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Abstract

This paper examines the response of the water and electricity group companies to regulatory pressure and in particular, the first regulatory price review after privatisation. The sample period incorporates industry-specific regulatory price reviews in both the water and electricity sectors and provides an interesting case study to examine the political cost hypothesis. The results obtained in this study confirm that the regulatory process has an impact on the group company's financial reporting decisions: there is evidence of income-decreasing earnings management in the year of regulatory price review in both sectors. However there is little evidence to support the premise of income-decreasing earnings management in the electricity sector, following the regulator's decision to re-open the distribution price review in 1995.

Key words: Accounting accruals; earnings management; price cap regulation; regulatory review; Regional Electricity Companies; Water and Sewerage Companies.

1. Introduction

The existing literature has examined the use of earnings management in response to potential political costs and has found support for the political cost hypothesis in a number of situations. For example, there is evidence found in support of income-decreasing earnings management following price increases in oil companies during the Persian Gulf crisis (Han and Wang, 1998). Evidence is also presented in Jones (1991), where companies are found to use earnings management to influence the decision to grant import relief in antitrust investigations (Cahan, 1992). However research evidence for earnings management in utility companies to date is quite limited.

Jarell (1979) examines the electric utilities in the US from 1912 to 1917 and finds evidence that regulated utility companies report higher book values for assets than non-regulated utilities, resulting in higher depreciation charges in the regulated companies. This depresses reported profits for the period and consequently, the Return on Assets (ROA) is lower. This gives companies greater bargaining power with the regulatory authorities and enables companies to justify the case for a greater ROA in the regulatory settlement. However managerial discretion is not limited to within policy choices such as the length of asset life for asset depreciation, there is also evidence of managers choosing the timing of adoption of policies for earnings management. For example, D'Souza (1998) examines the response of the US electricity companies to the imposition of SFAS 106 'Employer's Accounting for Post Retirement Benefits Other Than Pensions'. She found evidence to suggest managers use their discretion to enhance the effect of this policy change to increase company expenses, and therefore decrease profits, again enabling companies to lobby regulatory authorities for a higher permitted ROA.

In the UK, research on earnings management in the utility sector has focused upon companies in the public sector. McInnes (1990a and 2000) examined the British Gas Corporation and McInnes (1990b) investigated the South of Scotland Electricity Board. In both public sector companies, evidence was found in support the hypothesis of earnings management to justify the case for price increases. However, there is little evidence to the author's knowledge as to the extent of earnings management in response to regulatory pressure in the privatised utility companies in the UK.

This study intends to provide a link to the prior research evidence in support of the political cost hypothesis and generalise findings to the UK institutional setting with a study of privatised companies. It also provides some initial insight into earnings management in the privatised water and electricity companies in England and Wales that subsequently were subject to a politically motivated tax, the Windfall Tax, in July 1997 (Inland Revenue, 1997). The results confirm initial expectations and suggest that regulatory price reviews influenced the decision to use and direction of earnings management in utility group companies. This result holds for both the water and electricity sectors, although there is little evidence to suggest reaction to the re-opening of the distribution price review in the electricity sector in 1995, perhaps due to a lack of available discretion. Overall the results suggest that regulation of the core subsidiary company does influence financial reporting decisions in the group company.

The paper is ordered as follows. Sections 2 and 3 discuss the key features of the systems of regulation of the water and electricity industries in England and Wales, and identifies why this may lead to incentives for the companies involved to manage

earnings. Section 4 outlines the research method and data used in the study. Section 5 presents and discusses the results and section 6 concludes.

2. The Electricity and Water Sectors in England and Wales

This study investigates the existence of earnings management in the privatised Water and Sewerage (WaSC) and Regional Electricity (REC) group companies. They were privatised under the Water Act (1989) and the Electricity Act (1990) respectively. The Acts established the role of the Director General for each industry, and the powers and duties of the Secretary of State and the Monopolies and Mergers Commission (MMC) in this case. The Water and Electricity Acts were enlarged upon by the Competition and Service (Utilities) Act (1992) that increased the powers of the Directors General and obliged them to collect information regarding company performance as well as to publish their findings. In addition, this also specifically imposed the duty on the regulators to ensure trading between the group companies is undertaken at 'arms length' and transfer prices are set at market prices, or less.[1] The two industries combined in this study are similar: the individual companies were privatised as regional monopolies and large amounts of infrastructure investment were required to maintain the operating capability of their respective networks. The two industries also differed in one key respect: the water sector has retained its monopolistic operating structure since privatisation, whereas parts of the electricity sector now operate in competitive markets.

The water sector is regulated by the Office of Water Services (OFWAT) and, until 1999, the electricity sector was regulated by the Office for Electricity Regulation (OFFER).[2] In the electricity sector, the regional monopoly of companies for domestic customers ceased in 2002, following deregulation of the industry and the introduction

of competition. There is evidence of significant customer switching to other electricity suppliers: by March 2003 over 40 per cent of customers switched from their local REC to another electricity supplier (OFGEM, 2003). However, companies in the water sector are protected from competition apart from *Inset Appointments* (OFWAT, 2002b).[3] The sector has a *natural monopoly* and attempts to introduce competition by the regulator have generally had little effect.

Price-caps used in the UK take the form of the Retail Price Index (RPI) minus a factor, 'X', as opposed to the Rate of Return regulation framework used in the US. Price-cap regulation specifically includes an efficiency factor into the price cap which is an advantage of price cap regulation over rate of return regulation as it gives companies clear incentives for efficiency (Burns, 1994).[4] This does not suggest that earnings management is less worthwhile to a utility in the UK than in the US as there is still much which could be gained. For example, it is expected that the regulator will examine the rate of return along with many other factors in evaluating the appropriate price cap. Therefore incentives to show a 'reasonable' return exist for the utility companies if it is believed this may influence the regulatory outcome.

Privatisation of the utility companies in the UK was expected to provide a good quality product and service to customers at a 'reasonable' price. It was also intended to give utility companies access to the financial markets to obtain funds for the large infrastructure investment that was required. It was argued that through privatisation, the utility companies would be able to both remove inefficiency and use resources more effectively. However the transformation of public sector monopolies into listed companies was not straightforward because of their original status and accountability to customers. It also gave managers new incentives for and methods of earnings management that had previously been non-existent or less prevalent in the

public sector. These companies have also had to respond to and live up to the expectations of the various stakeholders, including shareholders, customers, and employees. However in the early years of privatisation, the utility sector was widely viewed in the media to be generating 'supernormal' profits and paying executives excessive salaries.[5] During the sample period, there was an upward trend in the market value of the utility companies' share capital. However, it must be said that this growth had been at the same time as there were generally increasing prices on the UK stock market as a whole. Therefore shareholders have benefited from both capital gains and as company costs decreased, increased dividends.

Post-privatisation the utility companies began to diversify away from their regulated business and, as they have become more experienced at operating as a plc, they have initiated considerable business expansion, giving groups' potential to generate profits in unregulated sectors. However some of this diversification from the main utility business has been unsuccessful and there has recently been a return to re-focusing the strategy around the core utility business (McGuinness and Thomas, 1997; OXERA, 1997a). Since the majority of group revenue is still generated by the core utility subsidiary for most companies, it is probable that the regulator will examine the group performance as well as the core utility subsidiary to determine price caps. In addition, the vast majority of media and press comment on the utility companies refers to the group, rather than the regulated company *per se.* Therefore under the assumption that the regulator uses all available information in decision-making, including group accounts, it is likely that the group company's behaviour will also be affected by the regulatory cycle.

Prior research (for example, Watts and Zimmerman, 1986) suggests that large companies attract political attention and are more susceptible to politically imposed

wealth transfers. Watts and Zimmerman (1986) suggest that firms providing consumer goods with rapid price increases are likely to attract political attention. The utility group companies studied in this paper are large and have been allowed to increase prices since privatisation to fund essential investment. However these increases in prices in the water sector, in particular, have attracted both political and media attention, particularly when customers have perceived that there have been few improvements in service.[6] On the other hand, it is also possible that political parties' and regulators' decisions to take action against these companies in the form of additional taxation or more strict regulation may be influenced by corporate lobbying of the companies (Stigler, 1971; Peltzman, 1976). However this is difficult for the researcher to specifically identify from published information.

The level of prices is crucial for a company in determining the level of income of the core subsidiary and therefore the group company income. This suggests that much could be achieved by having a more lenient price cap, which could generate more revenue for the company, particularly since there is a time lag between reviews. During the sample period of this study, there was a regulatory price review for both sectors, giving significant income-decreasing incentives to reduce scrutiny of company reported income by the media and suggest to the regulator that companies required more income through more generous price caps. The use of income-decreasing earnings management may also have been employed by managers to justify the case for more lenient price caps. However at the same time, these companies also have strong incentives from the stock market to produce improved performance year-on-year to maintain dividend and return levels.

The Water Sector and the WaSC Business

Before privatisation the water sector consisted of ten water and sewerage authorities and twenty-nine privately owned water-only companies (WoCs) (OFWAT, 2002a). The water and sewerage authorities provided sewerage services to all areas, but water services only to areas where customer demand was not satisfied by a WoC. The ten water and sewerage authorities vested on 1st September 1989 and their shares offered for sale in November 1989. On privatisation, £5 billion of the WaSCs' debt was written off and they were also given a £1.6 billion cash injection, known as *the green dowry*, to enable the companies to finance the infrastructure investment expenditure required (OFWAT, 2002a). The Government received £5.2 billion proceeds from the sale and retained a special share in each of the WaSCs. This so-called *golden share* prevented any one person or entity holding more than 15 per cent of the share capital that would enable them to obtain control. These shares were redeemed in December 1994, and opened the WaSCs up to the possibility of being taken over (OFWAT, 2000b).[7]

The water and sewerage business is characterised by slow growth and little has changed to the WaSCs' market situation since privatisation. The size of individual company distribution networks varies, but all WaSCs have been required to make substantial capital investment to meet legislative requirements from the EC. This extensive capital expenditure has enabled the WaSCs to be eligible for capital allowances that has decreased their effective rate of tax. On privatisation, the price caps for the next ten years had been determined, but in July 1991, the Director General of Water Services (DGWS) announced the intention to hold a *Periodic Review* in 1994. This was necessary because of the need to incorporate the impact of increasing legislation from the EC, not foreseen or taken into account at the initial

price setting. However there was no attempt to re-claim the efficiency savings companies had achieved over and above the level foreseen in 1989; it was believed that to do so would weaken future incentives for efficiency gains (OFWAT, 1992).

The Electricity Sector and the REC Business

The electricity sector comprises of generation, transmission and distribution businesses. On 31 March 1990, the electricity sector was vertically separated; the assets of the Central Electricity Generating Board (CEGB) were split into *natural monopoly* and potentially competitive components (Electricity Association, 1997). The natural monopoly transmission business was placed in the National Grid Company (NGC); National Power plc and PowerGen plc, privatised in April 1991, were given licences to generate. The twelve Regional Electricity Boards, responsible for the distribution and supply of electricity, became the twelve RECs privatised in December 1990 (Littlechild, 1997).

On privatisation, the Government also issued debentures to the RECs that were repayable at various stages. Many of the RECs took the opportunity to repay these debentures early, despite the premium required to cancel this debt. Thus the Government debt was removed and replaced by cheaper debt with less restrictive covenants. As with the WaSCs, the Government retained a *golden share* in the RECs, which prevented any one person or entity taking control over the RECs. Following the expiry of this *golden share* in March 1995, there was a flurry of take-over activity in the electricity sector, and by mid 1997, only one of the twelve RECs had not been taken-over - Southern Electric plc.

In the electricity sector there are separate price reviews for the different businesses: distribution, transmission and supply prices.[8] At privatisation, the RECs

operated both a distribution and supply business. However the majority of company profits arise from the distribution business that is less severely affected by the changes in economic conditions, unlike the supply business. The RECs' supply business operates in a competitive market and *Second Tier Supply* licences (held by all of the RECs) allow the electricity companies to supply electricity outside of their individual regional area (Electricity Association, 1997). The major generating companies National Power plc and PowerGen plc also hold *Second Tier Supply* licences and so there is considerable competitive pressure for the RECs' supply business. The RECs' distribution business is capital-intensive and substantial investment is required to improve the reliability of the system, and to replace and extend the distribution network. The majority of the electricity distribution systems in the UK were commissioned in the late 1940s and so these assets were reaching the end of their useful life at privatisation (REC Prospectus, 1990).[9]

-- INSERT TABLE 1 ABOUT HERE --

Both utility regulators use wide public consultation on the regulatory process, as can be seen from Table 1 that lists the consultation documents. This could be said to increase the transparency of the process, but it may also enable companies to influence the style and harshness of regulation. There have been regulatory reviews in electricity and water during the period of the study, although the regulatory timetable differs between the sectors. The WaSCs and RECs are hypothesised in this study to use earnings management to justify the case for price increases and obtain a more favourable regulatory settlement. This study aims to examine whether the effect of the regulatory pressure on their main subsidiary has an impact on the incentive to use earnings management in the group company.

3. Earnings Management

Given the monopolistic nature of the utility sector on privatisation, control of these companies through regulation was imperative. Laffont and Tirole (1986) suggest accounting data is invaluable when there is information asymmetry between the regulator and regulatee because the regulator can observe company costs directly from the financial statements. However this assumes that there is little or no earnings management in the financial statements. If undetected, earnings management could distort reality and mislead the regulator and enable a company to achieve a more favourable regulatory settlement. If firms believe their performance will influence the regulatory review, they will adapt their behaviour to ensure they get the best possible outcome (Jackson and Price, 1994). The regulation of the core subsidiary is considered to be a major constraint on the company's actions. Consequently, this could give incentives for earnings management if the company believes that the regulatory outcome may be influenced in its favour and it believes that the discretion will remain undetected by the regulator.

Watts and Zimmerman (1986) suggest that large companies may be subject to political action. The utility companies have been accused of generating 'excessive' profits and paying too much in dividends as compare to company investment levels. This would clearly give incentives for companies to reduce the level of reported profits to decrease media and political spotlight on the sector. However, executives in the utility sector justify the level of profits by commenting on the level infrastructure investment made since privatisation, particularly in the water sector (see for example, Severn Trent plc, 1991; Southern Water plc, 1995; Northumbrian Water Group plc, 1994). Clearly, given these companies were subject to a Windfall Tax in 1997, they were unsuccessful in lobbying for the view that they were generating 'normal' profits.

Companies in the media spotlight may be reluctant to engage in earnings management, despite the potential gains on offer from doing so. The media and press coverage of the utilities has been widespread, particularly early in privatisation when executive pay was mentioned as a concern. Also, if group profits are thought to be 'too high', it may be inferred that the regulation of the core subsidiary is ineffective since the majority of group revenue originates from the core utility business. Therefore media scrutiny is likely to influence the political acceptability of regulatory price caps and could be used as justification for tighter regulatory constraint. Thus group companies, as well as the core-regulated subsidiary are likely to have incentives to use income-decreasing earnings management in response to the regulatory price reviews.

This study hypothesises that the regulatory process affects accounting decisions in the group company. Although there are incentives to show the regulator 'reasonable' profits throughout the regulatory period, it is expected that there will be pronounced incentives to decrease profit in the year-end immediately prior to the outcome of a regulatory price review. It is therefore anticipated that income-decreasing incentives will exist for the water sector in 1994/95 and for the electricity sector in 1993/94 and 1994/95. Both supply and distribution price reviews took place in 1993/94, although there was a further review of distribution price announced in 1995 that followed Northern Electric's defence actions in response to a take-over bid from Trafalgar House. The media took the company's reaction, which included a large dividend payment to shareholders, to suggest that the companies were cash rich, and industry regulation was ineffective (Gribben, 1995). However the companies perceived this re-opening of the price review as a break of the regulatory agreement that de-stabilised the sector. Thus acute income-decreasing earnings management

incentives are likely to exist in 1995 for both sectors in response to regulatory price review.[10]

4. Research Design

Data and Method

The sample of group utility companies comprises the ten regional WaSCs and twelve regional RECs with 31st March accounting year-ends between 1992 and 1995. This sample period pre-dates the take-over and merger activity that has subsequently taken place in this sector following the expiry of the government held golden shares, which enables a complete panel of observations to be obtained, eliminating the possibility of survivorship bias. Data was collected from two sources: *Datastream International* and group company published annual reports.

The utilities are no different from businesses in other industries in the sense that non-discretionary accruals include those related to sales, purchases and depreciation on assets. For infrastructure assets in the water sector such as dams, reservoirs and pipes, the expected useful life is difficult to determine with accuracy and these assets are maintained and repaired as necessary, rather than being completely replaced. Infrastructure and Renewals Accounting was introduced to account for the depreciation of the assets' value, and also to provide a fund for the maintenance and replacement of assets (OFWAT, 2001b).[11] The infrastructure renewals charge (IRC) is calculated as the average expected expenditure over a period, typically twenty years, and charges are adjusted by accounting accruals or prepayments in the financial statements, as appropriate. Since the regulator closely monitors the infrastructure expenditure, the level of discretion over such elements is expected to be minimal.

The model used to examine earnings management in this paper is based upon models used in prior literature (for example: Jones, 1991; Cahan 1992; Han and Wang 1998). Model (1) controls for revenue-based and asset related non-discretionary components of accruals.

$$\begin{aligned} \textit{Model:}\quad TA_{it}/A_{it-1} &= b_0 + b_1\, REVCHG_{it}/A_{it-1} + b_2\, GDA_{it}/A_{it-1} + b_3\, FAI_{it} + b_4\, AAL_{it} + b_5\, YR93_{it} \\ &\quad + b_6\, YR94_{it} + b_7\, YR95_{it} + b_8\, INDDUM_{it} + b_9\, YR93 \cdot INDDUM_{it} \\ &\quad + b_{10}\, YR94 \cdot INDDUM_{it} + b_{11}\, YR95 \cdot INDDUM_{it} + \epsilon_{it} \qquad (1) \end{aligned}$$

where:

TA_{it} is the total accruals for firm i in period t; $REVCHG_{it}$ is the change in revenue for firm i in period t; GDA_{it} is the gross depreciable assets for firm i in period t; FAI_{it} is the fixed asset intensity for firm i in period t; AAL_{it} is the average asset life for firm i in period t; A_{it-1} is the total assets for firm i in period $t-1$; *YR93* is a year indicator dummy variable for the year 1993; *YR94* is a year indicator dummy variable for the year 1994; *YR95* is a year indicator dummy variable for the year 1995 and *INDDUM* is an industry dummy coded 1 for the water sector, 0 otherwise.

Total accruals (TA) are defined as the change in stock and work in progress, plus the change in debtors, less the change in creditors, less the depreciation and amortisation charge. REVCHG, the change in revenue between periods t-1 and t is expected to be positive in sign. The proxy for the impact of the depreciation accrual, Gross Depreciable Assets (GDA), is anticipated to be negative. This variable is also expected to be statistically significant as the utility sector in general is very capital intensive. Since the variable is capturing the effect of the depreciation accrual, items such as freehold land and construction in progress have been excluded in measuring this variable. The variables TA, CHGREV and GDA in model (1) are weighted by

prior period total assets to control for heteroscedasticity and white-adjusted t-statistics (White, 1980) are routinely reported.

Young (1998, 1999) suggests the model should control for the fixed asset structure of the company as this could influence the non-discretionary depreciation element of accruals. Young (1999) proposes two new variables: Fixed Asset Intensity (FAI) and Average Asset Life (AAL). Following an increase in the level of fixed assets, there would be an increased depreciation charge. FAI is expected to have a negative sign to reflect this. Conversely, AAL is expected to have a positive sign, due to the lower depreciation after an increase in the estimated life of the fixed assets. There is likely to be a high non-discretionary depreciation charge component to total accruals because the utility companies are highly capital intensive and fixed assets have long useful lives. The length of expected lives of assets in the utility sector will also affect the depreciation charge, which is typically quite long for many assets. This adjustment may therefore be a more efficient method of controlling for the non-discretionary depreciation accruals in the utilities. Table 2 shows the variable definitions used in this study to estimate model 1.

-- INSERT TABLE 2 HERE --

If there is evidence of earnings management, this is expected to be reflected by the year indicator variables in model (1). It is expected that the year of regulatory review will encourage managers to adopt income-decreasing earnings management. Therefore it is expected that Y94, the indicator for 1994 in the electricity sector, and Y95 and YR95·INDDUM, indicators for both sectors for 1995, will have a negative sign. If this is the case, this will suggest that the regulatory review does influence the level of accruals in the group company. There is no prediction made for the sign of the indicators of in the other sample years.

In sensitivity tests, the modification to the Jones Model proposed by Dechow *et al.* (1995), is used to control for the impact of revenue-based manipulation. The new variable, REVREC adjusts the change in revenue for the change of receivables during the period. The results are then re-estimated with the new variable REVREC replacing CHGREV in model (1).

5. Empirical Results

Descriptive Statistics

Table 3 shows the descriptive statistics for the dependent and explanatory variables used in this study for the entire sample and by industry. Column 1 indicates for the full sample, on average, total accruals are negative and represent 4 per cent of prior period total assets. The capital intensity of these utility firms is shown by GDA that comprise 65 per cent of prior period assets. In addition, leverage (LEV) differs substantially across the companies with an average of 21 per cent. In both the water and electricity sectors, the level of group company leverage has increased since privatisation. This increase in leverage may be explained by a number of factors including the need to finance the large capital investment required. It could also be an attempt to justify the case for more generous price caps to enable servicing of the debt. In addition, prior to the expiry of the Government held *golden shares*, the utilities may have been attempting to reduce their desirability as a cash rich take-over target. During the sample period, some of the companies began to buy back a proportion of their issued share capital, see for example, Eastern Group plc (1994: 22). This is a common alternative to issuing a dividend to shareholders and can be used to manipulate the earnings per share figures, maintain the increasing trend in dividend payments to shareholders or to increase debt to equity ratios.

Columns 2 and 3 summarise the sample descriptive statistics for the electricity and water sectors respectively. It is apparent that there are significantly greater negative total accruals in the electricity sector and there are more depreciable assets with a longer average life in the electricity than the water sector. This is largely due to the Infrastructure Renewals Accounting in the water sector for infrastructure assets that means these assets do not incur an annual depreciation charge. However, FAI clearly shows the intensity of the water sector over the electricity sector. There is greater variation between the regional companies in terms of AAL in the water sector, perhaps reflecting the differing stages of the asset replacement cycle in these companies. On average there is little size difference between the industries, proxied by market value of the companies, although there is statistically more leverage in water than electricity companies on average. This is not unexpected however as the water companies' income is likely to be less volatile and subject to seasonal variation in usage as compared with electricity. Therefore water companies are expected to be more able to service higher levels of debt than electricity companies.

-- INSERT TABLE 3 HERE --

-- INSERT TABLE 4 HERE --

The correlations in Table 4 between the independent and dependent variables show statistically significant positive correlations between GDA and AAL. Significantly negative correlations are evidenced between GDA and FAINT. This suggests GDA, and FAI and AAL are measuring similar aspects of the fixed asset related accruals. However only FAI is significantly positively correlated with TA.

Table 5 shows the results from the estimations for the pooled sample. In all models, the coefficient capturing the effect of sales-based accruals, CHGREV, is positive and coefficients proxying for the depreciation accrual, GDA and AAL, are of

the expected sign. FAI however is positive not negative as is expected. In models 1 to 3, only Y95 is statistically significant, although the coefficient is positive, not negative as was anticipated. The final model, model 4, segments the industries by the use of a dummy variable that is then interacted with the year dummies. There is evidence of income-decreasing earnings management in the electricity industry in 1994, and income-increasing earnings management in 1995, captured by the variables *YR94* and *YR95* respectively. It is noteworthy that the INDDUM coefficient is not significant, suggesting that the interaction terms are not simply picking up unmodelled industry effects. This suggests that earnings management used in the year of the distribution price review reversed in the following year and managers did not have sufficient available discretion to respond to the re-opening of the distribution price review following Northern Electric plc's reaction to the Trafalgar House bid. For the water sector, statistically significant income-decreasing earnings management is evidenced in 1995, as shown by *YR95·INDDUM,* which coincides with the regulatory review year. Thus regulatory price reviews do appear to have influenced the decision and direction of earnings management in these companies.

The CHGREV variable is replaced by the Dechow *et al*. (1995) adjustment for credit sales, REVREC. The results reported in Table 6 show that REVREC is negative but insignificant in models 1 through 3. However other coefficient signs and significance are broadly similar results are obtained. In particular, the year-industry interaction terms are very similar, confirming the previous finding that abnormal accruals occur in the years affected by regulatory price review.

-- INSERT TABLE 5 HERE --

-- INSERT TABLE 6 HERE --

Sensitivity Analysis

The measurement of total accruals used above and also in prior studies (for example, Jones, 1991; Cahan, 1992) is a proxy for the actual level of accruals. It leaves out items relating to provisions and deferred income amortization. Since there are large provisions made by a number of companies during the period, this could result in significant bias in the measure of accruals. Therefore to address this criticism, total accruals are re-defined in as the change in stock, plus the change in debtors[12], less the change in creditors, less the depreciation charge and amortisation plus the profit on the sale of assets, less the change in provisions, plus any deferred income amortisation. It is acknowledged that the use of change in provisions between years is an approximation of the actual amount of accruals. However due to the unavailability of detailed data, it is not possible to distinguish between the quantities provided and the amount utilised during the year. In addition, there is a certain amount of managerial discretion over the timing of expenditure, which cannot be viewed by the researcher.

Correlation between this new definition for total accruals and the earlier definition are significantly positive (0.9081). In order to investigate the impact of this new definition for total accruals, the models were re-estimated. The results are comparatively similar with some lower statistical significance of the non-discretionary accruals proxies.[13] However the year indicator variable for Y93 in model 2 is now positive and statistically significant, but the initial conclusions are unchanged, signalling evidence of earnings management in response to regulatory price reviews.

6. Conclusions and Further Research

Prior research has documented evidence in support of the Political Cost Hypothesis in various specific situations – for example in the oil industry during the Persian Gulf crisis (Han and Wang, 1998) and also in the adoption of new accounting standards in the US when this had an income-decreasing impact on reported income (D'Sousa, 1998). There is also support for this hypothesis in the public sector in the UK - gas and electricity companies appear to have used the discretion available to justify the case made for price increases. However there is little evidence specifically examining the privatised utility companies in the UK which have incentives to decrease earnings in response to the regulatory constraint on potential wealth transfers that could be employed by these regulators.

This paper specifically examines the use of earnings management; in particular, the discretion exercised over the accounting accruals by managers in privatised utility companies in the UK in response to regulatory price reviews. These group companies have conflicting incentives for earnings management. There are incentives to decrease earnings to justify the case for price increases through the regulatory price cap, but also incentives to increase earnings and meet shareholders' and the stock market's expectations. The study finds support for the hypothesis that these companies adopted income-decreasing accounting accruals during the year of regulatory review determinations. It was also anticipated that the re-opening of the regulatory price review for electricity distribution would also have given companies pronounced incentives for earnings management, although no evidence is found to corroborate that in this study. This is an interesting result in itself, as it may indicate that the companies believed that they would be 'found out' for any earnings management employed and so decided not to use any. It is possible that the media

scrutiny of the RECs following Northern Electric plc's defence strategy, and suggestions of a potential Windfall Tax could have been a significant disincentive to engage in any accounting discretion and this could explain the results. Alternatively, it may be the case that all the available discretion had been used by managers in response to the previous regulatory price review for electricity distribution in the prior year.

Further work still needs to be done in this area and could for example examine the impact of regulation on companies in other European countries and cross-country analysis could be adopted to distinguish whether different regulatory regimes are more or less prone to company manipulation of accounting information and potentially, regulatory capture. It may also be interesting to review the reporting timeliness and conservatism of these companies vis-à-vis other listed companies to examine whether evidence exists of greater conservative accounting in the utility sector.

NOTES

[1] This is assured through the Regulatory Accounting Guidelines (For example, for the water sector: see OFWAT, 2000a).

[2] In June 1999 the regulators for electricity and gas combined to form the Office for Electricity and Gas Markets (OFGEM).

[3] An *Inset Appointment* is where another supplier of water and sewerage services, other than the WaSC or WoC appointed company for the local area, may supply these services on a *specific* site. This is limited to large users of such services and is in practice very restrictive as the existing licensed supplier must agree to the inset appointment (OFWAT, 2002b).

[4] Since the Retail Price Index is not linked to the utility sector, there is a possibility that the firms may be allocated a higher price cap than is necessary. However a clear advantage of the use of the Retail Price Index rather than an industry related index is that the regulated company cannot manipulate the index used to determine regulatory price caps (OXERA, 1997b). It is therefore possible that companies' ability to achieve efficiency savings may be (under) over-estimated as a result of a (higher) lower RPI. Prices in the water sector are controlled by a tariff basket price cap: *RPI – 'X' + 'Q'*. This enables companies to pass through the uncontrollable costs relating to the investment to meet EC obligations through the *'Q'* factor, and targets for company efficiency are included through the *'X'* factor. An $RPI - X_d$ form of price control regulates the RECs' distribution charges and the RECs' supply charges are regulated by an $RPI - X_s + Y$ price-cap. The *'Y'* factor of the RECs' supply business price cap enables the pass through of transmission, distribution and electricity purchase costs and the *Fossil Fuel Levy* on to customers (Electricity Association, 1997). The Fossil

Fuel Levy enables the RECs to recover increased costs from customers since they were required to purchase a certain amount of electricity from renewable (i.e. non-fossil fuel) sources (HMSO, 1990).

[5] For example, Johnston (1995) suggested that the water companies avoided paying Corporation Tax by offsetting their capital allowances and that profits have increased substantially since privatisation. It is also suggested that electricity companies have experienced lower electricity purchase costs following the 'dash for gas' and cheaper nuclear electricity. Jones and Gibben (1995) and Jones and Griffiths (1995) highlight executive pay arrangements in the utilities and suggest that remuneration payments to utility executives to that date had been excessive.

[6] Even the water industry regulator is reported to suggest that "customers have seen prices rising for too long" and to request another quinquennial review in 1999, following the Periodic Review of prices completed in 1994 (Gribben and Edgecliffe-Johnson, 1996).

[7] The majority of the WaSCs have remained in UK ownership and two WaSCs successfully took over their Regional Electricity Company (REC); Welsh Water took over South Wales Electricity plc (SWALEC) to become Hyder in January 1996, and North West Water took over NORWEB to become United Utilities in November 1995. Southern Water was taken over by Scottish Power in August 1996, which also enabled the creation of a multi-utility company. In 1995, Northumbrian Water became subject to take-over from the French utility company, Lyonnaise Des Eaux. However where the company has been taken-over, the water industry regulator, OFWAT, has ensured that the assets of the core utility subsidiary are 'ring-fenced' (OFWAT, 2001a). This is done to protect the core subsidiary business from

interference from its new owner in order to prevent the new owner taking action that may jeopardise the core subsidiary company's ability to continue in business.

[8] However RECs are only subject to distribution and supply price reviews. The NGC holds the transmission assets and is subject to transmission price reviews. The NGC was owned jointly by the RECs at privatisation, but subsequently they were required to dispose of their holdings in the NGC when the NGC was floated on the stock market in 1995 (Electricity Association, 1997). The NGC increased in value substantially whilst in the RECs ownership, allowing them to benefit substantially from their share-holdings (National Audit Office, 1998).

[9] This part of the RECs' business is essentially a regional monopoly and until 1995 the regulatory control was linked to the number of units of electricity distributed, but after 1995 it has been based upon the number of customers served and the number of units sold (Centre for Regulated Industries, 1996). The regulatory control implemented from April 1994, only affected electricity supply customers with demand of below 100kW because other customers had a choice of supplier.

[10] It must be acknowledged however that the effect of a regulatory review is not going to be the same for all companies in the sector because of differing starting points at privatisation and differing operating areas. Even the electricity regulator has commented on problems in assessing company standing and performance (OFFER, 1994).

[11] The use of conventional depreciation charge is thought inappropriate to these assets as they have extremely long-lives and are more often repaired, rather than being replaced. Under the policy of Infrastructure Renewals Accounting, the system is considered to be a system maintained in perpetuity with 'no loss of value' and the annual charge replaces depreciation and maintenance charges in the accounts. The

water sector is the only utility sector to have adopted this form of accounting policy for infrastructure assets (OFWAT, 2001b).

[12] This includes the costs of electricity purchasing and amounts of unbilled consumption in the RECs.

[13] Results available from the author upon request.

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Table 1: Summary of Key Industry Events

Industry Year Date	Event for Water Industry	Event for Electricity Industry
1989/90		
July 1989	Water Act	Electricity Act
1990/91		
April 1990	10 Customer Consultative Committees (CSCs) Established	Vesting Day
November 1990	Director General of Water Services (DGWS) publishes consultation paper 'Paying For Water: A Time For Decisions'	
December 1990		Privatisation of RECs
1991/92		
July 1991	DGWS announces intention to carry out Periodic Review	
July 1991	DGWS publishes 'Cost of Capital: A Consultation Paper'	
February 1992		Director General of Electricity Supply (DGES) publishes 'Electricity Price Controls'
March 1992	Competition and Services (Utilities) Act	Competition and Services (Utilities) Act
1992/93		
April 1992	General Election: Conservative Government Returns to Power	
August 1992	DGWS publishes 'Cost of Quality'	
October 1992		DGES publishes 'The Supply Price Control Review. A Consultation Paper'
November 1992	DGWS publishes 'Assessing capital values at the periodic review: a consultation paper on the framework for reflecting reasonable returns on capital in price limits'	
February 1993	DGWS publishes 'Paying For Growth'	DGES publishes 'Review of Distribution Charges Structure, Top Up and Stand-By Charges'

Table 1 (continued)

Industry Year Date	Event for Water Industry	Event for Electricity Industry
1993/94		
July 1993	DGWS publishes 'Cost of Quality: Political Perspectives'	DGES publishes 'The Supply Price Control: Price Proposals'
October 1993	Secretary of State publishes 'Water Charges : The Quality Framework'	DGES announces initial Supply Price Review Results
		DGES publishes 'Electricity Distribution: Price Control, Reliability and Customer Service: Consultation Paper
November 1993	DGWS publishes 'Setting Price Limits'	
1994/95		
April 1994		Supply Business: Reduction in Franchise Limit to 100kW
July 1994	Outcome of 1994 Periodic Review is announced	
August 1994		Distribution Price Review: Proposal for new price limits announced
December 1994		Trafalgar House bid for Northern Electricity. Bid lapsed March 1995.
March 1995		Statement published on REC price controls. Further Consideration of Distribution Price Limits announced

Source: National Audit Office (1996)

Note: Industry year begins on 1st April and ends on 31st March for the water and electricity sectors

Table 2: Variable Definitions

Variable	*Definition*
Total Accruals (TA)	Δ Stock and Work in Progress $_t$ + Δ Debtors $_t$ - Δ Creditors – Depreciation and amortisation$_t$. Variable is weighted by beginning of period total assets.
Change in Revenue (REVCHG)	Δ (Sales revenue) $_t$. Variable is weighted by beginning of period total assets.
Change in Revenue less change in receivables (REVREC)	Δ (Sales revenue – Receivables)$_t$. Variable is weighted by beginning of period total assets.
Gross Depreciable Assets (GDA)	Tangible Fixed Assets at the year-end excluding assets that are not depreciated (e.g. freehold land and construction in progress). Variable is weighted by beginning of period total assets.
Fixed Asset Intensity (FAI)	Total Fixed assets $_t$ /Total market capitalisation $_t$
Average Asset Life (AAL)	GDA $_t$ /depreciation charge for year
Firm Size (SIZE)	Log of Market value of equity for the group company at the beginning of the period
Leverage (LEV)	(Total assets employed/Total share capital and reserves) * 100 % at the year-end.
Total Assets (ASSETS)	Total assets for the group company at start of year in £millions
Industry Dummy (INDDUM)	Dummy variable coded 1 for water industry, 0 otherwise

Table 3 Descriptive Statistics

Variable			INDUSTRY PARTITIONED SAMPLE		*p-value for Difference*
		ALL	ELECTRICITY	WATER	
Column No.		(1)	(2)	(3)	(4)
TA	*Mean*	-0.040	-0.055	-0.023	<.0001
	Std. Dev.	0.036	0.042	0.013	
	Median	-0.031	-0.050	-0.026	<.0001
	Minimum	-0.177	-0.177	-0.049	
	Maximum	0.038	0.038	0.005	
CHGREV	*Mean*	0.040	0.047	0.032	0.2485
	Std. Dev.	0.064	0.085	0.019	
	Median	0.030	0.039	0.029	0.3527
	Minimum	-0.110	-0.110	0.006	
	Maximum	0.247	0.247	0.088	
REVREC	*Mean*	0.038	0.048	0.026	0.0670
	Std. Dev.	0.061	0.081	0.017	
	Median	0.029	0.047	0.022	0.0189
	Minimum	-0.109	-0.109	0.004	
	Maximum	0.229	0.229	0.081	
GDA	*Mean*	0.654	0.890	0.371	<.0001
	Std. Dev.	0.286	0.087	0.149	
	Median	0.791	0.879	0.363	<.0001
	Minimum	0.123	0.702	0.123	
	Maximum	1.158	1.158	0.643	
FAI	*Mean*	1.070	0.670	1.561	<.0001
	Std. Dev.	0.520	0.176	0.360	
	Median	0.920	0.634	1.503	<.0001
	Minimum	0.420	0.420	1.017	
	Maximum	2.960	1.164	2.964	
AAL	*Mean*	20.490	23.975	16.302	<.0001
	Std. Dev.	7.020	2.483	8.334	
	Median	22.360	24.479	18.612	<.0001
	Minimum	4.100	18.188	4.096	
	Maximum	33.830	29.723	33.826	
SIZE	*Mean*	13.710	13.656	13.781	0.2370
	Std. Dev.	0.480	0.404	0.550	
	Median	13.700	13.658	13.769	0.2167
	Minimum	12.400	12.792	12.398	
	Maximum	14.580	14.405	14.577	
LEV	*Mean*	21.090	17.672	25.183	<.0001
	Std. Dev.	8.590	8.150	7.290	
	Median	22.010	17.753	25.925	<.0001
	Minimum	3.870	3.866	11.535	
	Maximum	43.250	39.918	43.254	
N		88	48	40	

The p-value for the difference in means (medians) is for a t- (Wilcoxon-) test for continuous variables and chi-square test for binary variables. Refer to Table 2 for variable definitions

Table 4: Correlations for Dependent and Independent Variables

	TA	REVCHG	REVREC	GDA	FAI	AAL
TA	1.000	0.109	-0.160	-0.403	0.428	-0.131
		(0.311)	(0.137)	(0.000)	(<.0001)	(0.223)
REVCHG	0.023	1.000	0.939	0.093	0.014	0.013
	(0.832)		(<.0001)	(0.391)	(0.894)	(0.903)
REVREC	-0.246	0.897	1.000	0.145	-0.064	0.030
	(0.021)	(<.0001)		(0.178)	(0.551)	(0.784)
GDA	-0.427	0.110	0.242	1.000	-0.771	0.733
	(<.0001)	(0.309)	(0.023)		(<.0001)	(<.0001)
FAI	0.479	0.095	-0.060	-0.700	1.000	-0.464
	(<.0001)	(0.380)	(0.581)	(<.0001)		(<.0001)
AAL	-0.118	-0.070	-0.028	0.613	-0.453	1.000
	(0.273)	(0.517)	(0.798)	(<.0001)	(<.0001)	

Note: Pearson (Spearman) correlations in upper (lower) triangle, *p-values in parentheses*
Refer to Table 2 for variable definitions

Table 5: Results from pooled estimations

Dependent Variable: TA

	Intercept	*CHGREV*	*GDA*	*FAI*	*AAL*	*INDDUM*	*Y93*	*Y94*	*Y95*	*Y93· INDDUM*	*Y94· INDDUM*	*Y95· INDDUM*	*N*	*Adj. R^2*	*F*
Ex. Sign	*(?)*	*(+)*	*(-)*	*(-)*	*(+)*	*(?)*	*(?)*	*(-)*	*(-)*	*(?)*	*(?)*	*(-)*			
Model 1	-0.015	0.112	-0.052				-0.001	-0.012	0.029				88	0.3263	9.43**
	(-2.04)*	(1.90)*	(-4.76)**				(-0.14)	(-1.47)	(3.36)**						
Model 2	-0.104	0.116		0.034	0.001		0.012	0.000	0.038				88	0.3307	8.16**
	(-5.88)**	(2.10)*		(5.17)**	(1.21)		(1.54)	(0.05)	(4.33)**						
Model 3	-0.054	0.127	-0.071	0.010	0.002		0.004	-0.008	0.033				88	0.3896	8.93**
	(-2.67)**	(2.25)*	(-3.46)**	(1.24)	(3.91)**		(0.52)	(-0.94)	(3.69)**						
Model 4	-0.070	0.117	-0.033	0.011	0.001	0.011	-0.009	-0.024	0.052	0.027	0.034	-0.043	88	0.5620	11.13**
	(-3.94)**	(2.40)**	(-1.52)	(1.61)	(2.92)**	(0.69)	(-0.89)	(-1.76)*	(4.30)**	(2.29)*	(2.36)*	(-3.44)**			

**(*) Significant at the 1% (5%) confidence level.

Note: The sample consists of the WaSCs and RECs in England and Wales fiscal year-ends of 31st March between 1992 and 1995. White adjusted t-statistics are reported in parentheses. Refer to Table 2 for definitions.

Table 6: Results from pooled estimations

Dependent Variable: TA

	Intercept	*REVREC*	*GDA*	*FAI*	*AAL*	*INDDUM*	*Y93*	*Y94*	*Y95*	*Y93· INDDUM*	*Y94· INDDUM*	*Y95· INDDUM*	*N*	*Adj. R^2*	*F*
Ex. Sign	*(?)*	*(+)*	*(-)*	*(-)*	*(+)*	*(?)*	*(?)*	*(-)*	*(-)*	*(?)*	*(?)*	*(-)*			
Model 1	-0.005	-0.030	-0.048				-0.007	-0.022	0.019				88	0.2958	8.31**
	(-0.73)	(-0.55)	(-4.44)**				(-0.90)	(-2.43)**	(2.22)*						
Model 2	-0.089	-0.020		0.031	0.000		0.006	-0.010	0.028				88	0.2967	7.12**
	(-4.94)**	(-0.39)		(4.51)**	(1.11)		(0.75)	(-1.11)	(3.13)**						
Model 3	-0.042	-0.006	-0.066	0.009	0.002		-0.002	-0.017	0.023				88	0.3472	7.61**
	(-2.11)*	(-0.11)	(-3.39)**	(1.16)	(3.51)**		(-0.24)	(-1.95)*	(2.60)**						
Model 4	-0.061	0.029	-0.030	0.011	0.001	0.005	-0.015	-0.035	0.043	0.032	0.044	-0.037	88	0.5303	9.93**
	(-3.38)**	(0.55)	(-1.43)	(1.64)	(2.81)**	(0.30)	(-1.40)	(-2.34)*	(3.37)**	(2.65)**	(2.85)**	(-2.82)**			

**(*) Significant at the 1% (5%) confidence level.

Note: The sample consists of the WaSCs and RECs in England and Wales fiscal year-ends of 31st March between 1992 and 1995. White adjusted t-statistics are reported in parentheses. Refer to Table 2 for variable definitions.