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Monograph:

Leaver, A. and Murphy, R. (2020) Financial engineering and the productivity crisis. Report. Productivity Insight Network

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PIN - Productivity Projects Fund

Targeted Small Grant Report

Financial engineering and the productivity crisis

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www.productivityinsightsnetwork.co.uk

About PIN

The Productivity Insights Network was established in January 2018 and is funded by the Economic and Social Research Council. As a multi-disciplinary network of social science researchers engaged with public, private, and third sector partners, our aim is to change the tone of the productivity debate in theory and practice. It is led by the University of Sheffield, with co-investigators at Cambridge Econometrics, Cardiff University, Durham University, University of Sunderland, SQW, University of Cambridge, University of Essex, University of Glasgow, University of Leeds and University of Stirling. The support of the funder is acknowledged. The views expressed in this report are those of the authors and do not necessarily represent those of the funders.

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Financialization, creative accounting and the UK's productivity crisis

Background

Researchers observing a link between the growth of financialization and falling productivity in major economies highlight two causes. A first focuses on the growing importance of agency theory arguments in the late 1970s and how this changed corporate governance priorities in large firms (Lazonick & O'Sullivan 2000). According to this argument, stock-based remuneration packages aligned managers' interests with those of owners (Fligstein, 2001, Lazonick, 2003), leading to zero sum distributional struggles: firms cut labour costs and investment to increase shareholder distributions in the short term, which reduced rates of productivity and international competitiveness (Fligstein and Shin, 2004; Lazonick 2010; Lazonick & O'Sullivan 2000; Lin and Tomaskovic-Devey, 2013). A second argues that the search for profit in non-financial firms encouraged them to switch capital from productive to financial investments (Christophers 2017; Dumenil & Levy 2001; Krippner 2005), leading to falling productivity and accumulation over the longer term (Orhangazi, 2008; Stockhammer 2004, 2007).

Concerns about the negative effects of shareholder-value pressures on productivity have spilled over into the mainstream. Within policy circles, Andrew Haldane, Chief Economist at the Bank of England, criticized the high pay-out ratios from internal funds (Haldane 2015, p.12), as well as the use of excessive discount rates which disincentivise investment (Ball & Haldane 2018). Larry Fink, CEO at Blackrock, argued against the 'buybacks or dividend increases' that led companies to, 'underinvest... in innovation, skilled workforces or essential capital expenditures necessary to sustain long-term growth'. Financial journalists like Martin Wolf and John Kay as well as prominent business school researchers (Mayer 2012; Stout 2012) have echoed such views: that financialization and the pursuit of shareholder value is leading to corporate short-termism which is bad for investment, productivity and growth.

However financialized processes may negatively influence productivity through different channels. There are, for example, many contemporary examples of intangible-asset-heavy, low-productivity firms who maintain extraordinarily high dividend payouts aided by creative but controversial accounting practices (see BEIS 2019). Changes to accounting rules may, therefore, have made it easier for managers to create returns to shareholders through forms of financial engineering and other creative accounting practices (Leaver et al 2020). This may lead managers to satisfice under conditions of time and resource constraints; switching their efforts from the 'difficult stuff' of exercising skill and judgement in the selection of investment opportunities or improvement in technique, to the simpler, low-risk practice of hiring law and accounting experts to advise on the representation of their annual accounts.

This report reflects on the co-incidence of creative accounting practices and low productivity outcomes in a context of financialization. It considers the following proposition: that if returns to creative accounting are high, they 'crowd out' investment-led, productivity-enhancing alternatives for shareholder value creation.

Context: The Financialization Of Accounting

Creative accounting has always been around, but the recent high-profile failures of Carillion, Interserve and others highlight a particular form: the realisation of large amounts of ‘brought forward’ income and the maintenance of optimistic intangible asset valuations which swell distributable reserves and help management pay out large dividends, before large impairments put the companies into administration (see Leaver 2018; 2019).

This kind of creative accounting was made possible as accounting rules and practices *financialized* – defined as, ‘the integration of valuation techniques derived from financial economics into accounting measurements and the rise of definitions of value derived from capital markets and capital market-based exchange’ (Mennicken & Power 2015). The influence of the discipline of economics on accounting led to a shift from a *historic cost* accounting regime which records items on the basis of actual transactions, to a market-based *fair value* regime which values items on a net present value basis – i.e. the market’s best estimate of current item values based on *expectations* of the discounted future cashflows they will generate. This emphasis on expectations of future economic states introduced greater subjectivity into the valuation process, handing managers more discretion to report the items that underlie shareholder value creation and trigger their bonuses. A series of scathing reports on the quality of audit (BEIS & WPC 2018; BEIS 2019; Competition & Markets Authority 2019; Kingman et al 2018; Leaver et al 2020) raise questions about the robustness of current audit practice in constraining excessive discretionary valuations that benefit management.

Approach and core concepts

The financialization of accounting is our focus. Our approach is therefore grounded in an understanding of the firm as a construct of accounting and law, rather than an aggregator of competences or transaction minimizing vehicle. Our analytical approach means we focus on certain features of law and accounting which may be new territory for researchers of productivity or even financialization and which require explanation:

- i) Distributable reserves: contrary to lay understandings, dividends and other forms of shareholder distributions are *not* paid from current profits of the consolidated group, but from the ‘distributable reserves’ of a company – normally the parent company in the case of a large, subsidiarised firm like our examples. Distributable reserves are a company’s accumulated, realised profits (not previously used by distribution or capitalisation) less its accumulated, realised losses (not previously written off in a reduction or reorganisation of capital) (section 830(2), Companies Act 2006). The true objective of the financialized firm, therefore, is to increase its distributable potential through the maximization of its distributable reserves. We are therefore interested in what accounting treatments underlie the construction of a company’s ‘distributable reserves’, because that ultimately determines how much can be paid out to shareholders.

- ii) 'Uncertain' items: the fair value regime introduces subjectivity into the valuation process (see section 2). The valuation of intangible assets, such as goodwill, therefore require some speculation as to what future cashflows will accrue to, and which future discount rates will apply to those assets. Goodwill, for example, is recorded as the difference between the purchase price paid by the acquirer and the fair value of the target firm's assets purchased. This difference is supposed to represent the market's best estimate of the expected discounted future cashflows of those intangible assets (brand, reputation etc) not currently recognised on the target firm's balance sheet. But there are relatively high levels of uncertainty in this process. First, if a firm holds large amounts of goodwill on their balance sheet, this may simply represent overpayments for their acquisitions. Second, whilst that goodwill would be assessed for impairment periodically to see whether its market value had fallen below its holding value, there is considerable subjectivity exercised in this process. Managers can (and do) claim that an underperforming acquisition has generated synergistic gains elsewhere in the business and so should not be written-down. Third, the value of goodwill crucially depends on the firm remaining a going concern – it has virtually no value at the point of company insolvency. For these reasons we classify goodwill and other accounting items like it as 'uncertain' because their valuation relies on the exercise of managements' subjective judgement. Firms where 'uncertain' assets make up a large proportion of total assets may be riskier, and there are many contemporary examples of corporate failure from Carillion to Thomas Cook which would indicate this is so. Those uncertain assets also potentially 'prop-up' distributable reserves: a goodwill impairment, for example, would normally lead to a reduction in retained earnings of the group (and parent, if the value of subsidiaries were also impaired - but see caveat below in (iii)), and that could restrict what is distributed to shareholders.
- iii) Parent vs. Group accounts: large listed companies post two sets of accounts in their annual report: parent and group accounts. A parent company is a company that has a controlling interest in another company, giving it control of its operations. Its assets are largely made up of the holding value of its subsidiaries. A corporate group or group of companies is a collection of parent and subsidiary corporations that function as a single economic entity through a common source of control. A group balance sheet presents a composite picture of parent, subsidiaries and joint concerns. There is (or at least should be) a reasonably strong symmetry between parent and group accounts. However – and crucially for the purposes of this report - dividends are paid from the distributable reserves of the parent company. Examples where the parent company has a much stronger net asset position or a larger pool of retained earnings (normally a proxy for its distributable reserves) may therefore be an indicator of creative accounting practices. They are, then, an issue to which we direct attention in this report.

Report Structure

This report examines the creative accounting practices and productivity performance in six companies; three each from the quoted UK pharmaceutical and water sectors. These sectors were chosen because the pharmaceutical sector is often considered to be a dynamic, research and development intensive, high-productivity sector which reinvests profits into the search for better medicines; although recent research suggests a sharp productivity slowdown (ONS 2018) The water sector, in contrast, involves companies which are quasi regional monopolies and are one of the most important sectors to have experienced a marked downturn in productivity post-crisis (Riley et al 2018), yet have evidence of high-dividend payouts (Yearwood 2018). Examining two such contrasting sectors allows us to draw out differences and commonalities.

To achieve this goal we use forensic accounting methods to examine, over a period of eight years: a) changing levels of investment in various asset forms b) the accounting treatment of items core to determining a firm's distributable funds c) changing levels of employees and asset productivity d) the relation between debt and dividends at company level over the same periods, and e) the reliability of tax reporting in those organisations as an indication of the likely prevalence of tax avoidance. We also noted overall financial performance using conventional measures of growth.

This paper continues in four further parts. First, we explain our sample election. Then we explain the data approach adopted and how that data is used to appraise various measures relating to productivity and financial engineering, for which purpose it was intended. Thereafter we note our results. We conclude with suggestions on the interpretation of our findings to date and suggestions as to further research that would be beneficial.

Research sample

Our sample companies had to be large companies to ensure some degree of comparability. They also needed to be listed firms because accounting disclosure is less substantial in privately held companies. Applying these criteria, there are four pharmaceutical companies in the FTSE 350 but one (Dechra Pharmaceuticals plc) is primarily engaged in the supply of veterinary products and as such is not directly comparable with the other three, which then formed the sample for this research. They are:

- a. GlaxoSmithKline plc (GSK)
- b. AstraZeneca plc (AZN)
- c. Hikma Pharmaceuticals plc (Hikma)

There are three water companies in the FTSE 350 quoted on the London Stock Exchange. They are:

- d. United Utilities Group plc (UU)
- e. Severn Trent plc (ST)
- f. Pennon Group plc (Pennon)

These companies form the basis for the work undertaken on this sector.

Methodology

The published financial statements for each company have been summarised for the years 2011 to 2018, excluding 2011 for Pennon Group plc where suitable data was not available: the company was created in its current form in 2012. Database sources were not suitable for this purpose as they provide insufficient data granularity on key issues like tax, current assets and current liabilities: extraction from primary sources has, then, taken place.

We sought to extract data that presented us with information about:

- a. Trading performance;
- b. Tax due and paid;
- c. Employee numbers and their remuneration;
- d. Cash flow;
- e. Group balance sheets;
- f. Parent company balance sheets;
- g. Distributions to shareholders and other financiers.

To do that, we analysed data from accounts between 2011-18 on the following accounting items:

- a. Turnover;
- b. Inflation adjusted turnover;
- c. Gross profit;
- d. Inflation adjusted gross profit;
- e. Operating profit;
- f. Inflation adjusted operating profit;
- g. Finance costs;
- h. Dividends;
- i. Net profit before tax;
- j. Inflation adjusted net profit before tax;
- k. Depreciation;
- l. Amortisation;
- m. EBITDA;
- n. Inflation adjusted EBITDA;
- o. EBIT;
- p. The tax charge and its components;
- q. Gross wage costs including employment related overheads such as social security and pension costs;
- r. Net wage costs;
- s. Number of employees;
- t. Average pay;
- u. Inflation adjusted average wage;
- v. Investment in tangible fixed assets
- w. Investment in intangible fixed assets;
- x. Investment in assets of uncertain market value e.g. deferred taxation and derivatives;
- y. Investment in inventories;

- z. Trade debtors;
- aa. Other debtors;
- bb. Cash balances;
- cc. Trade creditors;
- dd. Borrowing, both short and long term;
- ee. Other creditors
- ff. Provisions and other uncertain liabilities such as hedging and derivatives;
- gg. Deferred taxation;
- hh. Share capital and related reserves e.g. the share premium account;
- ii. Retained earnings;
- jj. Other reserves;
- kk. Minority interests;
- ll. Similar balance sheet data for the parent company, where appropriate. Parent company profit and loss data is not consistently available and so has not been collected.

Productivity data was then prepared in addition to indicators included in the above information:

- a. Labour cost productivity in proportion to:
 - Turnover;
 - EBITDA;
 - net profit before tax;
 This data has been prepared in 2018 prices;
- b. Individual employee productivity as expressed by:
 - Turnover per employee;
 - EBITDA pe employee;
 - Net profit per employee;
 This data has also been prepared in 2018 prices.
- c. Tangible assets per employee in inflation adjusted prices;
- d. Intangible assets per employee in inflation adjusted prices.

In addition, financial productivity was tested using the following ratios:

- e. Tangible asset productivity, measured by turnover to tangible assets;
- f. Intangible asset productivity, measured by turnover to tangible assets;
- g. Inventory productivity as measured by the ratio of inventory to turnover;
- h. Trade and other debtor management as measured as a ratio to turnover;

Costs of financing were also considered:

- i. Dividend ratios to available net profit before tax in the group;
- j. Interest ratios and costs are calculated including cover and implied costs;
- k. The gearing ratio is reviewed.

Finally at this stage, issues relating to accounting quality were addressed. We first examined assets of uncertain value. Assets of uncertain value are defined as those which are unlikely to be of any value unless the entity is a going concern; or where

their value is hard to determine by reference to any external market indicator (see section 3ii). Liabilities may also be uncertain by this latter measure. Assets and liabilities of this nature may be in categories such as trade debtors and other receivables, but for our purposes the focus of attention is upon those reported categories within financial statements where uncertainty is most likely to exist, including goodwill and other intangible assets, deferred taxation, derivatives, provisions and pension fund assets and liabilities. These items were appraised as follows:

- l. What proportion of the total assets of the company are of uncertain value?
- m. What proportion of the total liabilities of the company are of uncertain value?
- n. What proportion of the net assets of the company are of uncertain value?

Consideration of the availability of reserves for distribution by the parent was the next focus of concern in this category, since there have been persistent doubts raised on this issue (see BEIS 2019; LAPFF 2018). In particular, we gave focus to the disparity between reported group reserves and the reserves reported by the parent company. This is relevant because if group reserves are negative but parent reserves are positive, this may be an indicator of creative accounting practices in a context where positive reserves are required to pay out dividends. To address this issue the following issues were addressed:

- o. Did the distributable profits of the parent company exceed those of the group, and in what proportion?
- p. What was ratio of dividends to available reserves of:
 - The group;
 - The parent company?
- q. How did these proportions change over time?

The question of differing rewards was also addressed to indicate distributions & financial stress:

- r. What was the ratio of interest paid to EBIT and how did this change over time?
- s. What was the ratio of dividends to wage costs?
- t. What was the ratio of interest to wage costs?
- u. What was the ratio of total finance costs (interest plus dividends) to wage costs?

Finally, questions with regard to tax reporting were addressed:

- v. How large was the variation between the expected current tax rate and the actual current tax rate?
- w. How large were the annual restatements of tax liability and were they consistently negative, implying that successful tax avoidance was taking place?
- x. What was the scale of deferred tax restatement over the period and was trend significant?

The above measures were prepared for all companies for all years. We then broke these measures down into four categories:

1. Financial performance;
2. Productivity;
3. Distributions & financial stress;
4. Reliability of financial reporting.

Financial statements of a quoted company are, according to the International Financial Reporting Standard Foundation, primarily intended to assist 'existing and potential investors, lenders and other creditors in making decisions relating to providing resources to the entity' (IFRS 2018, A17). Data on performance, productivity, stress and reliability can, however, be derived from the information in financial statements, even if this is not the primary purpose for its production. Our approach aims to identify both i) *trends* (in how many years is there an improvement in performance?) and ii) *raw data* (what do the particular levels evident in this data tell us about the firm?) on these four criteria.

To appraise trend data, tables of the following sort have been created for all the variables:

Table 1 – example data table

Turnover	2011	2012	2013	2014	2015	2016	2017	2018	Average	Score	Years in test
	£'m	£'m	£'m	£'m	£'m	£'m	£'m	£'m	£'m		
AstraZeneca plc	20,944	17,673	16,455	16,082	16,144	16,716	17,514	16,442	17,246	3/7	7
GlaxoSmithKline plc	27,387	26,431	26,505	23,006	23,923	27,889	30,186	30,821	27,019	5/7	7
Hikma Pharmaceuticals plc	572	701	874	902	941	1,417	1,509	1,541	1,057	7/7	7
Total pharmaceuticals	48,903	44,805	43,834	39,990	41,008	46,022	49,209	48,803	45,322	3/7	7
Pennon Group plc	-	1,233	1,201	1,321	1,357	1,352	1,353	1,396	1,152	4/6	6
United Utilities Group plc	1,513	1,565	1,636	1,705	1,720	1,730	1,704	1,736	1,664	6/7	7
Severn Trent pc	1,711	1,771	1,831	1,857	1,801	1,787	1,638	1,694	1,761	4/7	7
Total water companies	3,224	4,569	4,668	4,883	4,878	4,869	4,695	4,826	4,577	4/7	7

Source: financial statements ending in the years noted for the entities noted

The table tests a very simply measure in each case: whether a variable has increased in value or not from one year to the next. The number of years when this happens is then calculated and that total is then divided by the number of years used for sampling (the 'Score' column). The direction of testing is dependent on the assumption as to whether an increase in a value is desirable, or not. We then rank trend results to indicate a) declining productivity, or b) increased accounting uncertainty or c) declining reporting quality. This was done using the following methodology:

- i. To interpret results, and to indicate a ranking, these trend results were first averaged for the indicator group and then subjected to a scoring process. Results of less than 30% were awarded a score of 1; the score was then increased by 1 for each 10% band (i.e. 30.01% - 40% is 2) with all results over 70% awarded a score of six.
- ii. These marks were then averaged for each company to create a ranking score.

In each case a low mark is an indicator of concern.

There are weaknesses in such simplicity: the resulting data is not testing the scale of change, for example (although this does emerge from the industry trend aggregates).

But what it does do is establish whether there are persistent patterns in the data, or not.

To add more details, we also created tables which show the raw data in each year, where relevant. In the measures of distributions and the quality of financial reporting this is particularly relevant. In these cases we strip out the impact of inflation, using the United Kingdom's retail prices index. This choice was considered appropriate, firstly, because this is the measure most familiar to those who work for a living and, secondly, because whilst many of the companies appraised have non-UK activity (and two - AstraZeneca and Hikma - actually report in US dollars¹) all report to the UK stock exchange.

¹ US dollar values have been translated to sterling when required at official exchange rates published by the UK's HM Revenue & Customs for the periods to which the financial statements relate.

Report Findings

a. Financial performance

Table 2 provides trend analysis and scores for financial performance in our six case companies. The variable tested is shown in the top row and the percentage number of years when change in trend improved according to those criteria is underneath the row headers:

Table 2: Trend analysis - financial performance

Financial performance data:	Inflation adjusted turnover	Inflation adjusted EBITDA	Inflation adjusted net profit	Inflation adjusted net assets	Inflation adjusted parent company net assets	Gross profit margin	Operating profit margin	Net profit margin	Return on capital employed	Average %	Ranking data
AstraZeneca plc	2/7	3/7	2/7	0/7	2/7	2/7	2/7	2/7	2/7	1.9/7	1
GlaxoSmithKline plc	3/7	3/7	3/7	2/7	3/7	3/7	3/7	3/7	2/7	2.9/7	3
Hikma Pharmaceuticals plc	6/7	4/7	4/7	6/7	4/7	4/7	4/7	4/7	4/7	4.5/7	5
Total pharmaceuticals	3.7/7	3.4/7	3/7	2.7/7	3/7	3/7	3/7	3/7	2.7/7	3.1/7	3
Pennon Group plc	2/6	5/6	4/6	5/6	5/6		5/6	5/6	3/6	5.2/7	6
United Utilities Group plc	3/7	4/7	4/7	7/7	2/7		4/7	4/7	2/7	4/7	4
Severn Trent pc	3/7	2/7	3/7	3/7	3/7		3/7	4/7	3/7	3/7	3
Total water companies	2.8/7	3.9/7	3.9/7	5.3/7	3.5/7		4.2/7	4.6/7	2.8/7	4/7	4

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

Note: for the underlying data, see the spreadsheet appendix.

Note: water companies' gross profit figures were not available through our database because they do not report this margin in their financial statements.

As the ranking analysis of table 2 shows, AstraZeneca plc (AZN) delivered the weakest financial performance over the period: there was a decline in most measures in most years, and a decline in its inflation adjusted group net assets in every year of the period. That is a concern because net assets (total assets minus total liabilities) exactly match the stockholders' equity of a business and so are a measure of a firm's safety and security as well as performance.

Smaller newcomers into their respective sectors - Hikma and Pennon – appear to perform better across the spread of indicators in table 2. This may support findings elsewhere that part of the UK's productivity problem may be the weak performance of larger incumbents (Schneider 2018) and their poor management relatively (Bloom and Van Reenen 2010).

In terms of profit, table 3 shows a worrying decline in real EBITDA performance for AZN and GlaxoSmithKline (GSK) and a flatlining of performance in water companies. Only Hikma emerges as having improved markedly since 2011, but even its EBITDA has been fairly static since 2013/2014.

This worrying performance is reflected in the relative net asset positions of these firms. AZN's net assets more than halved from £28.2bn to £14.0bn between 2011-2018 indicating a hollowing out of its equity support (table 4). GSK was also a weak performer by this measure, with group net assets falling from £10.6bn to £3.7bn over the same period. Water companies, however, modestly improved their aggregate net

asset position between 2012-2018; although Severn Trent underperformed - ending 2018 with a lower real asset position than in 2011; whilst Hikma Pharmaceuticals (HP) was the second-best performing company overall in terms of improvements in net asset position, albeit from a lower base.

Table 5 shows the activity differences between pharma and water. Pharma firms, with a relatively lower capital requirement, have tended to generate higher returns on capital employed. Water companies, due to their heavy tangible fixed asset requirements, require larger amounts of capital. But the trends are clear: the big pharma companies of AZN and GSK have experienced a significant weakening in their ability to generate a return from a given set of capital inputs between 2011-2018. Water companies have experienced a modest decrease in that ability. Hikma's performance has been more volatile, but shows an improvement in 2018 relative to 2011.

Table 3: Raw data - inflation adjusted EBITDA

Inflation adjusted EBITDA	2011		2012		2013		2014		2015		2016		2017		2018		Average		
	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	
AstraZeneca plc	18,418		12,406		9,358		5,956		7,571		7,728		6,873		7,027				9,417
GlaxoSmithKline plc	12,214		11,077		10,937		5,850		14,848		4,923		7,408		7,723				9,372
Hikma Pharmaceuticals plc	197		261		431		515		485		479		508		483				420
Total pharmaceuticals	30,828		23,743		20,726		12,321		22,904		13,130		14,789		15,233				19,209
Pennon Group plc			488		240		399		438		472		495		545				440
United Utilities Group plc			1,044		1,034		1,050		1,074		1,102		1,029		1,015				1,044
Severn Trent pc			930		881		887		850		756		906		889				869
Total water companies			1,974		2,404		2,177		2,322		2,296		2,380		2,412				2,297

Table 4: Raw data - inflation adjusted net assets

Inflation adjusted net assets	2011		2012		2013		2014		2015		2016		2017		2018		Average		
	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	£'m	2018	
AstraZeneca plc	28,165		27,862		26,232		21,619		20,162		17,827		17,178		14,044				21,636
GlaxoSmithKline plc	10,594		7,850		8,813		5,432		9,671		5,308		3,745		3,672				6,886
Hikma Pharmaceuticals plc			959		987		1,166		1,338		1,473		2,579		1,577				1,472
Total pharmaceuticals	39,718		36,699		36,211		28,388		31,305		25,714		22,501		19,413				29,994
Pennon Group plc					957		1,201		1,317		1,475		1,591		1,639				1,391
United Utilities Group plc			2,014		2,054		2,112		2,438		2,651		2,893		2,911				2,503
Severn Trent pc			1,327		1,141		952		1,199		838		1,089		994				1,062
Total water companies			3,341		4,152		4,265		4,955		4,964		5,573		5,422				4,782

Table 5 – Return on Capital Employed

Return on capital employed (EBIT / net assets + long term borrowing)	2011	2012	2013	2014	2015	2016	2017	2018	Average
	AstraZeneca plc	41.5%	24.4%	11.7%	7.6%	12.6%	15.6%	11.2%	10.4%
GlaxoSmithKline plc	40.0%	34.6%	31.6%	17.5%	46.2%	13.3%	23.4%	23.0%	28.7%
Hikma Pharmaceuticals plc	10.1%	13.4%	25.3%	28.6%	18.9%	9.6%	-33.8%	16.0%	11.0%
Total pharmaceuticals	30.5%	24.2%	22.9%	17.9%	25.9%	12.8%	0.3%	16.5%	18.9%
Pennon Group plc		9.0%	1.8%	5.7%	5.7%	5.6%	6.4%	7.5%	6.0%
United Utilities Group plc		8.4%	7.9%	7.6%	7.8%	6.2%	6.4%	6.4%	7.3%
Severn Trent plc		9.2%	8.9%	8.9%	8.6%	7.4%	9.4%	8.3%	8.8%
Total water companies		8.8%	8.6%	6.1%	7.4%	6.9%	7.1%	7.4%	7.5%

b. Productivity measures

Labour Productivity

Productivity measures focus on the effective use of labour. The following trend data is presented in Table 6.

Table 6: Trend data – Employee productivity

Employee productivity data	Average wages - 2018 prices	Ratio turnover to employee cost	Ratio EBITDA to employee cost	Ratio net profit to employee cost	Inflation adjusted turnover per employee	Inflation adjusted EBITDA per employee	Inflation adjusted net profit per employee	Inflation adjusted tangible assets per employee	Inflation adjusted intangible assets per employee	Average	Ranking data
	%	%	%	%	%	%	%	%	%	%	
AstraZeneca plc	3/7	1/7	2/7	2/7	0%	1/7	2/7	3/7	3/7	1.8/7	1
GlaxoSmithKline plc	6/7	2/7	3/7	3/7	4/7	3/7	3/7	4/7	3/7	3.5/7	3
Hikma Pharmaceuticals plc	6/7	3/7	4/7	4/7	5/7	4/7	4/7	3/7	2/7	4.1/7	4
Total pharmaceuticals	5/7	2/7	3/7	3/7	3/7	2.7/7	3/7	3.4/7	2.7/7	3.2/7	3
Pennon Group plc	3/6	2/6	5/6	4/6	2/6	4/6	4/6	4/6	4/6	4.1/7	4
United Utilities Group plc	2/7	3/7	5/7	4/7	3/7	4/7	4/7	4/7	6/7	3.6/7	4
Severn Trent pc	4/7	3/7	2/7	4/7	4/7	2/7	4/7	5/7	2/7	3.5/7	3
Total water companies	3.2/7	2.8/7	4.2/7	4.2/7	3.2/7	3.5/7	4.2/7	4.6/7%	4.2/7	3.7/7	4

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

Note: for the underlying data, see the spreadsheet appendix, Analysis1

There were differences between pharma and water companies in terms of inflation-adjusted wage costs per employee. In GSK and Hikma real wage costs per employee rose in 6 of the 7 years between 2011-2018; although there was a large drop at GSK in 2014 (table 7). AZN's wage costs dropped in 2013, only to rise rapidly between 2016-2018. In all three pharma companies, the average real wage was higher in 2018 than in 2011. Distributions, which we will address later, did not require a reduction to wages for the incumbent workforce, contrary to the 'zero sum' version of financialization (e.g. Lazonick & O'Sullivan 2000). In water, there was greater emphasis on employee cost control. United Utilities saw inflation-adjusted wage costs per employee fall in 5 of the 7 years in our sample, and by the end of 2018 the average real wage was £2,104 lower than in 2011. Wages were marginally lower at Severn Trent but marginally higher at Pennon in 2018 than in 2011/2012.

Table 7: Raw data – Average wage cost per employee

Average wages - 2018 prices	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	57,953	57,601	53,632	55,536	54,512	58,940	67,114	63,242	58,566
GlaxoSmithKline plc	65,458	68,930	70,772	65,544	66,009	68,469	73,935	74,372	69,186
Hikma Pharmaceuticals plc	21,364	23,218	22,578	22,597	24,454	29,824	30,315	30,611	25,620
Total pharmaceuticals	48,258	49,916	48,994	47,892	48,325	52,411	57,122	56,075	51,124
Pennon Group plc	33,629	33,051	33,203	34,390	33,884	33,791	34,025	33,710	33,710
United Utilities Group plc	44,359	44,523	43,413	42,744	42,722	43,267	42,747	42,255	43,254
Severn Trent pc	38,694	38,587	38,971	39,930	40,185	40,720	38,517	37,989	39,199
Total water companies	41,527	38,913	38,478	38,625	39,099	39,290	38,352	38,090	39,047

The emphasis on labour cost control (and activity requirements for a lower labour input) meant that revenue to employee cost (table 8) and EBITDA to employee cost productivity performance (table 9) were higher for water than pharma companies overall. But the two large pharma companies showed patterns of labour productivity

performance that echo their financial performance outlined above. EBITDA to employee cost fell from 3.31 to 1.31 in AZN and from 1.92 to 1.07 in GSK between 2011-2018. AZN show a secular decline, with turnover per employee falling in every year. AZN fell precipitously from a position of strength. It was the best performing firm on a real EBITDA per employee basis in 2011, realising £307,987 (table 10). By 2018 that figure had fallen to £111,187 per employee, lower than that realised by both United Utilities and Severn Trent and roughly on a par with Pennon Group. GSK also saw a marked deterioration in EBITDA per employee, falling from £125,395 in 2011 to £79,741 – the second lowest score in our sample.

The overall average scores for the sectors show a worrying decline in labour productivity performance in pharma and modest decline in labour productivity in water. This may indicate either that productivity growth was not an objective for management in either sector, or that if it was then they failed to achieve their goals.

Table 8: Raw data – Turnover to employee cost

Ratio turnover to employee cost	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	7.25	6.67	6.71	5.70	5.37	4.93	4.49	4.11	5.65
GlaxoSmithKline plc	5.16	4.52	4.23	3.91	3.90	4.36	4.24	4.28	4.33
Hikma Pharmaceuticals plc	5.22	5.28	6.18	6.15	5.83	6.09	6.03	5.98	5.85
Total pharmaceuticals	5.88	5.49	5.71	5.26	5.03	5.13	4.92	4.79	5.28
Pennon Group plc		9.42	8.94	9.84	9.43	8.56	8.61	8.18	9.00
United Utilities Group plc	8.65	8.03	8.02	8.24	8.31	8.12	7.75	7.86	8.12
Severn Trent pc	6.41	6.63	6.45	6.40	6.21	6.29	7.48	7.12	6.62
Total water companies	7.53	8.03	7.80	8.16	7.98	7.66	7.95	7.72	7.85

Table 9: Raw data – EBITDA to employee cost

Ratio EBITDA to employee cost	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	3.31	2.54	2.16	1.16	1.51	1.55	1.33	1.31	1.86
GlaxoSmithKline plc	1.92	1.63	1.55	0.90	2.22	0.72	1.01	1.07	1.38
Hikma Pharmaceuticals plc	0.93	1.07	1.73	1.93	1.80	1.40	1.53	1.40	1.47
Total pharmaceuticals	2.05	1.75	1.81	1.33	1.84	1.22	1.29	1.26	1.57
Pennon Group plc		3.21	1.58	2.70	2.79	2.80	3.05	3.20	2.76
United Utilities Group plc	4.97	4.56	4.56	4.71	4.89	4.40	4.53	4.60	4.65
Severn Trent pc	2.90	2.84	2.77	2.66	2.39	2.98	3.93	3.58	3.01
Total water companies	3.94	3.53	2.97	3.36	3.36	3.39	3.84	3.79	3.52

Table 10: Raw data – EBITDA per employee

Inflation adjusted EBITDA per employee	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	307,987	231,882	181,350	106,556	125,967	125,660	114,543	111,187	163,142
GlaxoSmithKline plc	125,395	112,250	109,571	59,267	146,733	49,314	74,569	79,741	94,605
Hikma Pharmaceuticals plc	31,928	39,199	60,979	72,138	67,428	57,456	59,601	57,411	55,767
Total pharmaceuticals	155,104	127,777	117,300	79,320	113,376	77,477	82,904	82,780	104,505
Pennon Group plc		107,851	52,271	89,595	96,120	94,746	103,137	108,716	93,205
United Utilities Group plc	220,529	202,981	198,127	201,538	208,737	190,313	193,694	194,275	201,274
Severn Trent pc	112,314	109,403	107,857	106,295	96,167	121,444	151,431	135,994	117,613
Total water companies	166,422	140,078	119,418	132,476	133,675	135,501	149,421	146,328	140,415

Asset Productivity

The productivity of financial assets is also an important consideration. The trend data for these measures is shown in Table 11.

Table 11: Trend data - Asset productivity

Financial productivity data t	Turnover to	Turnover to	Turnover to		Average	Ranking data
	tangible	intangible	Turnover to	trade and		
	assets	assets	inventory	related		
	%	%	%	debtors	%	
AstraZeneca plc	1/7	2/7	2/7	4/7	2.2/7	2
GlaxoSmithKline plc	3/7	4/7	3/7	4/7	3.5/7	3
Hikma Pharmaceuticals plc	4/7	4/7	4/7	3/7	3.8/7	4
Total pharmaceuticals	2.7/7	3.4/7	3/7	3.6/7	3.2/7	3
Pennon Group plc	1/6	3/6	0/6	1/6	1.5/7	1
United Utilities Group plc	2/7	1/7	6/7	4/7	3.2/7	3
Severn Trent pc	2/7	5/7	4/7	4/7	3.8/7	4
Total water companies	1.8/7	3.2/7	3.5/7	3.2/7	2.9/7	3

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

Pharma companies and water companies have very different asset structures. Pharma companies are R&D-intensive companies who produce patented (and occasionally other) drugs which compete in global markets, and are consequently intangible asset-heavy (see Froud et al 2006). Water companies, on the other hand are quasi-local monopolies with activities which are tangible fixed asset heavy, because they require plants, water pipelines and other physical infrastructure.

The asset productivity performance of these activities reflect these different activity bases and balance sheet structures. The more intangible-heavy pharma companies have much higher rates of turnover to tangible assets – although in AZN and GSK there has – again – been a slowdown: for AZN turnover was 5.23x and for GSK 3.13x their tangible assets in 2011. This fell to 2.98x and 2.79x tangible assets respectively by 2018 (table 12). There were also modest declines over the same period across our three water companies.

Pharma companies sell patented drugs – so building a stock of intellectual property is part and parcel of operating in a knowledge-based activity. As table 13 shows intangible assets per employee are not only much higher in pharma than water, but

have also increased significantly over our period of study (also contrast with table 10 on EBITDA per employee). United Utilities and Severn have much higher turnover to intangibles ratios because their local monopoly status prevents large acquisitions that would boost their goodwill. Pennon is an outlier because it has 2-3 times the intangibles of the other two water firms (table 14). These intangibles arise from investment in what are termed 'service concession arrangements' in its Viridor recycling business, which is one of the largest such operations in the UK.

These 'intangible' assets are often thought to be the driver of productivity in the pharma sector. However, the data reveals that this growth of intangibles has not led to an improvement in financial performance and productivity. As table 14 and 15 show, returns to intangibles have fallen quite spectacularly in the two large pharma firms, AZN and GSK. EBITDA to intangible assets fell by over two thirds at AZN and around three fifths at GSK; Hikma has also experienced decline since 2013 after rapid improvements from 2011-2013 (table 15). Some of this may relate to the changing sectoral environment – such as the slowing productivity of R&D investment (see Froud et al 2006). But it may also relate to the changing make-up of the intangibles on pharma firm balance sheets themselves. Intangibles may also include 'goodwill' (see section 3ii) which is valued by the future income streams that are expected to accrue to things like brand, loyalty, reputation etc, but is effectively just an accounting plug when one company acquires another. Turnover and EBITDA to intangibles ratios decrease as intangibles grow at AZN and GSK. This is not unsurprising because goodwill is effectively a stock of future cashflows, whilst turnover is a flow measure. Part of the asset productivity puzzle in this specific case may be the result of an accounting artefact – the non-amortization of goodwill which loads up the denominator in any Return on Asset calculation (see table 16). But placed alongside the financial performance and labour productivity performance above for GSK and AZN, there appears to be an inverse relation between the acquisition of goodwill and the decline of performance across a range of measures. It is unclear whether these M&A activities are defensive measures in worsening competitive environment - and that productivity performance would have been worse without those acquisitions. But it is also important not to discount the possibility that there are financial engineering benefits to multiple acquisitions but productivity diseconomies.

What are those financial engineering benefits? Goodwill values are a capitalised measure of the acquirer's expected future cash flows at the point of acquisition. But the cash flows which then result from that acquisition are accounted for as income that increases assets (cash, accounts receivable, etc.) or equity (retained earnings) without incurring any corresponding costs or reductions to goodwill. The benefits of an acquisition are, in other words, monetized first as goodwill, then again as income. The resulting inflation of assets and equity are thus a form of double counting and this may distort managerial incentives. For example, given the option of either capitalising or distributing this double-counted income many managers may choose to distribute. This may lead to an 'acquire and distribute' strategy which displaces other investment-led, productivity-focused sources of shareholder value creation. Hence, even if an acquisition has productive diseconomies, it may have benefits in terms of improving managements' capacity to distribute. Remuneration structures tied to shareholder value measures or measures that underpin the creation of shareholder value may exacerbate this problem.

In both cases there is little indication of successful investment likely to result in increased productivity, and unsurprisingly it was not delivered. Water companies invested more: it may explain their slightly better productivity performance, but other factors – such as the pricing regime - may play a role (see Leaver forthcoming). Within the pharmaceutical sector the overall levels of investment per employee also fell (see below).

Table 12: Raw data – Turnover to tangible assets

Turnover to tangible assets	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	5.23	4.59	4.42	4.42	3.85	3.36	2.95	2.98	3.97
GlaxoSmithKline plc	3.13	3.01	2.99	2.54	2.47	2.58	2.78	2.79	2.79
Hikma Pharmaceuticals plc	2.19	2.63	3.08	2.90	2.84	2.01	2.34	2.38	2.55
Total pharmaceuticals	3.51	3.41	3.50	3.29	3.06	2.65	2.69	2.71	3.10
Pennon Group plc		0.40	0.37	0.38	0.38	0.35	0.33	0.32	0.36
United Utilities Group plc	0.18	0.18	0.18	0.18	0.18	0.17	0.16	0.16	0.18
Severn Trent pc	0.27	0.27	0.27	0.26	0.24	0.23	0.20	0.20	0.24
Total water companies	0.22	0.28	0.27	0.28	0.27	0.25	0.23	0.23	0.25

Table 13: Raw data - real intangible assets per employee

Inflation adjusted intangible assets per employee	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	418,317	572,985	569,039	640,381	624,324	682,452	653,970	532,690	586,770
GlaxoSmithKline plc	142,400	171,205	152,438	134,276	235,035	264,952	242,044	237,385	197,467
Hikma Pharmaceuticals plc	79,626	75,773	71,355	92,792	91,974	220,463	95,095	91,050	102,266
Total pharmaceuticals	213,448	273,321	264,277	289,150	317,111	389,289	330,370	287,042	295,501
Pennon Group plc		83,881	83,427	83,884	81,088	82,565	82,811	91,264	84,131
United Utilities Group plc	25,095	21,691	22,345	24,779	29,905	32,988	36,488	37,852	28,893
Severn Trent pc	29,419	23,268	19,348	13,080	13,580	12,474	28,492	24,102	20,471
Total water companies	27,257	42,947	41,707	40,581	41,524	42,676	49,264	51,073	42,128

Table 14: Raw data – Turnover to intangible assets

Turnover to intangible assets	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	1.61	1.06	0.99	0.82	0.72	0.59	0.59	0.66	0.88
GlaxoSmithKline plc	2.37	1.82	1.97	1.91	1.10	1.13	1.30	1.34	1.62
Hikma Pharmaceuticals plc	2.24	2.56	3.05	2.47	2.37	1.13	2.47	2.70	2.38
Total pharmaceuticals	2.08	1.81	2.00	1.73	1.40	0.95	1.45	1.57	1.62
Pennon Group plc		3.78	3.54	3.89	4.00	3.51	3.51	3.05	3.61
United Utilities Group plc	15.28	16.47	15.58	14.21	11.87	10.65	9.08	8.78	12.74
Severn Trent pc	8.43	11.00	12.99	19.55	18.38	20.54	10.11	11.22	14.03
Total water companies	11.86	10.42	10.70	12.55	11.42	11.57	7.57	7.68	10.47

Table 15: Raw data – EBITDA to intangible assets

Ratio of EBITDA to intangible assets	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	73.6%	40.5%	31.9%	16.6%	20.2%	18.4%	17.5%	20.9%	29.9%
GlaxoSmithKline plc	88.1%	65.6%	71.9%	44.1%	62.4%	18.6%	30.8%	33.6%	51.9%
Hikma Pharmaceuticals plc	40.1%	51.7%	85.5%	77.7%	73.3%	26.1%	62.7%	63.1%	60.0%
Total pharmaceuticals	67.3%	52.6%	63.1%	46.2%	52.0%	21.0%	37.0%	39.2%	47.3%
Pennon Group plc		128.6%	62.7%	106.8%	118.5%	114.8%	124.5%	119.1%	110.7%
United Utilities Group plc	878.8%	935.8%	886.7%	813.3%	698.0%	576.9%	530.8%	513.3%	729.2%
Severn Trent pc	381.8%	470.2%	557.4%	812.6%	708.2%	973.6%	531.5%	564.2%	624.9%
Total water companies	630.3%	511.5%	502.3%	577.6%	508.2%	555.1%	395.6%	398.9%	509.9%

Table 16: Raw data – EBITDA to tangible and intangible assets

Ratio of EBITDA to total tangible and intangible fixed assets	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	56.3%	32.9%	26.0%	14.0%	17.0%	15.7%	14.6%	17.1%	24.2%
GlaxoSmithKline plc	50.1%	40.9%	43.4%	25.2%	43.3%	13.0%	21.0%	22.7%	32.4%
Hikma Pharmaceuticals plc	19.8%	26.2%	42.9%	41.9%	39.9%	16.7%	30.5%	29.5%	30.9%
Total pharmaceuticals	42.1%	33.3%	37.4%	27.1%	33.4%	15.1%	22.0%	23.1%	29.2%
Pennon Group plc		12.3%	5.9%	9.6%	10.3%	10.3%	10.7%	11.4%	10.1%
United Utilities Group plc	10.4%	10.2%	10.2%	10.3%	10.3%	9.2%	9.4%	9.2%	9.9%
Severn Trent pc	11.7%	11.2%	11.4%	10.8%	9.1%	10.9%	10.4%	9.9%	10.7%
Total water companies	11.0%	11.2%	9.2%	10.2%	9.9%	10.1%	10.2%	10.2%	10.3%

c. Distributions & Financial Stress

Our distributions analysis describes those measures that might indicate whether shareholder distributions are excessive relative to underlying operating performance. It is also, therefore, also a measure of financial stress. Overly generous distributions to shareholders may expose creditors and other stakeholders to the risk of impairments or bankruptcy. Table 17 presents indicative trend data on a series of measures.

Table 17: Trend data - Distributions & financial stress

Cost of financing ratios	Dividend to	Ratio of	Ratio of	Ratio of		Ratio of	Average	Ranking data	
	net profit	dividends to	dividends to	interest cost	Gearing ratio	dividends			
accounts	ratio - group	available	available	to borrowing	(Debt to	and interest			
%	accounts	group	parent	Interest to	equity)	costs to	%		
%	earnings	earnings	earnings	EBIT ratio	accounts	wage cost	%		
AstraZeneca plc	2/7	0/7	3/7	1/7	6/7	0/7	3/7	2.2/7	2
GlaxoSmithKline plc	4/7	3/7	3/7	4/7	4/7	2/7	4/7	3.4/7	3
Hikma Pharmaceuticals plc	3/7	2/7	3/7	3/7	3/7	3/7	1/7	2.6/7	2
Total pharmaceuticals	3/7	1.7/7	3/7	2.7/7	4.3/7	1.7/7	2.7/7	2.7/7	2
Pennon Group plc	3/6	4/6	4/6	3/6	2/6	5/6	3/6	4/7	4
United Utilities Group plc	3/7	3/7	2/7	4/7	4/7	4/7	5/7	3.6/7	4
Severn Trent pc	3/7	3/7	3/7	4/7	4/7	3/7	3/7	3.3/7	3
Total water companies	3.2/7	3.5/7	3.2/7%	3.9/7	3.5/7	4.2/7	3.9/7	3.6/7	4

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

Note: available earnings here are calculated as retained earnings from the previous year plus net profit after tax from the current year.

Note: on the dividend figures above a low figure is again a measure of undesirability – hence on 'dividends to net profit ratio – group accounts' a score of 2/7 for AZN means that in 5 years out of 7, the ratio increased.

Table 18 shows that the ratio of dividends paid to group net profit for all pharma companies are higher in 2018 than in 2011, and that the growth in dividends relative to group profit increases steadily across those years. Water companies show a slightly more uneven trend: Pennon's dividends to group net profit grow steadily to 2017 only to fall back to a level just above the 2011 figure in 2018. United Utilities and Severn's dividends to group net profit figure fluctuate throughout the period studied, but end 2018 marginally below 2011 figures.

Importantly, AZN distributes dividends in excess of group net profit in 6 of the 8 years in our sample. GSK do the same in 3 of the 8 years in our sample (table 18). Table 19 shows that dividends to group earnings are increasing for AZN. More spectacularly

they show that in 2016-18 GSK had negative earnings at group level, but continued to pay out dividends of £12.7bn. This was only possible because, as noted in section 3i, the legal limit of dividend distributions is the distributable reserves of the parent company not the group, which are ordinarily interpreted as the parent's 'retained earnings'. Table 20 shows a significant discrepancy between group and parent figures at GSK. GSK has relatively high earnings at parent level, which allows it to continue to pay large amounts of dividends (table 20). There are many reasons why there might be discrepancies between group and parent (for example if the parent is trading and generates its own profit), but it may – as both PIRC and the FSA recognise – be a signal that the holding value of parent subsidiaries are over-estimated, leading to an over-statement of distributable reserves (Bouvier 2019).

Table 18: Raw data – Dividends to current net profit ratio

Dividend to net profit ratio - group accounts									
	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	30.6%	47.9%	105.9%	282.6%	113.6%	100.3%	158.0%	174.8%	126.7%
GlaxoSmithKline plc	44.2%	57.0%	55.4%	129.5%	36.8%	250.1%	132.9%	81.8%	98.5%
Hikma Pharmaceuticals plc	26.6%	20.5%	13.1%	15.2%	20.1%	36.7%	-10.7%	29.5%	18.9%
Total pharmaceuticals	33.8%	41.8%	58.1%	142.4%	56.8%	129.0%	93.4%	95.4%	81.3%
Pennon Group plc		34.5%	357.3%	43.7%	35.0%	59.7%	62.5%	41.0%	90.5%
United Utilities Group plc	69.1%	74.6%	71.8%	44.0%	72.9%	73.3%	59.5%	61.8%	65.9%
Severn Trent plc	66.8%	101.3%	161.0%	65.4%	133.1%	61.2%	57.9%	65.2%	89.0%
Total water companies	68.0%	70.1%	196.7%	51.0%	80.3%	64.7%	60.0%	56.0%	80.9%

Table 19: Raw data – Dividends to available group earnings ratio

Ratio of dividends to available group earnings									
	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc		15.2%	16.9%	19.4%	22.0%	23.4%	32.0%	33.9%	23.2%
GlaxoSmithKline plc		47.0%	58.6%	102.6%	61.5%	-1447.8%	-145.4%	-161.5%	-212.1%
Hikma Pharmaceuticals plc		4.7%	5.3%	5.6%	5.6%	6.5%	6.4%	5.1%	5.6%
Total pharmaceuticals		22.3%	26.9%	42.5%	29.7%	-472.6%	-35.7%	-40.9%	-61.1%
Pennon Group plc		40.1%	14.2%	11.1%	9.3%	15.4%	15.5%	11.9%	16.8%
United Utilities Group plc		20.9%	21.0%	14.8%	16.6%	12.9%	11.4%	11.4%	15.6%
Severn Trent pc		6.3%	9.4%	5.6%	6.3%	6.1%	5.7%	6.1%	6.5%
Total water companies		22.4%	14.9%	10.5%	10.7%	11.5%	10.9%	9.8%	12.9%

Table 20: Raw data – Dividends to available parent company earnings ratio

Ratio of dividends to available parent earnings									
	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc		27.9%	19.6%	18.6%	17.8%	19.2%	19.4%	20.6%	20.4%
GlaxoSmithKline plc		16.3%	13.1%	19.2%	12.3%	23.0%	26.5%	15.0%	17.9%
Hikma Pharmaceuticals plc		3.0%	2.4%	3.3%	3.3%	4.0%	4.0%	6.3%	3.8%
Total pharmaceuticals		15.7%	11.7%	13.7%	11.1%	15.4%	16.6%	14.0%	14.0%
Pennon Group plc		40.1%	13.0%	8.2%	7.5%	10.5%	11.4%	8.8%	14.2%
United Utilities Group plc		7.2%	8.5%	7.3%	8.9%	7.1%	7.2%	7.5%	7.7%
Severn Trent pc		6.3%	9.4%	5.6%	6.3%	6.1%	5.7%	6.1%	6.5%
Total water companies		17.8%	10.3%	7.1%	7.6%	7.9%	8.1%	7.5%	9.5%

Another indicator of financial stress – or at least financial risk – is the gearing ratio. A general rule of thumb for high R&D firms like pharma is that a debt-to-equity ratio of 2:1 is the norm (Gallo 2015). AstraZeneca's debt-equity ratio is well below this, but does almost triple during our sample period. GSK is well above that norm, quadrupling its debt-equity ratio between 2011-2018, ending with a ratio of 7:1. Water companies have always been relatively highly levered because they are quasi-monopolies with a guaranteed price and customer base which makes it less risky to borrow against those future income streams. A ratio of 2-2.5x debt-equity is therefore probably not as risky

(particularly with their under-exposure to goodwill impairment risks); although Severn's increase to 5.6x by 2018 may be cause for concern.

Table 21: Raw data – Gearing ratio

Gearing ratio (Debt to equity)	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	39.8%	43.1%	44.6%	55.2%	81.3%	100.8%	107.0%	136.1%	76.0%
GlaxoSmithKline plc	168.8%	271.3%	233.6%	380.6%	187.3%	378.6%	471.0%	709.8%	350.1%
Hikma Pharmaceuticals plc	65.0%	68.9%	42.7%	46.2%	53.8%	35.6%	50.8%	37.5%	50.1%
Total pharmaceuticals	91.2%	127.7%	107.0%	160.7%	107.5%	171.7%	209.6%	294.5%	158.7%
Pennon Group plc		307.7%	248.4%	234.5%	219.2%	209.7%	216.4%	206.8%	234.7%
United Utilities Group plc	316.6%	331.7%	329.8%	273.9%	273.1%	258.0%	261.9%	268.1%	289.1%
Severn Trent plc	392.8%	448.3%	568.8%	424.0%	640.7%	482.0%	571.9%	560.2%	511.1%
Total water companies	354.7%	362.6%	382.3%	310.8%	377.6%	316.5%	350.1%	345.0%	350.0%

Note: debt here = short term + long term debt

Finally, one explanation of productivity decline is that of growing inequality (Berg & Ostry 2011). One driver of that inequality may be that a greater proportion of internally generated funds are being distributed to capital rather than labour (see Piketty & Goldhammer 2014). Table 22 shows the relatively high costs of capital relative to wages in all firms. Costs are higher in water companies due to their higher leverage and reliance on debt funding, with companies like United Utilities paying out over twice as much in interest and dividends than it does in wages. Even a pharmaceutical company like AZN who we might think would need to pay a premium to retain a high-skilled workforce, pays out almost as much in interest and dividends as it does in wages. It is also worth noting that this high payout to capital is happening at a time when interest rates are very low.

Table 22: Raw data: Dividends to wage costs ratio

Ratio of dividends and interest costs to wage cost	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	92.3%	99.3%	101.9%	94.6%	98.1%	104.6%	98.2%	88.7%	97.2%
GlaxoSmithKline plc	77.5%	77.7%	70.0%	76.6%	73.8%	86.3%	75.2%	64.5%	75.2%
Hikma Pharmaceuticals plc	27.3%	29.0%	33.5%	36.8%	47.8%	52.8%	21.2%	46.5%	36.9%
Total pharmaceuticals	65.7%	68.7%	68.5%	69.3%	73.2%	81.2%	64.9%	66.6%	69.8%
Pennon Group plc		108.0%	88.8%	91.8%	76.3%	108.9%	139.5%	119.5%	104.7%
United Utilities Group plc	273.7%	266.7%	252.0%	160.4%	273.3%	224.6%	205.6%	214.6%	233.9%
Severn Trent plc	155.1%	176.8%	215.5%	129.3%	150.7%	143.0%	180.4%	175.2%	165.7%
Total water companies	214.4%	183.8%	185.4%	127.2%	166.8%	158.8%	175.2%	169.8%	172.7%

This analysis of distributions offers an alternative reading of the relationship between the costs of capital and productivity slowdown: if liabilities are taken on to finance acquisitions, then there are two implications. First, this will lead to a growing amount of goodwill on firm balance sheets which is not amortised but does carry an impairment risk. The absence of amortisation and the discretion management appears to have over the impairment decision, shores up the net asset position of the group and diminishes pressure on the parent to impair the holding value of its subsidiaries. That acts both as a support for its distributable reserves, and an incentive for further M&A activity. It also creates a double standard relative to those firms who try to grow organically, but cannot realise any 'internally generated' goodwill (see Haskel & Westlake 2017). In a sense, then, the goodwill rules incentivise M&A which may benefit them in terms of financial engineering possibilities, but may make no sense in terms of building internal competences organically which improve productivity.

In this sense, managers may switch their efforts away from the ‘difficult stuff’ of exercising skill and judgement in the selection of investment opportunities or improving technique, to the simpler, lower-risk practice of buying corporate assets which add financial engineering opportunities.

d. *Reliability of financial reporting*

The above point about financial engineering can be understood by examining the prevalence of assets of uncertain value on our sample companies’ balance sheets. The ratios of uncertain assets to total assets and uncertain liabilities to total liabilities are shown in table 23.

Table 23: Raw data– Ratios of uncertain assets to total assets, uncertain liabilities to total liabilities and uncertain net assets to total net assets

Uncertain assets to total assets	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	42.3%	51.3%	48.7%	57.6%	59.4%	64.5%	63.5%	59.4%	55.8%
GlaxoSmithKline plc	35.1%	40.8%	37.0%	36.2%	46.3%	49.3%	48.1%	46.3%	42.4%
Hikma Pharmaceuticals plc	28.2%	27.7%	27.6%	29.7%	26.1%	43.3%	27.2%	25.5%	29.4%
Total pharmaceuticals	35.2%	39.9%	37.8%	41.2%	43.9%	52.4%	46.2%	43.7%	42.5%
Pennon Group plc		7.6%	7.1%	6.8%	6.3%	6.8%	6.5%	7.4%	6.9%
United Utilities Group plc	1.1%	0.9%	1.0%	1.1%	1.3%	1.4%	1.5%	1.5%	1.2%
Severn Trent pc	2.7%	2.1%	1.8%	1.2%	1.2%	1.0%	1.8%	1.6%	1.7%
Total water companies	1.9%	3.6%	3.3%	3.1%	2.9%	3.1%	3.3%	3.5%	3.1%
Uncertain liabilities to total liabilities	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	24.8%	20.9%	19.8%	15.1%	14.3%	16.8%	17.3%	14.4%	17.9%
GlaxoSmithKline plc	23.9%	16.0%	13.3%	15.8%	15.0%	14.3%	11.9%	10.7%	15.1%
Hikma Pharmaceuticals plc	4.4%	4.3%	5.1%	4.9%	3.9%	2.2%	4.0%	2.2%	3.9%
Total pharmaceuticals	17.7%	13.8%	12.8%	11.9%	11.1%	11.1%	11.1%	9.1%	12.3%
Pennon Group plc		15.3%	16.7%	14.4%	14.5%	14.1%	13.5%	12.9%	14.5%
United Utilities Group plc	20.8%	18.2%	16.8%	16.2%	15.1%	14.6%	13.6%	12.2%	15.9%
Severn Trent pc	21.0%	22.0%	21.2%	18.7%	18.2%	15.9%	17.6%	16.4%	18.9%
Total water companies	20.9%	18.5%	18.2%	16.4%	16.0%	14.9%	14.9%	13.8%	16.7%
Uncertain net assets to total net assets	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	64.2%	88.8%	89.2%	141.9%	160.9%	195.9%	193.1%	208.8%	142.8%
GlaxoSmithKline plc	75.7%	168.1%	141.0%	184.5%	203.5%	430.9%	573.8%	573.1%	293.8%
Hikma Pharmaceuticals plc	51.4%	52.0%	47.1%	50.8%	46.4%	76.7%	55.3%	50.2%	53.8%
Total pharmaceuticals	63.8%	103.0%	92.5%	125.7%	137.0%	234.5%	274.1%	277.4%	163.5%
Pennon Group plc		-24.4%	-26.1%	-17.0%	-18.4%	-13.8%	-13.9%	-7.7%	-17.3%
United Utilities Group plc	-89.3%	-80.0%	-70.8%	-55.4%	-49.2%	-43.5%	-39.7%	-34.7%	-57.8%
Severn Trent pc	-105.7%	-134.5%	-163.7%	-108.0%	-169.4%	-107.8%	-137.1%	-123.5%	-131.2%
Total water companies	-97.5%	-79.6%	-86.9%	-60.1%	-79.0%	-55.0%	-63.5%	-55.3%	-72.1%

Source: Author’s calculations based on financial statements ending in the years noted for the entities noted

Note ‘Uncertain net assets to total net assets’ is calculated as (uncertain assets – uncertain liabilities)/net assets

As table 23 shows, uncertain assets are inconsequential in the water companies surveyed. They amount to little more than small deferred tax balances and other small items. In contrast such assets are significant on the balance sheets of pharmaceutical companies. Liabilities of uncertain value are broadly similar across pharma and water companies. The third row shows uncertain net assets to reported net assets, calculated as ‘(uncertain assets – uncertain liabilities)/reported net assets’ In the two large pharmaceutical firms, the value of uncertain net assets substantially exceed total net assets. In effect this means that the balance sheet position of AZN and GSK are

heavily dependent on assets where substantial management judgement is involved in any valuation process.

Another concern is highlighted in table 24. These ratios show that in the cases of AZN and GSK the value of the parent companies' net assets are growing in proportion to their groups' net assets. It also shows that in all of our cases the value of the parent company exceeds that of that of their respective groups, although the growth is most marked in the two largest pharmaceutical companies and Severn Trent, repeating a trend observed above. The patterns of retained earnings are difficult to interpret because, as previously noted, GSK have negative retained earnings at group level from 2014 onwards but positive retained earnings at a parent company level, leading to a negative result in table 24. But the implication is clear: there is a large divergence between the retained earnings position of group and parent.

Table 24: Raw data – ratios of parent company net assets to group net assets and parent company retained earnings to group retained earnings

Ratio of parent company net assets to group net assets	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	57.1%	91.7%	107.3%	123.1%	121.8%	136.2%	133.9%	135.5%	113.3%
GlaxoSmithKline plc	261.6%	402.6%	288.4%	582.8%	288.6%	428.2%	768.7%	652.9%	459.2%
Hikma Pharmaceuticals plc	138.8%	199.6%	163.9%	165.2%	154.8%	131.1%	203.9%	179.0%	167.0%
Total pharmaceuticals	152.5%	231.3%	186.5%	290.4%	188.4%	231.9%	368.8%	322.4%	246.5%
Pennon Group plc		106.1%	120.2%	114.6%	127.5%	120.7%	121.3%	118.5%	118.4%
United Utilities Group plc	246.1%	220.7%	217.6%	183.3%	195.9%	175.3%	167.4%	159.2%	195.7%
Severn Trent pc	255.2%	373.8%	397.5%	320.2%	440.6%	342.5%	377.2%	349.3%	357.0%
Total water companies	250.6%	233.6%	245.1%	206.0%	254.7%	212.8%	222.0%	209.0%	229.2%

Ratio of parent company retained earnings to group retained earnings	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	38.4%	84.0%	104.1%	128.2%	128.0%	188.0%	180.9%	204.2%	132.0%
GlaxoSmithKline plc	554.6%	3435.7%	1881.6%	-1121.1%	-1434.0%	-288.2%	-341.3%	-847.8%	229.9%
Hikma Pharmaceuticals plc	171.2%	265.7%	196.3%	192.1%	174.0%	136.8%	75.9%	61.4%	159.2%
Total pharmaceuticals	254.7%	1261.8%	727.3%	-266.9%	-377.3%	12.2%	-28.2%	-194.1%	173.7%
Pennon Group plc		109.7%	145.9%	129.0%	158.7%	146.2%	146.9%	137.7%	139.1%
United Utilities Group plc	375.5%	303.1%	286.7%	205.4%	200.6%	170.6%	159.9%	149.2%	231.4%
Severn Trent pc	730.3%	1244.4%	656.8%	450.5%	893.5%	533.0%	654.8%	539.8%	712.9%
Total water companies	552.9%	552.4%	363.1%	261.6%	417.6%	283.3%	320.5%	275.5%	378.4%

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

One way of exploring this relation more fully is to examine how the value of the investment in subsidiary companies on the parent company balance sheet compares with the net asset value of the group. This is shown in table 25

Table 25: Raw data – Ratio of parent company value of investment in subsidiary to net asset value of the group

Ratio of parent company value of investment in subsidiaries to net asset value of group	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	99.8%	105.9%	117.3%	139.6%	162.3%	182.7%	189.2%	236.7%	154.2%
GlaxoSmithKline plc	223.0%	291.8%	252.1%	398.9%	226.4%	407.7%	558.8%	544.3%	362.9%
Hikma Pharmaceuticals plc	208.4%	197.9%	162.3%	167.2%	139.6%	131.9%	217.5%	196.1%	177.6%
Total pharmaceuticals	177.0%	198.5%	177.2%	235.2%	176.1%	240.8%	321.8%	325.7%	231.6%
Pennon Group plc		142.6%	124.3%	110.5%	112.5%	109.5%	107.6%	120.9%	118.3%
United Utilities Group plc	333.7%	317.3%	299.1%	252.7%	260.0%	233.9%	224.3%	214.4%	266.9%
Severn Trent pc	321.0%	370.8%	431.5%	345.2%	488.9%	374.4%	360.2%	335.0%	378.4%
Total water companies	327.4%	276.9%	285.0%	236.1%	287.2%	239.2%	230.7%	223.4%	263.2%

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

What the data shows is that the value of the subsidiaries reported in the parent company accounts is increasing against the valuation of net assets of the group. And again, the most significant growth over this period is at AZN and GSK; although all companies show that subsidiary valuations on the parent balance sheet are much higher than group net assets, with the exception of Pennon. If the value of the investment in subsidiaries was reduced to reflect the value of their assets, marked to value (as International Financial Reporting Standard requires, albeit without upward goodwill revaluation) on the group balance sheet then the value of reserves in the parent company accounts of all these groups of companies would be significantly impaired. The consequence would be a substantial reduction in the available reserves in those parent companies. Table 26 presents this counterfactual calculation: it provides an indication of the impairment required to equate the values of the investment in subsidiary companies with the net asset values of their groups.

Table 26: Raw data - Value of impairment required to restate the cost of investment in subsidiary companies at net asset worth

Value of impairment required to restate cost of investment in subsidiary companies at net asset worth	2011	2012	2013	2014	2015	2016	2017	2018	Average
	'Mn	'Mn	'Mn	'Mn	'Mn	'Mn	'Mn	'Mn	'Mn
AstraZeneca plc	-45	1,403	4,016	7,780	11,538	13,780	14,840	19,200	9,064
GlaxoSmithKline plc	10,853	12,942	11,879	14,755	11,218	15,273	16,647	16,315	13,735
Hikma Pharmaceuticals plc	866	830	644	817	536	768	1,795	1,631	986
Pennon Group plc		350	259	126	170	141	115	342	215
United Utilities Group plc	3,922	3,835	3,728	3,384	3,893	3,622	3,507	3,376	3,658
Severn Trent pc	2,444	2,657	2,798	2,673	2,991	2,793	2,402	2,336	2,637

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

Note that the figures for AstraZeneca and Hikma are in US dollars and as such totals are not calculated.

The impact of this impairment on parent company retained earnings, which would be restated if these sums were provided would then leave them as stated in Table 27.

Table 27: Raw data – Value of parent company retained earnings if impairment as made of subsidiary cost to reflect group net asset value

Value of parent company retained earnings if impairment was made of subsidiary cost to reflect net asset value	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	6,918	13,684	13,640	8,929	3,609	1,527	34	-7,598	5,093
GlaxoSmithKline plc	7,836	9,459	5,300	8,496	8,815	265	5,459	1,802	5,929
Hikma Pharmaceuticals plc	-68	549	738	877	1,241	2,071	-746	-661	500
Pennon Group plc	0	172	210	477	464	527	569	465	360
United Utilities Group plc	-3,231	-3,056	-2,843	-2,154	-2,282	-1,743	-1,516	-1,256	-2,260
Severn Trent pc	-2,121	-2,400	-2,360	-2,006	-2,667	-2,233	-1,948	-1,788	-2,190

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

It is a legal requirement that a company have retained realised earnings before it may make a distribution to its shareholders by way of dividend. This data suggests that if the provisions noted were made then neither United Utilities or Severn Trent would have been capable of making dividend payments during this period whilst AstraZeneca and Hikma joining them in this situation by 2018 and with GSK trending in that same direction. Only Pennon appears to have no issue to address. The impact of judgement in the valuation of assets of inherently uncertain value is demonstrated in that case.

The same question of reliability of the reporting of accounting data and associated issues in the case of taxation related matters. Table 28 provides a summary of the heuristic reporting on this issue.

Table 28: Trend data – Tax quality ratios

Tax ratios	Ratio of			Average	Ranking data
	Ratio of current tax paid against expectation	restated tax in net current tax liability	Total deferred tax savings per annum		
AstraZeneca plc	5/7	3/7	3/7	3.6/7	4
GlaxoSmithKline plc	4/7	2/7	3/7	3/7	3
Hikma Pharmaceuticals plc	5/7	3/7	2/7	3.4/7	3
Total pharmaceuticals	4.7/7	2.7/7	2.7/7	3.4/7	3
Pennon Group plc	1/6	3/6	2/6	2/6	2
United Utilities Group plc	3/7	3/7	4/7	3.4/7	3
Severn Trent pc	4/7	5/7	4/7	4.3/7	5
Total water companies	2.8/7	3.9/7	3.5/7	3.4/7	3

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

As with the heuristic reporting for accounting uncertainty it is apparent that this tax reporting will require refinement before it is generically useful. The underlying data better explains what is happening in these cases.

Three tests have been undertaken. The first concerned the difference between the current tax rate declared by the company for a period and the headline rate of tax for that period. The ratio in Table 29 is that of the declared rate to expected rate and not of the declared tax rate.

Table 29: Trend data – Ratio of current tax paid against expectation

Ratio of current tax paid against expectation									
	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	79.0%	89.5%	184.0%	325.5%	100.6%	52.1%	88.2%	197.8%	139.6%
GlaxoSmithKline plc	102.3%	104.1%	100.2%	116.3%	119.2%	365.7%	238.6%	128.1%	159.3%
Hikma Pharmaceuticals plc	56.2%	108.2%	177.5%	93.8%	102.8%	278.6%	-21.1%	51.7%	106.0%
Total pharmaceuticals	79.2%	100.6%	153.9%	178.5%	107.5%	232.1%	101.9%	125.9%	135.0%
Pennon Group plc		64.1%	552.4%	102.6%	99.0%	75.1%	74.0%	46.0%	144.8%
United Utilities Group plc	40.4%	67.1%	102.0%	-55.5%	67.1%	62.2%	37.6%	14.6%	41.9%
Severn Trent plc	47.7%	156.0%	-28.0%	-3.3%	125.2%	85.4%	31.7%	57.5%	59.0%
Total water companies	44.1%	95.7%	208.8%	14.6%	97.1%	74.3%	47.8%	39.4%	77.7%

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

Rather surprisingly the current tax rates paid by pharmaceutical companies during the period are at, or usually exceed, the expected rate of tax due on declared profits. Without more analysis this cannot be explained in depth, but one likely explanation is the increased focus on the enforcement of transfer pricing rules during the course of this period which has had particular impact on pharmaceutical companies. It is also explained by the relatively low rate of spending on tangible assets in proportion to activity in these companies when compared with that on intangible assets, which usually attracts lower rates of tax relief. In contrast the water companies generally paid rates of tax lower than those expected as indicated by headline tax rates. This is explained by the generous capital allowance regime on capital spending that these companies tend to enjoy.

This comparison of headline rates of tax with actual tax rates paid does not, however, provide a good indication of the quality of the tax accounting of these companies. It does, instead, indicate the differing ways in which the tax regime tends to treat their expenditure profiles. A better view of the quality of their tax accounting is provided by a check of the legal requirements concerning UK tax reporting which requires that a company split disclosure of its tax liabilities between those due for the current period and those due in respect of prior periods. It was argued by Deloitte (2009), who are one of the Big 4 firms of accountants that dominate the supply of auditing and other related services, that the reported adjustments to prior year liabilities were the best indicator of successful tax avoidance by large companies. If that is the case then most of these companies are, most of the time, reporting successful tax avoidance since as Table 30 shows, most adjustments are negative i.e. a reduction in previously reported liabilities is disclosed, meaning sums actually paid are less than previously reported, which Deloitte interpreted to mean that tax avoidance had succeeded in its objectives. It should be noted that some companies e.g. GSK in 2011-13 and United Utilities in 2011-12 did not report this data.

Table 30 – Ratio of restated tax in net current tax liability

	2011	2012	2013	2014	2015	2016	2017	2018	Average
AstraZeneca plc	-4.0%	-4.7%	3.3%	-12.5%	-63.8%	-3.8%	-75.9%	5.1%	-19.5%
GlaxoSmithKline plc	0.0%	0.0%	0.0%	-77.0%	-19.8%	-10.5%	-31.4%	-42.1%	-22.6%
Hikma Pharmaceuticals plc	-14.3%	14.3%	0.0%	-12.3%	-1.5%	1.7%	0.0%	0.0%	-1.5%
Total pharmaceuticals	-6.1%	3.2%	1.1%	-33.9%	-28.4%	-4.2%	-35.8%	-12.3%	-14.5%
Pennon Group plc		-1.6%	-39.3%	-48.6%	-15.0%	-3.2%	6.7%	-156.5%	-36.8%
United Utilities Group plc	0.0%	0.0%	-9.5%	216.9%	-21.3%	-20.5%	-71.9%	-55.8%	4.8%
Severn Trent plc	-106.3%	-15.0%	223.1%	2450.0%	-21.1%	-5.5%	-135.0%	-12.1%	297.3%
Total water companies	-53.1%	-5.5%	58.1%	872.8%	-19.1%	-9.7%	-66.7%	-74.8%	87.7%

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

The scale of these restatements, which are almost invariably material within the context of the tax reporting of the companies who disclose this data, suggest that there is either significant tax avoidance taking place in these companies or that the quality of their management's judgement on the provisions to be made is materially incorrect, which is significant in the context of this research.

The tax liability of a company is not solely comprised of its current tax due. Transactions can arise in the current period that might not give rise to a current tax liability or saving, but which might do so in years to come. These are accounted for through the mechanism of deferred taxation, which can give rise to reported assets (reflecting a future tax saving that the reporting entity is confident of recovering) and liabilities, being tax due at some time in the future as a result of current or past activities of the company. Although all deferred tax liabilities are meant to be recorded as such, deferred tax assets are subject to considerable discretion on the part of management as to whether they are accounted for or not. There is also substantial uncertainty inherent in all deferred tax accounting because it is not known when, or why, or at what tax rate many of the potential assets and liabilities might be realised. They are, then, in many ways the archetypal asset of uncertain value, not least because the asset is invariably unsaleable, and the liability is uncertain if the entity ceases to be a going concern.

During the period subject to survey the UK corporation tax rate fell from 26% in 2011 to 19% in 2018. Table 31 notes the approximate savings arising to the companies surveyed during this period as a result of restatement of their deferred tax liabilities to reflect falling corporation tax rates at which any potential liabilities might fall due, much (but not all) of which will arise for this reason. Hikma and AstraZeneca data is stated in US\$m, the rest in UK£m.

Table 31 – Total deferred tax credits arising

Total deferred tax savings per annum	2011	2012	2013	2014	2015	2016	2017	2018	Average
Note - negative number is a saving									
AstraZeneca plc	(240)	(301)	(702)	(861)	(390)	(224)	(1,019)	(806)	(568)
GlaxoSmithKline plc	154	242	(530)	(605)	(418)	(541)	(263)	(414)	(297)
Hikma Pharmaceuticals plc	(4)	(10)	(41)	7	(3)	(65)	71	(20)	(8)
Total pharmaceuticals	(30)	(23)	(424)	(486)	(270)	(277)	(404)	(413)	(291)
Pennon Group plc	0	(3)	(33)	(34)	15	7	0	18	(4)
United Utilities Group plc	(62)	(77)	(50)	(129)	23	(88)	(23)	66	(43)
Severn Trent plc	(54)	(78)	(6)	(150)	(5)	(65)	(13)	29	(43)
Total water companies	(58)	(53)	(30)	(104)	11	(49)	(12)	38	(32)

Source: Author's calculations based on financial statements ending in the years noted for the entities noted

The total savings in the case of GSK, for example, exceeded £2.3 billion and the water companies saved an average exceeding £250 billion each. The reward to deferring tax liabilities was, in that case, quite considerable and had a significant effect on post tax earnings in these companies.

An index of findings

An objective of this research was to determine whether it was possible to create a ranking of the companies surveyed to assist those asking whether there were key concerns within companies on productivity, financial engineering and the quality of the financial data each reported. The basis for providing an overall score for each activity has already been noted. It seems very unlikely that at present this can be applied to the tax data, for reasons already noted. For the other reviews undertaken the results are shown by Table 32.

Table 32 – Overall rankings of surveyed companies

Overall rankings	Financial performance ranking	Employee productivity	Financial productivity	Cost of financing	Accounting quality	Overall ranking
AstraZeneca plc	1	1	2	2	2	1.60
GlaxoSmithKline plc	3	3	3	3	4	3.20
Hikma Pharmaceuticals plc	5	4	4	2	5	4.00
Total pharmaceuticals	3	3	3	2	4	3.00
Pennon Group plc	6	4	1	4	4	3.80
United Utilities Group plc	4	4	3	4	5	4.00
Severn Trent pc	3	3	4	3	5	3.60
Total water companies	4	4	3	4	5	4.00

Source: Author's calculations

There remain doubts, again for reasons noted, whether the accounting quality data supports this ranking. In the other areas noted the data seems considerably more robust.

The ranking does not produce the outcome based on financial performance alone, although there are similarities in the trends noted.

More research is required into this area, and a more sophisticated approach is almost certainly required, most especially if reliable rankings on quality issues are to be produced. It is, however, felt that the approach shows promise and justifies more research to indicate:

- a. Which of the measures used are most appropriate as indicators of risk;
- b. Whether other measures need to be considered;
- c. Whether and how scale can be added into the measurement process;
- d. Whether the findings translate to other sectors;
- e. Whether users find the resulting indicators useful.

2. Report Summary & Discussion

This research sought to identify whether indicators of financialization derived from the annual reports of six companies in two sectors (pharmaceuticals and water) co-incide with weak productivity performance. We use the term 'co-incidence' deliberately because establishing causation conclusively would require research that could shed

light on management motives. This caveat is important because it is not clear whether the use of financial engineering to create shareholder value ‘crowd out’ investment-led, productivity-oriented alternatives, or whether managers turn to financial engineering when those alternatives are exhausted; or indeed whether in this very small sample the coincidence is random. Nevertheless, this report does paint a worrying picture of performance in some of the UK’s largest and most prestigious firms which warrants some comment.

Our results show that companies showing the weakest *trends* in terms of labour productivity coincided with the highest proportionate investment in assets of uncertain value where balance sheet valuation might be subject to the greatest degree of management discretion e.g. goodwill, intangible assets, derivatives and deferred tax assets. This was matched also by higher levels of liabilities of uncertain value e.g. deferred tax and pension liabilities. As a whole, the proportion of assets and liabilities of uncertain value rose across the sample over the period reviewed, but rose most notably as a proportion of group net asset values in companies with the weakest trends in productivity, where the value of those assets dominated the worth of these companies at the end of the period under review.

One particular finding was the extent to which companies were taking advantage of the different reporting requirements for group and parent entities. The rules for single entity parent company accounting reflect the fact that as standalone entities parent companies may record their profits and losses and assets and liabilities on the basis of their own trading, which is usually focussed upon investment activity. Here, the impairment of assets is rarely required and profit is declared upon the basis of dividends received from subsidiary companies. This can be a decidedly selective process because only profitable subsidiaries pay such returns and the results of loss-making activities are therefore excluded from view in this representation. However, when reporting as a group, a company must prepare consolidated accounts which net out all the profits and losses, assets and liabilities etc. The result is that parent companies operating as single entities tend to report much higher levels of retained profit than they do when reporting as group parent entities. This matters because it is the profits of parent companies as single entities that, controversially, determines their ability to pay dividends, even when the group accounts question their ability to do so. Our research suggests most of the companies were, to some degree, relying upon this mechanism to support their dividend payments but those by far the most likely to do so were those with the most worrying productivity trends. In other words, those companies most likely to be failing to achieve commercial returns were, nonetheless, maintaining their returns to shareholders by relying upon accounting mechanisms that might not fairly reflect the underlying overall performance of the group entities under the management and control of the parent entity.

We also reviewed the quality of the financial reporting of these entities. This was based upon their apparent reliability of their tax disclosures, and adjustments made to them over time. Our provisional conclusion is that the quality of that reporting is declining, which might either indicate a greater use of tax avoidance, giving rise to a broad trend of increased revisions to past tax disclosures, or a genuine decline in the quality of tax estimates included in these accounts, which did however appear consistent and systemic in many cases over the period. This is important because a penny saved on tax is a penny available for distribution, which would again be

indicative of how the financialization of reporting provides opportunity for shareholder distributions. However, this finding is not conclusive and further research is required to confirm this more concretely.

Based upon these findings we have suggested heuristic methods for recording these broad-based trends, doing so on the understanding that no one indicator will in itself be significant, most especially given the artificiality of all financial statements that impose time period reporting constraints on what are, in effect, ongoing streams of financial transactions. Our suggestion is that these heuristic approaches might be of considerable value for those looking for a number of key qualities in the companies in which they wish to invest. Those qualities are underlying profitability; the delivery of returns on investment in productive assets, and financial resilience as indicated by having balance sheets that are as free from subjective judgment capable of disguising a lack of resilience. In an era when analysis of company data is declining as a result of the increasing cost of undertaking that activity that cannot usually be passed onto clients as a result of the constraints imposed by the European Union's MIFID II directive² the measures that we have identified might be of considerable value. On that basis we welcome the opportunity to undertake further research on this issue.

Close up on pharma

The most worrying trends in our results can be found in our two large pharmaceutical firms: AstraZeneca (AZN) and GlaxoSmithkline (GSK).

For AZN, between 2011-2018:

- on financial performance, real EBITDA fell by around three fifths, real net assets halved and ROCE fell by three quarters
- on productivity, real EBITDA per employee fell by nearly two thirds and EBITDA to total assets fell by around the same.
- on distributions, the firm paid out dividends in excess of its group net profit in six of the eight years in our study, although dividends as a percentage of available group and parent earnings were much lower.
- on reporting reliability, uncertain assets to total assets were higher than for any company in our sample in 2018, and that part of that valuation at least explain the large amounts of available earnings at group and company level; also the parent company value of their investment in subsidiaries was over twice that of group net assets in 2018 – it is not clear what explains this discrepancy.

For GSK between 2011-2018:

- on financial performance, real EBITDA fell by over a third and real net assets by two thirds; ROCE nearly halved.
- on productivity, real EBITDA per employee fell by a third and EBITDA to total assets halved.

² https://ec.europa.eu/info/law/markets-financial-instruments-mifid-ii-directive-2014-65-eu_en

- on distributions, GSK paid out dividends in excess of its group net profit in three of the eight years in our study, but more worryingly its dividends were in excess of its available group earnings from 2016-2018, although its dividends to available parent earnings were much lower.
- on reporting reliability, uncertain assets to total assets were the second highest next to AZN, whilst net uncertain assets to total net assets were higher than any firm in our sample; the discrepancy between dividends as a percentage of group and parent available earnings can be explained by the significant difference between reported group and parent available earnings. Also, the parent company value of their investment in subsidiaries was over five times that of reported group net assets in 2018

These findings may seem to challenge prevailing narratives about UK pharma as national champions - R&D powerhouses and drivers of UK productivity. This analysis presents a rather different picture – one where they certainly distribute a lot of money to shareholders, but do so on an increasingly flimsy operating base using assets which are increasingly intangible, and don't appear to be improving the underlying productivity of each firm. Distributions are hollowing out group but not parent retained earnings and net assets, leading to a divergence in the reported positions of those two entities (see close up on GSK below). If the lessons of other firms, like Thomas Cook and Interserve are anything to go by, that divergence may eventually need to be reconciled, and that reconciliation may be costly and, in the worst cases, destabilising.

These companies do, however, remain powerful actors within the pharmaceutical sector and maintain an effective gatekeeper position in final markets due to their extensive marketing operations. The question is whether high shareholder distributing, but declining productivity-enhancing, behemoths like AZN and GSK crowd out younger, more nimble firms in the sector such as Hikma - a smaller LSE-listed company, who fared much better on growth, performance and productivity indicators in our sample. Answering this question may lend support to Schneider's (2018) finding that the UK productivity puzzle is located in the practices of larger incumbents. We would add, that if the size of those incumbents blocks the development of newer, nimbler, more innovative entrants, then the productivity gap between the UK and competitor countries will endure.

UK incumbents' productivity underperformance may reflect the UK's more shareholder value focused business culture and corporate governance systems. This may allow relatively unproductive incumbents to survive for longer if they use financial engineering to maintain high shareholder distributions, which would position them more favourably with capital providers relative to smaller competitors. Getting to the root of that culture would require research on the career background of UK company boards, particularly the role of the Big 4 accounting firms as a training ground for the UK officer class. The role of the Big 4 in shaping board-level skills and norms may explain why financial engineering rather than investment-led, productivity-oriented solutions are sought at board level. This could add a different dimension to Bloom and Van Reenen's (2010) findings about the weak performance of UK management relatively.

Close up on GSK

The reporting at GSK requires a bit more exploration. Zooming in on distributions by adding share buybacks, we see that between 2011-2018 GSK distributed over £7bn more in dividends and share buybacks than it generated in comprehensive group income for the year (table 33). This (in part) explains the hollowing out of retained earnings at group level over that period – they are distributing more than they earn, hence retained earnings are exhausted. But, as noted in section 3iii – it is the distributable reserves (retained earnings) of the parent not the group which determine what can legally be distributed. And here there is a large discrepancy between group and parent retained earnings (table 34). There are reasonable explanations for this – for example if the parent has received interest or dividends from its subsidiaries in the past, which now put the parent retained earnings in net surplus and its subsidiaries retained earnings in net deficit. The auditor can presumably explain how the parent's subsidiaries were able to do this without breaching the 2006 Companies Act.

Table 33: GSK – Difference between group comprehensive income for the year and shareholder distributions (nominal)

	2011	2012	2013	2014	2015	2016	2017	2018	Total 2011-2018
Total Comprehensive Income For The Year	4292	3834	5752	1130	7902	1196	2431	3747	30284
Other Adjustments	-117	-242	-297	-36	-3351	-341	663	4247	526
Dividends	-3406	-3814	-3680	-3843	-3874	-4850	-3906	-3927	-31300
Share Buybacks	-2191	-2493	-1504	-238					-6426
Total Distributions	-5597	-6307	-5184	-4081	-3874	-4850	-3906	-3927	-37726
Difference between comprehensive income and dividends	-1305	-2473	568	-2951	4028	-3654	-1475	-180	-7442

Table 34: GSK – Difference between group and parent retained earnings at end of year (real)

	2011	2012	2013	2014	2015	2016	2017	2018
Group retained earnings	3,370	652	913	(2,074)	(1,397)	(5,392)	(6,477)	(2,137)
Parent company retained earnings	18,689	22,401	17,179	23,251	20,033	15,538	22,106	18,117

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