference survey was 77% of the whole population, except in cases where data had been retrieved from the industry body for water and sewage, where the response rate was nearly 100%.

A disadvantage of questionnaire survey studies is the lack of assurance as to who really answers the questions. All questionnaires were addressed to the manager of the water and sewage operation, which could be assumed to have a good apprehension about who that would be best, suited to answer the questions. The questionnaire was ended with questions about the name, phone number, and e-mail address of the respondent.

The Herfindahl index (Teil, 1972) (H-index) was used to investigate whether the level of harmonization had changed. The formula of the H-index is:

² The study was conducted in February 1998 but reflects the situation before the Municipal Accounting Act was in force.

$$H = \sum_{i=1}^n p_i^2$$

where

H = Herfindahl index;

N = number of alternative accounting methods;

P_i = relative frequency of accounting method 1.

The H-index was also used in the reference study (Tagesson, 1999; 2002a) which here will be used as reference to see if the level of harmonization has changed. The method is commonly used in various kinds of studies on accounting harmonization (Van der Tas, 1988; Tay and Parker, 1990; Murphy, 2000). Even though the method is quite simple, it gives more information than if only frequencies and numbers are measured (Van der Tas, 1988). The weakness of the method is that it does not give any explanation as to what the numbers between 0 and 1 indicate (Tay and Parker, 1990), that is, when harmony can be considered to be achieved. This can represent a problem when conducting a study that aims to measure the rank of harmony, but the method is proper in the present study, where the purpose is to investigate the change in level of harmonization at two different points of time (e.g. Murphy, 2000).

To test the second hypothesis, that *the level of harmonization is higher among operations run within the legal form of a company than operations that are run by the municipal administration*, the Mann-Whitney test is used when data are ordinal, and Pearson's independent chi-square test is used when the data are nominal. The Mann-Whitney test is appropriate as a substitute for the T-test when the sample does not have a normal frequency distribution. The chi-square test is based on the assumption that no difference exists between expected and real value. These tests enable an investigation of whether there is any significant relationship between the groups that respondents belong to and how they answer the questions. The independent variable represents whether the operation is run within the legal form of a company or if it is run by the municipal administration, while the dependent variables represent how different accounting transactions are treated in the accounting. The H-index is also used to compare whether there is any difference in the level of harmonization between operations run by companies and operations run by municipal administrations.

Analysis

In this section I present and analyze the statistics generated from the 2002 survey and compare the results with those of the reference survey. I begin with the methods used in accounting for depreciation, capital charge³ and connection fees. These are followed by the analysis of depreciation periods, estimated economic lifetime for different categories of assets, internal interest-rate level and the base for settlement of this level, methods used when accounting for re-investments, methods used when accounting for re-investments combined with maneuvers increasing capacity, and finally what the connection fee is intended to cover and how income from connection fees is accounted for.

Methods used when accounting for depreciation and capital charge

Methods used in Swedish water and sewage operations when accounting for depreciation and capital charge are shown in Table 1. The values within parentheses are the comparable values from the reference study.

Table 1 Methods used when accounting for depreciation and capital charge, 2002

Method	Frequency	Percent	Valid percent ^a
Nominal linear method (NL)	216 (232)	89.3 (81.1)	89.6 (81.1)
Real annuity method (RA)	17 (39)	7.0 (13.6)	7.1 (13.6)
Both NL and RA method	1 (3)	0.4 (1.0)	0.4 (1.0)
Other	7 (12)	2.9 (4.2)	2.9 (4.2)
Non-respondents	1 (0)	0.4 (0.0)	
Total	242 (286)⁴	100.0 (100.0)	100.0 (100.0)

^a H-index =0.81 (0.68)

Slightly more than 89% of the respondents who answered this question stated that the nominal linear method was used, and slightly more than 7% stated that the real annuity method was used. In the reference survey the corresponding distributions were 81% and 14% respectively.

³ The capital charge is more of a management accounting issue than one of financial accounting. However, the operators of a water and sewage operation are allowed to be compensated for cost of capital tied up in assets. This compensation is called capital charge and is calculated as an interest rate on the book value of the assets.

⁴ In the reference study data about methods used when accounting for depreciation and capital charge was obtained from the department of statistics within the trade association for Swedish water and sewage operations.

The H-index is 0.81 for the present survey compared to 0.68 in the reference survey. This indicates that the level of harmonization has increased. However, this change to the nominal method at the expense of the real annuity method had already started in the 1990s (Yard, 1997) and is probably a consequence of the fact that the nominal method is easier to understand and use. Possibly the change was accelerated by the fact that Swedish Association of Local Authorities from 1996 recommended its members to use the nominal linear method (Svedin, 1996). The reference to GAAP in the law has, on the other hand, hardly put a check on the trend towards the nominal method. From this supporting evidence the conclusion must be drawn that the level of harmonization has increased with respect to the method used when accounting for depreciation and capital charge.

It was not possible to detect any significant relationship between method used when accounting for depreciation and capital charge and the form of association. However, none of the companies stated that they used the real annuity method. Thirty companies stated that they use the nominal method, while two stated that they used some other method. The H-index for companies is 0.88 compared to an H-index of 0.80 for operations run by municipal administration. Accordingly, there are no indications that the level of harmonization is higher among company-run operations than among operations run by municipal administration.

One explanation of the improved harmonization among the total population that cannot be excluded is that the number of operations run by companies has increased and the level of harmonization is high in this group.

Depreciation periods

The amount of costs for depreciation and capital charge is affected not only by the method of accounting for depreciation, but also by the depreciation period and interest rate used in calculation. In this sub-section I present the questionnaire results for depreciation periods and estimated economic lifetime for different categories of assets. One uncertainty with the data is that many respondents answered in terms of intervals or by stating two different periods for depreciation for the same category of assets. In those cases, the mean for the interval or two stated depreciation periods was used in calculations. This was the same procedure as used in the reference study.

There are reasons to believe that depreciation periods have lengthened in comparison to the reference study. The Swedish Association of Local Authorities published guidelines in 1996 (Svedin, 1996) for new and longer depreciation periods, and one would expect that these guidelines would gain more adherents in 2002 than in 1997.

The guidelines from the Swedish Association of Local Authorities are shown in Table 2.

Table 2 Guidelines for depreciation periods (Swedish Association of Local Authorities)

Capital assets	Guideline
Water tunnels	50 years
Water and sewage pipes, water reservoir	50 years
Waterworks, sewage works, pumping stations	25 years

Table 3 shows the applied depreciation periods for various capital assets.

Table 3 Applied depreciation periods, 2002 survey (1998 survey in parentheses)

Capital assets	Mean year	Standard deviation	Minimum	Maximum	N
Water tunnels	47 (46)	6.7 (6.8)	25 (25)	50 (50)	72 (57)
Water pipes	40 (38)	9.5 (8.9)	20 (20)	67 (67)	237 (215)
Sewage pipes	40 (38)	9.6 (9.0)	20 (20)	67 (67)	236 (214)
Waterworks	25 (26)	5.3 (6.1)	10 (10)	50 (50)	228 (207)
Sewage works	25 (25)	5.2 (5.7)	10 (10)	50 (50)	227 (205)
Pumping stations	24 (25)	6.3 (5.9)	1 (10)	50 (50)	233 (208)

Table 3 shows that no major changes have occurred with respect to applied depreciation periods. A small increase can be discerned in the periods for water pipes and sewage pipes.

Table 4 Estimated economic life

Capital assets	Mean year	Standard deviation	Minimum	Maximum	N
Water tunnels	90 (146)	40.9 (219.7)	10 (20)	200 (1000)	46 (35)
Water pipes	64 (64)	33.5 (40.9)	25 (20)	250 (400)	215 (191)
Sewage pipes	64 (67)	34.3 (47.7)	5 (20)	250 (417)	216 (192)
Waterworks	33 (33)	13.0 (12.8)	10 (10)	100 (100)	192 (183)
Sewage works	31 (31)	11.6 (11.7)	10 (10)	100 (100)	195 (183)
Pumping-stations	31 (29)	34.6 (12.0)	10 (10)	501 (100)	206 (193)

From Table 4 it is clear that there is no dramatic change between the two surveys in the respondents' estimations of economic life. The only major change in estimated economic life is for the asset category of water tunnels. This can be explained by the fact that the economic life for this category of assets is hard to estimate because of its longevity. Also, only a limited

number of respondents answered the question about water tunnels or estimated economic life, whereas an outlier in the statistical data from the reference study may have considerably affected the mean value. Analysis of the data on applied depreciation periods and estimated economic life indicates that the statistical data from the questionnaires are stable, and there appears to be good comparability between the two studies.

The conclusion, apart from this uncertainty, is that a great number of water and sewage operations apply the depreciation periods recommended by the Swedish Association of Local Authorities. Those depreciation periods are based upon extreme prudence. The estimated economic lifetimes are substantially longer, at least for water tunnels, water pipes, and sewage pipes.

To investigate whether there was any significant relation between applied depreciation periods and form of association, a Mann-Whitney test was conducted. The results of the test are presented in Table 5.

Table 5 Relation between applied depreciation periods and form of association

	Mean year	Standard deviation	N
Water tunnels			
Companies	44.33	8.78	6
Municipal administrated	47.68	6.54	66
Mann-Whitney: no significance			
Water pipes			
Companies	35.00	8.58	32
Municipal administrated	40.49	9.45	205
Mann-Whitney: significance level .001			
Sewage pipes			
Companies	35.39	8.72	33
Municipal administrated	40.62	9.51	203
Mann-Whitney: significance level .05			
Waterworks			
Companies	26.77	6.18	31
Municipal administrated	25.30	5.19	197
Mann-Whitney: no significance			
Sewage works			
Companies	26.19	6.16	31
Municipal administrated	25.18	5.01	196
Mann-Whitney: no significance			
Pumping stations			
Companies	21.67	7.25	30
Municipal administrated	24.56	6.11	203
Mann-Whitney: significance level .05			

Table 5 shows that water and sewage operations run by companies tend to have shorter depreciation periods than operations run by municipal administrations. For water pipes, sewage pipes, and pumping-stations there is a significant relationship between depreciation periods and form of association.

Level of interest rates

The capital charge is affected by the level of interest rate used in calculating the charge. Every year the Swedish Association of Local Authorities publishes guidelines for the appropriate level of interest rate. The interest rate recommended for calculation of capital charge for year 2002 was 5.5% (nominal interest rate). Since the level of interest rate is adjusted every year, there is no value in comparing the levels between the present and reference studies. It could possibly be of interest to investigate if the standard deviation had increased or decreased compared to the reference study, since a striking diminution of standard deviation ought to indicate that harmonization of interest rates had increased. A total of 216 respondents reported the nominal level of interest rate they used in 2002 when calculating capital charge. The lowest reported level was 4% and the highest 11%. The mean level of interest rate reported was 5.59%, i.e. close to that recommended by the Swedish Association of Local Authorities. The standard deviation was 0.77, compared to the standard deviation of 0.75 in the reference study. The difference, in other words, was very small, indicating that the spread between the levels of interest rate were approximately the same in the two survey studies. No significant relationship between level of interest rate and form of association could be found.

The recommendation from the Swedish Association of Local Authorities is not the only base for determining the level of interest rate. The actual bases use by the various operations to determine the level is shown in Table 6.

Table 6 Base for determination of level of interest rate

Base	Frequency	Percent	Valid percent ^a
Interest rate for own borrowing	87 (52)	36.0 (23.7)	36.4 (34.9)
Recommendation from Swedish Association of Local Authorities	120 (58)	49.6 (26.5)	50.2 (38.9)
Other	32 (39)	13.2 (17.8)	13.4 (26.2)
Non-respondents	3 (70)	1.2 (32.0)	
Total	242 (219)	100.0 (100.0)	100.0 (100.0)

^a H-index = 0.40 (0.34)

Slightly more than 36% of the respondents who answered this question stated that they used the interest rate for the organization's own borrowing as the base for determination of interest rate in calculating capital charge. Almost 50% of respondents stated that they used the recommendation from the Swedish Association of Local Authorities for that purpose. In the reference study the corresponding split was 35% and 39%, respectively. The H-index was 0.40 in the present survey and 0.34 in the reference study, indicating that the level of harmonization had increased. The validity of this finding, however, may be questioned in both surveys. It seems that the interest rate for organizational borrowing remarkably often equals the recommendation from the Swedish Association of Local Authorities. Besides, in the reference study the non-respondent rate was very high on this question. On the other hand it is not entirely preposterous that the actual interest rate for companies and municipalities should come very close to 5.5% when borrowing capital. A very strong significant relationship ($p < .001$) is shown between form of association and base for determination of interest rate when calculating capital charge.

Table 7 Relationship between form of association and base for determination of level of interest rate when calculating capital charge

Base for determination of interest rate level	Municipalities	Companies	Total
Interest rate on own borrowing	58	29	87
Recommendation from Swedish Association of Local Authorities	117	3	120
Other	32	0	32
Total	207	32	239

Table 7 shows that a clear majority (29 out of 32) of the companies who answered the question used the interest rate on their own borrowing when determining the base for interest rate for calculation of capital charge. In the operations run by municipal administration the majority (117 out of 207) used the recommendation from the Swedish Association of Local Authorities for this purpose.

Methods used when accounting for reinvestments

A subject long debated and disputed within the water and sewage sector is accounting for reinvestments. The regulating bodies as well as the Swedish Association of Local Authorities have very clearly expressed that exchange of already written-off assets, for example water pipes, should be accounted for as investments and indicated on the balance sheet. A direct write-off of investment expenditure, however, leads to poor commensurability and

consistency (Tagesson, 2002a), and such a write-off is contrary to the need for comparability, a fundamental and qualitative characteristic of accounting (Hendriksen and Van Breda, 1992; Smith, 1997; Rutherford, 2000). Nevertheless, representatives of the water and sewage business plead for direct write-off of investment expenditure (e.g. VAV, 2001).

Table 8 shows which practice the respondents state that they use when accounting for re-investments.

Table 8 Method used when accounting for re-investments

Accounting practice	Frequency	Percent	Valid percent ^a
Direct write-off	69 (61)	28.5 (27.9)	30.4 (28.8)
Depreciation	93 (69)	38.4 (31.5)	41.0 (32.5)
Related to amount of expenditure	65 (69)	26.9 (31.5)	28.6 (32.5)
Other	0 (13)	0.0 (5.9)	0.0 (6.1)
Non-respondents	15 (7)	6.2 (3.2)	
Total	242 (219)	100.0 (100.0)	100.0 (100.0)

^a H-index = 0.34 (0.29)

The H-index of 0.34 from the present study, compared to the H-index of 0.29 in the reference study, indicates that the level of harmonization has increased. However, the proportion of operations using direct write-off has not decreased; rather, a small increase can be noticed from just over 29% to just over 30%. The big difference between the results from the two surveys is that 6% of respondents in the reference study but none in the present study stated that an “other” method was used. In both surveys a number of respondents stated that there is no decided principle of how accounting for reinvestments should be handled; they say that the method is dependent on the distribution of money between the investment budget and the operations budget.

The proportion of respondents stating that accounting practices were related to the amount of the expenditure decreased from 32.5% to approximately 27%. In the present study, 46 of the 65 respondents to this question reported on the monetary limit that decided whether the expenditure should be reported or written off directly. The lowest limit stated was 5,000 SEK (Swedish kroner) and the highest 1,000,000 SEK, with a mean value of 114,688 SEK. If respondents reporting a limit of 10,000 SEK or less are reclassified as respondents who capitalized the investment expenditure, the H-index increases only marginally to 0.35. If respondents reporting a limit of 37,000 SEK (one basic amount) or less are reclassified as capitalizing the investment expenditure, the H-index increases to 0.38. Surprisingly, there is

no significant relationship between form of association and method used when accounting for reinvestments. Accordingly, one may conclude that there must be some authorized public auditors who accept accounting practices that evidently contradict generally accepted accounting principles.

Table 9 shows how respondents reported the treatment of reinvestments combined with measures increasing capacity .

Table 9 Accounting for re-investments combined with measures increasing capacity

Accounting practice	Frequency	Percent	Valid percent ^a
Direct write-off	17 (14)	7.0 (6.4)	7.3 (6.7)
Depreciation	158 (132)	65.3 (60.3)	67.5 (63.5)
Only expenditure classifiable as increasing capacity is capitalized; other expenditure is written off directly	43 (42)	17.8 (19.2)	18.4 (20.2)
Other	16 (20)	6.6 (9.1)	6.8 (9.6)
Non-respondents	8 (11)	3.3 (5.0)	
Total	242 (219)	100.0 (100.0)	100.0 (100.0)

^a H-index = 0.48 (0.44)

As shown in Table 9, a majority of respondents (67.5%) stated that the whole expenditure should be capitalized and that they applied depreciation when a reinvestment is combined with measures that increase capacity. The corresponding value in the reference study was 63%. The H-index increased a little, from 0.44 to 0.48, indicating an increased level of harmonization. It is surprising (considering the reported methods of accounting for reinvestments) that more respondents did not report the third alternative, that only expenditure classifiable as increasing capacity was capitalized and other expenditures written off directly. It is even more surprising that one company stated that expenditure for reinvestments combined with maneuvers increasing capacity is written off directly; also, that eight companies stated that only expenditures assignable to increased capacity were capitalized. Again, there was no significant relationship between form of association and accounting practice.

Connection fees

Accounting for connection fees is another disputed subject in the water and sewage sector (e.g. Falkman and Gravin, 2002; Eriksson, 2002; Tagesson 2002a, 2002b). Public companies and companies with common interests should follow the standards published by the standard-

setting body, the Accounting Council (Redovisningsrådet (RR), 1999) . If the subscriber can expect that the connection fee will provide some kind of advantage in the future, the connection fee should, according to Standard RR11 from the Accounting Council, be recognized as a debt on the balance sheet by the operation that charges the connection fee. Also the Accounting Standards Board (*Bokföringsnämnden* or BFN) indicates in a statement about connection fees charged by electric power companies (BFN U93:2) that connection fees should be recognized on the balance sheet on the debt side and accounted for as deferred income, provided that the amount is of material value. The Council for Municipal Accounting refers to the statement from the Accounting Standards Board in an information circular dated March 2000, declaring that this reasoning is valid also for water and sewage operators.

There are accordingly two questions of importance that must be answered before it is possible to decide whether income from connection fees should be capitalized or not. First, is the amount to be considered as of material value? Secondly, is the connection fee assignable to costs that occur at other time or space than during the connection operation? Is the connection fee more than 10,000 SEK, or even more than half a basic amount (a basic amount = 37,900 SEK for year 2002)? These are two limits normally used when deciding whether the amount should be capitalized or written off directly with reference to the concept of materiality. No matter which level is chosen, the amount of the connection fees is higher and, in other words, must be considered as material.

Concerning the second question, it can be asserted that besides direct labor and direct material for the connection (which only correspond to an insignificant part of the connection fee), the income from connection fees are supposed to be used for investments in assets, assets that should be recognized on the balance sheet.⁵ Thus, both questions must be answered positively. One could thus expect income from connection fees to be recognized on the debt side and accounted for as deferred income. Before showing how the respondents answered the question about the method of accounting for connection fees, it will be of value to describe which costs respondents considered that connection fees should cover (see Table 10).

⁵ The operator charges a certain fee to cover costs for maintenance and operation.

Table 10 What the connection fee is intended to cover

Costs that connection fee is intended to cover	Frequency	Percent	Valid percent ^a
Only direct costs for connecting subscriber to local network	24 (13)	9.9 (5.9)	10.3 (6.2)
Expenditure for investments in the local network, as well as direct costs for connection	41 (38)	16.9 (14.6)	17.5 (18.3)
Part of investment expenditure in main pipes, waterworks, etc, as well as direct costs for connection and expenditure for investments in the local network	165 (157)	68.2 (71.7)	70.5 (75.5)
Other	4 (0)	1.7 (0)	1.7 (0.0)
Non-respondents	8 (11)	3.3 (5.0)	
Total	242 (219)	100.0 (100.0)	100.0 (100.0)

^a H-index = 0.54 (0.61)

Table 10 shows that a clear majority of the respondents, slightly more than 70%, indicate that the connection fee should not only cover direct costs concerned with the connection but also help to pay for investments in joint assets such as waterworks, main pipes, etc. In the reference survey, the corresponding value was 75%. In the present survey, 10% of respondents (compared to 6% in the reference survey) indicated that the connection fee should only cover direct costs related to the connection. The H-index is lower (0.54) in the current survey than in the reference survey (0.61). In both cases, the results support the argument that income from connection fees should be recognized as a debt on the balance sheet.

The foregoing discussion implies that water and sewage operations accounted for income from entrance deferred income. At least this is valid for operations that are run by companies. For operations run by municipal administration, the regulation is somehow unclear. Even though the Council for Municipal Accounting in its information circular of March 2000 refers to the statement (BFN U93:2) from the Accounting Standards Board, the Council for Municipal Accounting has not clearly rejected a former standard that indicates income from connection fees should be accounted for as revenue.

Tables 11a and 11b show how respondents answered the question on methods of accounting for income from connection fees.

Table 11a Methods used when accounting for connection fees, 2002 data

Accounting practice	Frequency	Percent	Valid percent ^a
Accounted for as revenue	171	70.7	72.2
Accounted for as deferred income	8	3.3	3.4
Net accounting	58	24.0	24.5
Non-respondents	5	2.1	
Total	242	100.0	100.0

^a H-index = 0.58

Table 11b Methods used when accounting for connection fees, 2002 data by 1998 categories

Accounting practice	Frequency	Percent	Valid percent ^a
Accounted for as deferred income	8 (20)	3.3 (9.1)	3.4 (9.3)
Other	229 (194)	94.6 (88.6)	96.6 (90.7)
Non-respondents	5 (5)	2.1 (2.3)	
In total	242 (219)	100.0 (100.0)	100.0 (100.0)

^a H-index = 0.93 (0.83)

The reason for two tables (Tables 11a and 11b) is that, in the questionnaire for the reference survey, no distinction was made between those who accounted for connection fees directly as revenue and those who used net accounting. From both tables it emerges that only 3.4% recognize the income from connection fees as debts in the balance sheets and account for it as deferred income. This is remarkable, considering the statements and standards from regulating bodies. Slightly more than 72% stated that they accounted for income from connection fees as direct revenues and almost 25% stated that they used net accounting. Net accounting means that the comparability is lost, not only over a span of time for the same activity but also as between activities within the same time and space (Tagesson 2002a). Hence, a majority of water and sewage operations use an accounting practice that evidently contradicts the standards from regulating bodies and generally accepted accounting principles. Even worse, the degree of concentration for an accounting method that contradicts generally accepted accounting principles has increased—from an H-index of 0.83 in the reference survey to 0.93 in the present survey.

Pearson's independent chi-square test showed that there was a significant relationship (at the 0.05 level) between form of association and accounting method for connection fees. A cross tabulation between the two forms of association (municipalities and companies) and the accounting methods for connection fees is shown in Table 12.

Table 12 Form of association and accounting method for connection fees

Accounting practice	Municipalities		Companies	
	N	Valid percent ^a	N	Valid percent ^b
Accounted for as revenue	144	70.6	27	81.8
Accounted for as deferred income	5	2.5	3	9.1
Net accounting	55	27.0	3	9.1
Total	204	100.0	33	100.0

^a H-index = 0.57

^b H-index = 0.69

Table 12 demonstrates the relatively larger number of companies that account for income from connection fees as revenue, in comparison with municipalities. The opposite is valid for the use of net accounting. The H-index is higher for company-run operations than for operations run by municipal administration. It is still a fact that slightly more than 90% of the companies use accounting methods that contradict generally accepted accounting principles and standards from the standard-setting bodies. For the operations run by municipal administration, the corresponding proportion rises even higher (97.5%).

Summary and conclusions

The aim of the study was to examine whether legalization or form of association affected the level of harmonization in Swedish water and sewage sector. To study the impact of legalization, a comparative study was undertaken to investigate the level of harmonization with respect to applied accounting methods, by taking measurements just before and five years after the 1998 legislation on municipal accounting in Sweden. The level of harmonization was measured with the Herfindahl index (H-index). To examine whether there was any significant relationship between form of association and level of harmonization, the data from present survey were tested using non-parametric tests: Pearson's independent chi-square test and the Mann-Whitney test. The tests results and conclusions are summarized in Table 13.

Table 13 **Conclusions of the analysis**

Accounting transaction	H-index		Relationship to form of association
	1997/1998	2002	
Depreciation and capital charge	0.68	0.81	no significance
Reinvestments	0.29	0.34	no significance
Reinvestments combined with measures for increasing capacity	0.44	0.49	no significance
Connection fees	0.83	0.93	significance at .05 level

Table 13 shows that the level of harmonization has increased. Is this then an effect of legalization? As for the method used when accounting for depreciation and calculating capital charge, the study shows that the use of the nominal linear method has increased at the expense of the real annuity method. However, this pattern of change started before the legislation (Yard, 1997). Thus, the increased level of harmonization of methods used when accounting for depreciation or calculation capital charge can hardly be assigned to the legislation. Also, as for the method used when accounting for re-investments, the level of harmonization has to all appearances increased. However, the numbers of respondents that state that expenditure for reinvestments is written off directly have not decreased, rather the other way around. The major difference between the reference survey and the present survey is that in the present study the proportion of respondents stating “other” decreased whilst the proportion of respondents stating that expenditures are treated as prepaid expenses have increased a little. The results on this comparison are, in other words, full of contradictions. Consequently, it is not possible to argue that the municipal accounting legislation has led to any increased level of harmonization with regard to accounting for reinvestments. Also, the results on accounting for reinvestments combined with measures increasing capacity are ambiguous. The proportion of respondents who stated that they wrote off the whole expenditure has not decreased; here, the explanation of the difference between the two surveys is that in the present study the proportion of respondents stating “other” decreased, reporting instead that expenditures were treated as prepaid expenses. Neither in this case was it possible to assert that the increased level of harmonization was assignable to the legislation. The increased level of harmonization on methods of accounting for connection fees is evident. However, the concentration has increased for an accounting method that is not in line with generally accepted accounting principles and the intention of the Municipal Accounting Act. Thus, not even in this case is it possible to argue that the increased level of harmonization is assignable to the municipal accounting legislation.

Hypothesis 1, that *regulation through legislation increases the level of harmonization*, must accordingly be rejected.

The other aim of the study was to examine whether there was any relationship between the form of association and the level of harmonization. Companies are more strictly regulated and the sanctions more evident for operations run within this form of association than for operations run by municipal); in addition, companies must be scrutinized by professional external auditors (e.g. Cassel 2000). Earlier research has shown that external auditors are a group that strongly affects the implementation and institutionalization of accounting standards (e.g. Jönsson, 1985). Beyond those differences there are other factors, such as taxation, that can affect the harmonization process (Nobes, 2002). This line of reasoning leads to the prediction that operations run by a company should have a higher level of harmonization and a higher concentration for accounting methods that are in line with generally accepted accounting principles than operations run by a municipal administration. Still, from the results shown in Table 13 it can be understood that only in one case out of four was there a significant relationship between form of association and level of harmonization. The case in which it was possible to show a significant relationship was accounting for connection fees. Operations run by companies had, compared to the operations run by municipal administrations, a slightly higher concentration for the method that corresponds to the standards from the standard-setting bodies (RR11, BFNU93:2). Nevertheless slightly more than 90% of companies and 97.5 % of municipalities accounted for the connection fees in a way which was not in accordance with generally accepted accounting standards and recommendations from regulating bodies. On the basis of this study it is therefore not possible to argue that there is any relationship between form of association and level of harmonization.

Hypothesis 2, that *the level of harmonization is higher among operations run within the legal form of a company than operations that are run by the municipal administration*, must accordingly be rejected.

The analysis, however, showed a significant relation between form of association and applied depreciation time. Companies tend to use shorter depreciation time than operations run by municipal administration. Judging from the respondents' answers about estimated economic life and the use of depreciation periods, it is notable that the sector as a whole is very prudent when valuating its assets. Most prudent are the companies. The use of too short depreciation

periods is a doubtful praxis, since the principle of equal treatment across different generations then could be questioned. If, without any actual reason, there is a large variation among depreciation periods, the possibility of making true and fair comparisons will be affected in a negative way.

The analysis also showed that there was a significant relationship between form of association and base for determination of interest rate used when calculating capital charge. Operations run by municipal administrations to a large extent use the recommendation of the Swedish Association of Local Authorities when determining the interest rate, while operations run by companies use the interest rate on their own borrowing as a base for determining the interest rate for calculation of capital charge.

To summarize, it is not possible to show that the municipal accounting legislation has had any effect on the level of harmonization within the water and sewage sector. The level of harmonization is very low. Many operations use accounting practices that are not in line with the intent of the law and of generally accepted accounting principles. The possibility of using accounting data as a source for benchmarking and relevant comparisons of this nature is thus very poor, limiting stakeholders' chance to control and follow up efficiency. In my opinion, this state of affairs in the long run may undermine the confidence for the sector. It was not possible either to show any relationship between form of association and level of harmonization. In spite of the fact that companies are audited by professional external auditors, the companies used accounting practices that were not in line with legislation and generally accepted accounting principles, suggesting that the actions and professionalism of the external auditors must be questioned strongly. This further indicates that auditing of municipal operations in a similar way to companies is not the solution to the shortcomings of accounting practices within the sector.

If the sector is going to gain a higher level of harmonization around accounting practices that are in line with generally accepted accounting principles, I believe that it is important that the industry body for water and sewage make it clear that their standpoint is that the accounting should be done in accordance with legislation and generally accepted accounting principles. I also believe that there is a need for more information and education about accounting matters within the sector.

Possible explanations of the results

One possible explanation of the results may be that it is not legislation in itself that leads to harmonization, but the sanctions that follows from breaking the law. There are no evident consequences for breaking the Municipal Accounting Act, as when breaking the Bookkeeping Act or the Annual Accounts Act that regulate company accounting. However, this reasoning is contradicted by the fact that, in general, there were no significant connections between form of association and use of accounting practice. The companies have recently been formed and, in all cases except in one, they are still owned by the municipalities. This might be one explanation of the poor accounting practices used by the companies. Possibly principal rather than form of association governs the use of accounting principles—a presumption that is in line with the assertion from positive accounting theory (e.g. Watts and Zimmerman, 1978).

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