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**ORIGINAL ARTICLE**

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Regulatory monitoring and university financial reporting quality: Agency and resource dependency perspectives

Margaret J. Greenwood  | Lei Tao 

University of Bath School of Management,
University of Bath, Claverton Down, Bath, BA2
7AY, United Kingdom

Correspondence

Lei Tao, Henley Business School, University of
Reading, Whiteknights, Reading, RG6 6UD,
United Kingdom.
Email: lei.tao@henley.ac.uk

Abstract

In this paper we exploit the complementarities between agency theory and resource dependence theory to investigate the influence of regulatory monitoring on financial reporting quality in the higher education sector. Our setting is U.K. universities. Using 14 years of data over the period 2002–2015, we find that financial reporting quality, (proxied by discretionary accruals), improves with the intensity of monitoring and resource dependence (proxied by the proportion of funding from regulators/funding bodies). However, this positive influence is mitigated in the presence of a pre-discretionary deficit, a proxy for the threat of regulatory intervention. A net benefit from monitoring remains for those universities with low levels of regulated funding but in those where there is high dependence the monitoring benefit is reversed and a pre-discretionary deficit is converted to a small reported surplus. Both agency and resource dependence theories offer explanations for these findings. Agency theory predicts increased financial reporting quality with increased monitoring and also a reduction in financial reporting quality to avoid costly regulatory intervention. Resource dependence theory predicts that both these effects will increase with increased dependence on resources from a key provider. These findings extend our theoretical understanding of financial reporting quality of universities, contribute to the limited literature on financial reporting quality in the not-for-profit and public sectors, and contribute to the exploration of the use of alternative theoretical frameworks in the domain of public sector accounting.

KEYWORDS

agency, financial reporting quality, regulatory monitoring, resource dependence, universities

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1 | INTRODUCTION

The higher education sector has enjoyed a long period of expansion over the last 40 years (OECD, 2014) and, globally, now represents the second largest economic sector after healthcare (HM Government, 2013; Parker, 2013). In the United Kingdom alone higher education contributes about £40bn (2.8%) of GDP and over £17bn to U.K. exports (HM Government, 2013; Universities UK, 2014) while, internationally, the growth in the number of students seeking higher education across national boundaries has been increasing exponentially (OECD, 2014). Despite the increasing presence of for-profit universities, the vast majority are dependent to a significant extent on government funding (European Commission, 2007). However, in a policy context that favours the marketisation of the higher education sector, public funding has been declining and has been made increasingly conditional upon demanding institutional accountability requirements. (Lapsley & Miller, 2004; Parker, 2013). In this environment a key concern for regulators, both nationally and internationally, has been institutional financial sustainability (European University Association, 2008). A key resource for assessing financial sustainability and often used by sector regulators, are annual financial statements (Universities UK, 2014). The use of financial statements for such regulatory decision making emphasises the importance of understanding financial reporting quality in this distinctive not-for-profit and public sector setting. However, while the commercialisation and financialisation of universities has been addressed in the higher education and accounting literature (Christopher & Leung, 2015; Craig, Amernic, & Tourish, 2014; Czarniawska & Mazza, 2013; Parker, 2013), few empirical studies have investigated financial reporting quality in this setting (Christiaens & De Wielemaker, 2003; Parker, 2013).

Steinberg (2010) and Van Puyvelde, Caers, Du Bois, and Jegers (2012) argue that new insights into the governance of not-for-profit entities can be generated by using agency theory in complementarity with other theoretical frameworks. Our aim in this paper is to extend our understanding of financial reporting quality in the not-for-profit and public sectors by investigating the impact of regulatory monitoring in the higher education sector using both agency and resource dependence perspectives. Agency theory represents the most common framework for explaining financial reporting quality in the private sector (Dechow, Ge, & Schrand, 2010). However, its application in not-for-profit and public sectors has been subject to criticism because of the challenges posed by multiple stakeholders, ambiguous organisational goals, and a weak incentive framework. Steinberg (2010) argues that these issues hamper the potential of agency theory to resolve questions of accountability in not-for-profit organisations. Perhaps as a consequence, our understanding of financial reporting quality in not-for-profit and public sectors is largely limited to evidence of small surplus reporting (Ballantine, Forker, & Greenwood, 2007; Ferreira, Carvalho, & Pinho, 2013; Hoerger, 1991; Leone & Van Horn, 2005) and small loss avoidance (Ballantine et al., 2007), consistent with incentives to signal competence and efficiency to key stakeholders. In contrast, resource dependence theory has been used extensively in the governance literature (Hillman, Withers, & Collins, 2009) in both the private and public sectors (Ward & Forker, 2017), but represents a relatively recent innovation in the financial reporting literature. This limited but growing literature includes a consideration of the impact of resource dependence on the tendency to adopt Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS) (Alon & Dwyer, 2014; Carpenter & Feroz, 2001; Verbruggen, Christiaens, & Milis, 2011), to adopt program budgeting in Greece (Cohen & Karatzimas, 2014), and to increase disclosures in response to funders' requirements (Thomson, 2010).

The setting for our study is U.K. universities and the investigation covers a sample period of 14 years from 2002 to 2015. U.K. universities derive a significant proportion of their revenue from the government via four funding bodies.¹ The sector operates a system of regulation that involves progressive monitoring and intervention for the purposes of protecting public money and student interests (Universities UK, 2014). A significant part of the system is the assessment of organisational financial sustainability, as required by statute (s.68 Higher Education and Research Act, 2017). Based on annual accountability returns from universities, these annual returns include audited financial statements that have been prepared in accordance with the U.K. GAAP compliant Statement of Recommended Practice (SORP)

for Further and Higher Education (Higher Education Funding Council for England (HEFCE), 2010, 2014; Office for Students (OFS), 2018; Scottish Funding Council (SFC), 2014).

Agency theory predicts that financial reporting quality increases with increased monitoring because of reduced information asymmetry and a consequent reduction in the scope for earnings management. Resource dependence theory further predicts that where funding providers are focused on the quality of financial governance, financial reporting quality will increase with increased dependence on funding. Both agency theory and resource dependence theory predict a reduction in financial reporting quality when managers and organisations seek to report desired levels of performance in order to avoid regulatory intervention and a loss of managerial autonomy. These effects, according to resource dependence theory, increase with resource dependence.

Using discretionary accruals as a proxy for financial reporting quality and the proportion of regulated funding derived from the government funding bodies as a proxy for resource dependence, we find that financial reporting quality increases with resource dependence. We further find that, consistent with the rational self-interested manager of agency theory, discretionary accruals are managed to avoid deficit reporting and that, consistent with resource dependence theory, this response is strongest in those universities most dependent on regulated funding.

This paper makes the following contributions to the literature. First it extends the limited literature on financial reporting quality in not-for-profit and public sectors in the context of higher education sector. Second, it generates first-time insights into the interaction between the monitoring and incentive effects of regulation on financial reporting quality. Little attention has been paid to this interaction in the not-for-profit and public sectors with most investigations in for-profit settings (Chung, Firth, & Kim, 2002, 2005). Third, this paper contributes to the literature which considers theory complementarity, in this case resource dependence theory and agency theory, in the context of financial reporting in the not-for-profit and public sectors.

This paper proceeds as follows: Section 2 reviews prior literature, Section 3 overviews the institutional setting, Section 4 provides the theoretical basis for our hypotheses, Section 5 describes our research method, and Section 6 reports our findings. We conclude in Section 7 with a discussion of the findings and their implications for practice, policy, and future research.

2 | PRIOR LITERATURE

In contrast with the private sector (Dechow et al., 2010) relatively little is known about the determinants of financial reporting quality in the public and not-for-profit sectors. Such evidence as there is, is largely restricted to the reporting of small surpluses which is consistent with incentives to signal competence and efficiency to important stakeholders such as the providers of funds, service users, and the general public. In an early study, Hoerger (1991) finds lower earnings variability in US non-profit hospitals as compared with for-profit hospitals. An explanation for this phenomenon was subsequently provided by Leone and Van Horn (2005) who find that, in this same setting, both discretionary spending and accruals are managed to report small surpluses. Ballantine et al. (2007) similarly find that accruals are managed to report small surpluses in English NHS hospitals and that, in addition, there is an aversion to the reporting of small deficits. Deficits, it is argued, signal weak financial control, while surpluses signal that financial resources are in excess of those required to satisfy demand for services or that management capacity is insufficient to fully and effectively deploy available financial resources. The avoidance of small deficits is also found to be incentivised by increased CEO turnover (Ballantine, Forker, & Greenwood, 2008) and, in the case of Portuguese local authorities, by political considerations just prior to an election (Ferreira et al., 2013).

The small number of studies that investigate the impact of external monitoring on not-for-profit financial reporting generally adopt agency theory as a framework of analysis. Jones and Roberts (2006) and Krishnan and Yetman (2011) for example find cost-shifting in US not-for-profits aimed at enhancing important performance ratios such as the program ratio, a widely used measure of spending efficiency. However, this adverse impact on financial reporting quality

was found to be moderated, in US not-for-profit hospitals, by the percentage of Medicare and Medicaid (government) funding, a proxy for the intensity of systematic external monitoring (Krishnan & Yetman, 2011). This study provides early evidence that is also consistent with resource dependence predictions that an organisation will orientate itself to so as to demonstrate alignment with resource provider objectives. Similarly, Andrés-Alonso, Cruz, and Romero-Merino (2006) find that, in Spanish not-for-profits, the efficiency of resource allocation is positively associated with the proportion of donations from institutional donors who are assumed to engage in monitoring activities. However, when regulatory intervention is threatened financial reporting quality is found to be adversely affected (Ballantine et al., 2007; Greenwood, Baylis, & Tao, 2017).

We contribute to this literature by extending the literature that adopts complementary theoretical frameworks to generate new insights into not-for-profit financial reporting quality in non-for-profit and public sectors with a specific focus on the proportion of funding from regulators as a proxy both for resource dependence and intensity of monitoring. Specifically, we contribute to our understanding of their interactions within an increasingly marketised external environment characterised by growing constraints on funding from regulators combined with more intense performance monitoring. We also contribute an empirical study to complement the limited, and mainly critical, literature on the financial reporting quality in not-for-profit and public sectors.

3 | INSTITUTIONAL AND REGULATORY SETTING

The setting for our investigation is U.K. universities. Consistent with a wider programme of public sector reform, U.K. universities are predominantly not-for-profit entities that are allowed considerable freedom about how they arrange their affairs and manage their strategic development. The three main generators of university income are teaching and research activities, with commercial income from student accommodation, consultancy contracts, and endowments making up the balance. The funding bodies are the biggest funders of teaching and research in the United Kingdom overall and they currently distribute about £4bn of public funds annually which account for over 32% of U.K. universities' revenue during the period of our study. Academic teams generated additional research income (17%) by applying for research grants from research councils and other research sponsors, while tuition fees levied on individual students generated another 31% of income. This funding structure confers considerable power and influence on the regulators over universities they fund.

Consistent with a policy environment heavily influenced by the doctrines of New Public Management (Hood, 1991, 1995; Hyndman & Lapsley, 2016) public funds are provided subject to regulation by independent regulators/funding bodies such as HEFCE and SFC who subject universities to extensive financial monitoring (HM Treasury, 2013). Universities are required to send an annual accountability return to the regulator/funding body, which includes audited financial statements. The financial statements are required to follow the sector's SORP which is based on U.K. GAAP (HEFCE, 2010; SFC 2014). This information combined with that obtained from other financial information submitted via the TRAC (Transparent Approach to Costing) system is used to assess the financial sustainability of each university. The TRAC return is consistent with the audited financial statements but also provides additional activity based cost information relating to activity categories, most notably, research and teaching (Parker, 2013). This information is not available to the public or to academic researchers but is requested by the regulators because of long-held concerns that teaching activities may be used to subsidise research.

Although the detailed performance criteria and metrics that the regulators use to assess financial sustainability are not publicly available, the ability to generate sufficient income to cover the costs and allow a margin of surplus for investment in the infrastructure is a key indicator in the risk-based approach adopted in the United Kingdom (HEFCE, 2010, 2014; HEFCW, 2017; SFC, 2014). The expectation of a surplus is incorporated into the financial memorandum between universities and funding bodies and consecutive deficits are identified as a cause for concern and potential intervention (e.g., HEFCE, 2010; HEFCW, 2017; SFC, 2014). Regulatory intervention, which is proportionate to the assessed risk to financial sustainability, commences with requests for additional information and assurances regarding

management action but can culminate in withdrawal of funding (HEFCE, 2010, p. 28; HEFCE 2014, p. 24),² particularly where there are perceived risks to public funds or the interests of students (HEFCE, 2010, p. 9 and p. 26; HEFCE 2014, p. 11 and p. 21).³

4 | THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Resource dependence theory adopts an open system approach to predict how organisations respond and adapt to the external environment in order to secure the resources needed to ensure survival and maintain managerial autonomy (Pfeffer & Salancik, 2003). Organisations will survive by managing the flow of resources and by managing their dependence on external resource providers (Fernandez, 2008; Hager, Galaskiewicz, & Larson, 2004). As dependence increases with the concentration and importance of resources (Froelich, 1999), organisations that depend heavily on a few key resource providers are likely to experience stronger constraining influences from their environment. According to resource dependence theory, organizations are thus driven to compliance with the requirements of major resource providers (Froelich, 1999) and simultaneously to seeking out ways in which to reduce dependence and maintain managerial autonomy (Fernandez, 2008; Hager et al., 2004). In a financial reporting context, resource dependence theory thus predicts that universities will orientate themselves to demonstrate alignment with the funding bodies' objectives by delivering high-quality financial reporting and a reputation for sound financial management but that they will also attempt to maintain managerial autonomy when regulatory intervention is threatened, as for example, when a deficit is reported. In these latter circumstances resource dependence theory predicts both a reduction in financial reporting quality and that this effect will increase with resource dependence.

Agency theory, which is focused on the bilateral relationship between principal and agent (Jensen & Meckling, 1976) and is founded on the conception of a rational self-interested agent, predicts that agents will act in their self-interest even at the expense of principals. Agency theory thus predicts the management of financial performance to avoid regulatory intervention and to meet stakeholder expectations, such as analysts' forecasts (Dechow et al., 2010). In the private sector there is widespread evidence that managers respond to these incentives by managing earnings, using a variety of mechanisms including accruals management (Dechow et al., 2010). In the public and not-for-profit sectors, however, the incentives to manage reported financial performance are weaker. The primary objective of not-for-profit and public sector organisations is service delivery rather than the generation of profit—university missions, for example, are often couched in terms of education, learning, and research with little if any mention of financial performance (Elwick, 2018).⁴ Further, although the incidence of performance-related pay has been increasing (Ballantine et al., 2008), it remains low in comparison with the private sector and again has a focus on service delivery rather than financial performance (The Work Foundation, 2014).⁵ Additionally, information asymmetry between organisational managers and those monitoring and evaluating their performance is often low: regulators and funding providers often have the power and resources to demand additional information that reduces the potential for disguising underlying performance. Finally, the culture of organisations delivering public services is arguably driven by a public service ethic rather than purely commercial concerns and characterised by a high level of ethical standards (Ferlie et al., 1996, p.21). These factors arguably combine to create a setting in which there are few incentives to manage reported financial performance. However, the marketisation of higher education, which is a global phenomenon, has undoubtedly strengthened the incentive framework in which universities operate. Elsewhere in the public sector there is evidence that, in this context, managers respond to incentives particularly around the avoidance of regulatory intervention (Ballantine et al., 2007; Greenwood et al., 2017) and there is widespread evidence in both the public and not-for-profit sectors that earnings are managed so as to report small surpluses, in order to signal competence and efficiency in the use of resources to external stakeholders. Large surpluses, in particular, are perceived as being contrary to the primary

objectives and ethos of a not-for-profit enterprise whereas deficits are interpreted as a negative signal regarding the financial viability of the organisation.

In U.K. universities, the funding providers specifically identify deficits as a cause for regulatory concern and potential intervention (HEFCE 2010; HEFCW, 2017; SFC, 2014). Deficits would also have a negative impact on universities in the increased competition of student recruitment, which is referred to as “the battle” in the media considering its importance during a period when direct government funding is being cut.⁶ Under such an environment, the perception that a university is financially at risk could further deteriorate the organisation’s financial viability.⁷ In the context of prior evidence and of the regulatory environment we would therefore expect university managers to manage earnings to report small surpluses close to zero and that, in particular, they would try to avoid the reporting of deficits.

A common proxy for the intensity of monitoring in the agency-based literature in both the for-profit and not-for-profit sectors is the extent to which an entity’s capital or revenue is provided by a small number of institutions that have the motivation and the resources to engage in monitoring activities. This proxy is taken to represent the extent to which management responds to the monitoring activity. In the private sector, the proportion of capital held by institutional shareholders has been used as a proxy for monitoring intensity (Balsam, Bartov, & Marquardt, 2002; Chung et al., 2002; Mitra & Cready, 2005) as has the proportion of long-term debt (Chung et al., 2005), while in the not-for-profit sector Yetman and Yetman (2012) use the proportion of donations with donor restrictive clauses and in the US not-for-profit hospital sector Krishan and Yetman (2011) use the percentage of revenue derived from the Medicare and Medicaid programmes to reflect the intensity of regulatory oversight.

Thus, the resource dependence perspective combined with evidence from the agency-based literature, lead to our first hypothesis:

H1: University financial reporting quality is positively associated with the dependence on funding from regulators.

Monitoring is however undertaken with a purpose and to inform decision-making. In the United Kingdom the purpose of monitoring in the higher education funding regimes is to determine the need for intervention. The literature from both the agency and resource dependence perspectives suggests that managers, in both the for-profit and not-for-profit sectors, manage earnings to avoid regulatory intervention (Dechow et al., 2010; Greenwood et al., 2017). Therefore we expect that in the setting of U.K. universities financial reporting quality will be negatively affected when deficits are reported due to the fear of regulatory intervention and negative impacts on student recruitment hence future financial performance. Agency theory also predicts university manager have the incentives to avoid reporting deficits for their self-interest (Dechow et al., 2010). Therefore this leads to our second hypothesis:

H2: University financial reporting quality is negatively associated with the presence of a pre-discretionary deficit.

From the agency and resource dependence perspectives, we develop the analysis further by considering the prediction that the beneficial impact of monitoring on financial reporting quality will be mitigated in the presence of a pre-discretionary deficit. Resource dependence theory predicts that, in order to forestall loss of managerial autonomy and to remove contextual constraints on behaviour, an organisation may take actions to reduce the probability of being subject to the enforcement of external demands (Pfeffer & Salancik, 2003) and to minimise the environmental constraints under which they operate (Froelich, 1999). This analysis suggests that an organisation would manage earnings to avoid the reporting of a deficit (as in H2), which is also supported by agency theory. However resource dependence theory further predicts that organisational positioning to preserve and protect managerial discretion will increase with resource dependence (e.g. Froelich, 1999). Thus this leads to our third hypothesis:

H3: The positive association between financial reporting quality and the dependence of funding from regulators is mitigated in the presence of a pre-discretionary deficit.

5 | METHOD

In this study we use discretionary accruals as an inverse measure of financial reporting quality (Dechow et al., 2010) and, in the absence of identifiably significant specific accruals (McNichols, 2002), such as loan loss provisions in the banking sector (Kanagaretnam, Lobo, & Yang, 2004) we adopt an aggregate accruals model. This is consistent with the approach adopted in prior not-for-profit and public sector studies as in, for example, Leone and Van Horn (2005) Ballantine et al. (2007) and Ferreira et al. (2013).

We apply the model of Dechow and Dichev (2002) which is based on cash flows and which allows for the reversing out of accruals, and which generally has greater explanatory power than those models based on Jones (1991). We adapt this model as recommended by McNichols (2002), and applied by Francis, LaFond, Olsson, and Schipper (2005) and Ballantine et al. (2007) to accommodate changes in revenue and the level of Property, Plant and Equipment (PPE) (Equation 1). Discretionary accruals are taken as the residual from an annual estimation of this model:

$$\frac{\Delta WC_{it}}{TA_{it-1}} = \alpha_0 + \alpha_1 \left(\frac{CFO_{it-1}}{TA_{it-1}} \right) + \alpha_2 \left(\frac{CFO_{it}}{TA_{it-1}} \right) + \alpha_3 \left(\frac{CFO_{it+1}}{TA_{it-1}} \right) + \alpha_4 \left(\frac{\Delta REV_{it}}{TA_{it-1}} \right) + \alpha_5 \left(\frac{PPE_{it}}{TA_{it-1}} \right) + \varepsilon_{it} \quad (1)$$

where ΔWC_{it} is calculated as the change in non-cash current assets from time $t-1$ to time t , minus the change in cash and minus the change in current liabilities for entity i ; CFO_{it} represents cash flow from operations; ΔREV_{it} is the change in revenue from time $t-1$ to time t ; PPE_{it} is property, plant, and equipment at time t ; ε_{it} is the residual, a measure of discretionary accruals. All variables are scaled by lagged total assets (Dechow & Dichev, 2002).

5.1 | Hypothesis 1: University financial reporting quality is positively associated with the dependence on funding from regulators

As a basis for our investigation we use the model developed by Leone and Van Horn (2005) and as applied in Ferreira et al. (2013) and Verbruggen and Christiaens (2012) to investigate small surplus reporting in not-for-profit entities through the mechanism of accruals management. This model, which models discretionary accruals—our (inverse) proxy for financial reporting quality— as a function of the pre-discretionary surplus/deficit, the prior year's reported surplus/deficit, and prior year discretionary accruals, is shown in Equation 2.

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \alpha_2 Surplus_{it-1} + \alpha_3 DA_{it-1} + \varepsilon_{it} \quad (2)$$

where $preSD_{it}$ is the surplus or deficit before discretionary accruals of institution i in period t divided by total assets in period $t-1$; $Surplus_{it-1}$ is the reported surplus or deficit of institution i in period $t-1$ divided by total assets in period $t-2$; and DA_{it-1} is the estimate of discretionary accruals of institution i in period $t-1$ divided by total assets in period $t-2$.

A negative coefficient (α_1) on $preSD_{it}$ would demonstrate that discretionary accruals would be increasingly negative, and therefore income decreasing, as pre-discretionary surpluses increase (and vice versa). Thus, financial reporting quality decreases with distance from financial breakeven. Prior year performance $Surplus_{it-1}$ is included in the model because there is a positive relation between past performance and current period discretionary accruals (Kothari, Leone, & Wasley, 2005). Thus, they expect α_2 to be positive. Finally, the variable DA_{it-1} is included in the regression to control for the probability of autocorrelation in discretionary accruals.

To test Hypothesis 1, that university financial reporting quality increases with dependence on funding from regulators, we introduce a variable representing each university's level of funding from regulators and interact it with the pre-discretionary surplus/deficit (Equation 3).

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \alpha_2 RF_{it} + \alpha_3 preSD_{it} * RF_{it} + \alpha_4 Surplus_{it-1} + \alpha_5 DA_{it-1} + \varepsilon_{it} \quad (3)$$

where RF is the proportion of funding from regulators expressed as a percentage of total revenue and relative to the sample annual mean.⁸ The value of RF can be positive if the proportion of funding from regulators is above the annual mean, or negative if below.⁹

If dependence on funding from regulators has a beneficial impact on financial reporting quality then we would expect the coefficient on the interaction (α_3) to be positive, indicating that discretionary accruals are lower for a given level of pre-discretionary performance.

To provide further evidence to support our hypothesis regarding the impact of funding from regulators on financial reporting quality we also investigate the impact of other sources of funding (research, tuition and other) which do not exercise the same levels of monitoring as the funding bodies/regulators. We predict that there will be no significant relationship between discretionary accruals and the proportion of funding drawn from these sources because the dependence on individual students and other providers of revenue is low (resource dependence theory), because they have widely differing information needs creating difficulties in contracting, and because the costs of monitoring are disproportionately high (residual agency costs). We adapt Equation 3 to obtain Equation 4, as follows:

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \sum \alpha_j Source_{jit} + \sum \alpha_j preSD_{it} * Source_{jit} + \alpha_4 Surplus_{it-1} + \alpha_5 DA_{it-1} + \epsilon_{it} \quad (4)$$

where $Source$ = the proportion of funding from regulators such as HEFCE, research councils, student tuition fees, and others, respectively, expressed as a proportion of total revenue relative to the sample annual mean, with 1 unit being 1% of total revenue.

5.2 | Hypothesis 2: University financial reporting quality is negatively associated with the presence of a pre-discretionary deficit

Leone and Van Horn's (2005) model (Equation 2), assumes a linear relationship between discretionary accruals and the pre-discretionary surplus/deficit. However, given prior research findings and the deficit aversion signalled in the regulatory regime, we predict that universities are subject to particularly strong incentives to avoid reporting a deficit and that discretionary accruals, our inverse proxy for financial reporting quality, will be higher in the presence of a pre-discretionary deficit. This is investigated by introducing a variable $preDef$ (pre-discretionary deficit) and interacting it with the pre-discretionary surplus/deficit ($preSD$).

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \alpha_2 SDef_{it} + \alpha_3 preSD_{it} * preDef_{it} + \alpha_4 Surplus_{it-1} + \alpha_5 DA_{it-1} + \epsilon_{it} \quad (5)$$

where $preDef_{it}$ is a dummy variable equal to 1 for a pre-discretionary deficit, and 0 otherwise. We predict a negative coefficient on the interaction term α_3 ,¹⁰ as evidence that universities adopt a more aggressive reduction in financial reporting quality.

5.3 | Hypothesis 3: The positive association between financial reporting quality and the dependence of funding from regulators is mitigated in the presence of a pre-discretionary deficit

We proceed to investigate the extent to which deficit aversion is affecting resource dependence by combining the interaction of the pre-discretionary surplus/deficit with both pre-discretionary deficit and funding from regulators as follows:

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \alpha_2 SDef_{it} + \alpha_3 RF_{it} + \alpha_4 preSD_{it} * RF_{it} + \alpha_5 preSD_{it} * preDef_{it} + \alpha_6 preSD_{it} * preDef_{it} * RF_{it} + \alpha_7 Surplus_{it-1} + \alpha_8 DA_{it-1} + \epsilon_{it} \quad (6)$$

With reference to prior agency-based literature this model will also indicate the extent to which monitoring by regulators (as proxied by the variable *RF*) moderates the strong incentive to avoid reporting a deficit.

6 | SAMPLE AND DATA

Data from the audited financial statements of all U.K. universities that receive government funding for the period from 2002 to 2015 were collected from the Higher Education Statistics Association (HESA)¹¹ database, resulting in an unbalanced panel data set. Our sample generates a total of 1,973 university-year observations. However, the requirement for lagged and leading variables for the modified version of the Dechow and Dichev model (Francis et al., 2005; McNichols, 2002) that we use as our primary estimator of discretionary accruals reduces the sample to 1,827 observations and this reduced further to 1,683 observations for our multivariate analysis.

7 | FINDINGS

7.1 | Descriptive statistics

Table 1 sets out the context for our study by providing a range of descriptive statistics. Panel A shows that over the period of this study the mean revenue of universities was £161 m, of which the 32% was provided by the funding body grant (mean £52 m). University revenue grew (untabulated) from £105 m in 2003 to £211 m in 2014. The comparable figure for mean assets is £269 m. The mean reported surplus amounts to just £4.9 m representing 3.0% of mean revenue, providing prima facie evidence of the tendency to report small surpluses close to zero. Student-related income is also a significant source of revenue representing 31% of mean revenue over the period. This is followed by research funding at 17% and other sources of income at 20%, including endowment. Panel B further shows funding body grant has decreased as a percentage of total revenue over 40% in 2008 to 21% in 2014.

With respect to the key performance figure of the reported surplus or deficit, Panel C proceeds to provide further details of the “within” and “between” variations of scaled reported surplus/deficits (scaled by lagged total assets). This panel shows that the within variation (variation across time for each university) at 4.4% is greater than the between variation of 1.8%. Panel D shows that the mean surplus/deficit for each year scaled by total revenue ranges from 1.74% to 3.99% during the sample period while Panel E shows that 12% (199/1,683) of observations reported a deficit during the sample period. Figure 1 further provides the distribution of the scaled reported surplus/deficit. As shown in the figure the distribution peaks around the bins between 0% and 2.5% of lagged total assets and in comparison, the bins in relation to small deficits have far fewer observations.

7.2 | Multivariate analysis

All our multivariate analysis has been conducted using panel data regression techniques. In each case, after conducting a Hausman test, which indicated that a random effect regression was not appropriate, we have used and reported the findings for fixed effect regressions.

7.2.1 | Estimation of discretionary accruals

We estimate discretionary accruals, our inverse proxy for financial reporting quality, as being the difference between the actual and expected value of accruals based on the Dechow and Dichev (2002) model (as adapted by McNichols [2002]), the Jones model (Jones, 1991), and the modified Jones model (Dechow, Sloan, & Sweeney, 1995). The results of these estimations are presented in the Appendix which shows that, consistent with prior research, the explanatory power of the Dechow and Dichev (2002) models (Models 1 and 2) is greater than that of the Jones models (Models

TABLE 1 Descriptive statistics

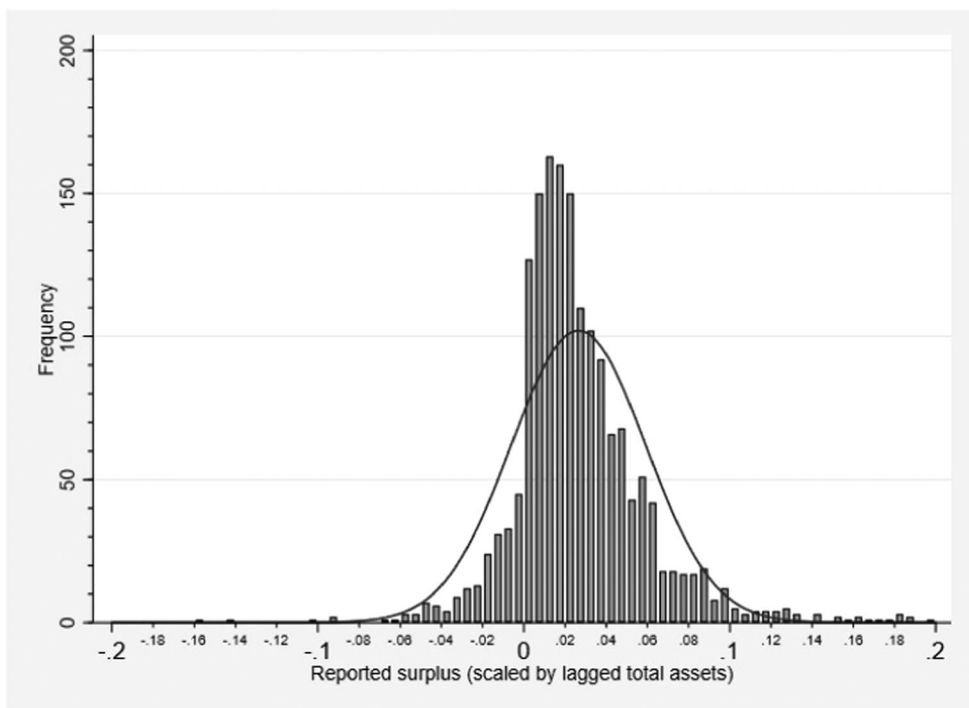
Panel A: Descriptive statistics of funding sources								
	N	Mean	SD	Min	Lower quartile	Median	Upper quartile	Max
Total revenue (£'000)	1,683	161,490	169,522	5,215	59,162	118,318	188,686	1,504,477
Total assets (£'000)	1,683	269,416	385,481	28	85,531	166,897	300,192	4,592,502
Surplus/Deficit (£'000)	1,683	4,923	9,592	-58,810	287	2,270	6,824	94,704
Funding body grant (£'000)	1,683	52,230	42,913	622	22,457	41,297	66,187	257,815
Student tuition fees (£'000)	1,683	50,307	44,702	405	17,423	39,114	70,733	351,724
Research funding (£'000)	1,683	26,842	53,551	0	1,460	6,039	26,338	471,957
Other income (£'000)	1,683	29,929	50,634	0	8,243	17,850	32,985	722,600
Endowment (£'000)	1,683	2,128	4,777	0	320	787	1,887	63,888
Panel B: Descriptive statistics of funding body grant (funding from regulators) as a percentage of total revenue by year								
Year	N	Mean	SD	Min	Max			
2003	137	43.73	11.44	7.33	69.51			
2004	139	44.20	12.15	7.50	83.61			
2005	140	44.13	12.21	8.23	81.16			
2006	141	44.24	12.12	8.91	80.75			
2007	141	43.12	11.35	8.51	77.82			
2008	142	41.69	11.08	8.16	73.21			
2009	142	39.97	10.95	7.60	72.00			
2010	142	38.68	10.45	8.85	71.59			
2011	141	36.60	10.33	6.79	69.32			
2012	139	33.77	9.69	6.98	67.51			
2013	139	26.71	9.30	6.77	69.15			
2014	140	21.38	10.27	6.18	69.00			
Total	1,683	38.19	13.07	6.18	83.61			
Panel C: Within and between variations of reported surplus/deficit (scaled by lagged total assets)								
	Mean	SD	Min	Max	Observations			
Overall	0.028	0.047	-0.404	1.045	N = 1,683			
Between		0.018	-0.028	0.107	n = 143			
Within		0.044	-0.348	0.966	T = 11.77			
Panel D: Descriptive statistics of reported surplus/deficit by year								
Year	N	Mean	SD	Min	Max			
2003	137	1.74%	2.44%	-7.00%	11.22%			
2004	139	2.67%	4.75%	-4.96%	44.24%			
2005	140	1.96%	2.76%	-4.69%	13.42%			
2006	141	2.90%	6.63%	-5.83%	51.62%			
2007	141	2.31%	3.56%	-6.08%	22.46%			
2008	142	3.36%	4.31%	-15.58%	18.78%			
2009	142	2.71%	9.36%	-14.36%	104.46%			
2010	142	2.17%	5.31%	-40.40%	12.98%			
2011	141	3.99%	3.16%	-3.31%	13.29%			

(Continues)

TABLE 1 Continued

Year	N	Mean	SD	Min	Max
2012	139	3.16%	2.73%	-4.30%	11.21%
2013	139	3.17%	3.08%	-4.96%	16.03%
2014	140	3.13%	2.77%	-4.91%	12.16%
Total	1,683	2.77%	4.71%	-40.40%	104.46%

Panel E: Frequency of reported surplus and deficit by year													
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Reported Deficit	21	16	21	27	20	10	28	21	7	9	8	11	199
Reported Surplus	116	123	119	114	121	132	114	121	134	130	131	129	1,484
Total	137	139	140	141	141	142	142	142	141	139	139	140	1,683

**FIGURE 1** Distribution of reported surplus/deficit

Notes: The distribution of reported surplus/deficit scaled by lagged total assets. The distribution interval width, which is calculated using as $2(IQR)n^{-1/3}$, in accordance with Degeorge, Patel, and Zeckhauser (1999), is approximately 0.005. The first interval to the right of zero contains all observations in the interval $[0, 0.005)$, the second interval contains $[0.005, 0.01)$, and so on.

3 and 4). Further, Model 2, which includes long-term provisions and depreciation in the calculation of the change in working capital (Ballantine et al., 2007), has greater explanatory power (11.1%) than Model 1 (9.4%) and is therefore adopted as the primary estimator of discretionary accruals for the purposes of our investigations.

Prior to our multivariate analysis we provide in Table 2 descriptive statistics on discretionary accruals and the pre-discretionary surplus/deficit (Panel A), other key variables (Panel B), and correlation coefficients (Panel C). Key variable definitions are given in Panel D.

TABLE 2 Descriptive statistics of key variables

Panel A: Summary of pre-discretionary surplus/deficit and discretionary accruals (scaled by lagged total assets)								
	N	Mean	SD	Min	Max			
Discretionary accruals (DA)	1,683	0.000	0.065	-0.568	0.680			
Positive	854	0.041	0.050	0.000	0.663			
Negative	829	-0.042	0.048	-0.574	0.000			
Pre-discretionary surplus/deficit (<i>preSD</i>)	1,683	0.029	0.074	-0.355	1.108			
Surplus	1,209	0.053	0.062	0.000	1.105			
Deficit	474	-0.036	0.046	-0.375	0.000			
Panel B: Summary of other key variables								
Variable	N	Mean	SD	Min	Max			
<i>preDef</i>	1,683	0.276	0.439	0.000	1.000			
RF	1,683	0.000	10.95	-36.68	47.62			
Tuition	1,683	0.000	11.58	-49.89	48.26			
Research	1,683	0.000	11.59	-10.96	54.55			
OtherIncome	1,683	0.000	7.13	-18.04	35.88			
Surplus	1,683	0.028	0.047	-0.216	1.045			
Panel C: Pearson correlation table								
	1	2	3	4	5	6	7	8
DA (1)	1							
<i>preSD</i> (2)	-0.76*	1						
<i>preDef</i> (3)	0.49*	-0.57*	1					
RF (4)	0.04	0.04	0.03	1				
Tuition (5)	0.04	0.01	0	-0.15*	1			
Research (6)	-0.09*	0.01	-0.04	-0.51*	-0.61*	1		
OtherIncome (7)	0.01	-0.09*	0	-0.41*	-0.37*	0.13*	1	
Surplus (8)	0.03	0.10*	-0.07*	0.12*	0.09*	-0.13*	-0.11*	1
Panel D: Variable definitions								
Variables	Definitions							
DA	Discretionary accruals obtained from the accrual model (Equation 1).							
Surplus	Reported surplus or deficit scaled by lagged total assets.							
<i>preSD</i>	Pre-discretionary surplus or deficit, (calculated as reported surplus/deficit minus discretionary accruals, consistent with related literature), scaled by lagged total assets. A surplus has a positive value, a deficit has a negative value.							
<i>preDef</i>	A dummy variable equals to 1 if there is a deficit before discretionary accruals and 0 otherwise.							
Source	Sources of funding							
RF	Funding from regulators (funding body grant) expressed as a percentage of total revenue relative to the sample annual mean.							
Tuition	Tuition fees expressed as a percentage of total revenue relative to the sample annual mean.							
Research	Research-related income expressed as a percentage of total revenue relative to the sample annual mean.							
OtherIncome	Other income expressed as a percentage of total revenue relative to the sample annual mean.							

Panel B Note: All variables are defined in Panel D

Panel C Notes: ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table 2 Panel D.

TABLE 3 Influence of external monitoring

Dependent variable	DA	DA	DA	DA
Models	Model A	Model B	Model C	Model D
<i>preSD</i>	-0.852***	-0.849***	-0.848***	-0.848***
<i>RF</i>	0.000	-0.001**	0.001	0.001
<i>preSD</i> × <i>RF</i>	0.015***	0.017**	0.014**	0.015***
<i>Tuition</i>			0.002*	0.001***
<i>preSD</i> × <i>Tuition</i>			-0.003	-0.002
<i>Research</i>		-0.002***		-0.001
<i>preSD</i> × <i>Research</i>		0.002		0.000
<i>OtherIncome</i>		-0.001***	0.000	
<i>preSD</i> × <i>OtherIncome</i>		0.002	-0.001	
<i>Surplus</i> _{<i>t</i>-1}	0.060	0.046	0.048	0.047
<i>DA</i> _{<i>t</i>-1}	-0.040*	-0.043*	-0.041*	-0.042*
Constant	0.014***	0.015***	0.015***	0.015***
Year control	Yes	Yes	Yes	Yes
Observations	1,683	1,683	1,683	1,683
R-squared	0.644	0.65	0.649	0.65
Number of universities	143	143	143	143

Note: This table presents the results from panel data regression estimations of the impact of sources of funding on the level of discretionary accruals. All regressions use fixed effect with year control included. Robust standard errors are reported in the table.

***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

Model A:

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \alpha_2 RF_{it} + \alpha_3 preSD_{it} * RF_{it} + \alpha_4 Surplus_{it-1} + \alpha_5 DA_{it-1} + \varepsilon_{it}$$

Models B–D:

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \sum \alpha_j Source_{jit} + \sum \alpha_j preSD_{it} * Source_{jit} + \alpha_4 Surplus_{it-1} + \alpha_5 DA_{it-1} + \varepsilon_{it}$$

Source: *j* refers to the source of funding (*j* = *RF*, *Tuition*, *Research*, or *Other*). All other variables are defined in Table 2 Panel D.

7.2.2 | Hypothesis 1: University financial reporting quality is positively associated with the dependence on funding from regulators

Table 3 Model A shows the results of our test of Hypothesis 1. The coefficient on the pre-discretionary surplus/deficit (*preSD*) is negative at -0.85 ($p < 0.01$). This is consistent with the evidence from prior studies (Ferreira et al., 2013; Leone & Van Horn, 2005; Verbruggen & Christiaens, 2012). As predicted, the coefficient on the interaction term *preSD***RF* is positive (0.015, $p < 0.01$) indicating that financial-reporting quality (proxied inversely by discretionary accruals) improves with increasing levels of funding from regulators. For example, for a university with funding from regulators which is 10 percentage points above the sample annual mean, discretionary accruals are 70% of the scaled pre-discretionary surplus/deficit. The comparable figure for a university with funding from regulators which is 10 percentage points below the sample annual mean is 100%.¹²

To provide further evidence to support our hypothesis regarding the impact of monitoring on financial reporting quality Models B, C, and D show the effect of introducing other sources of funding into the regression. In each case the results for funding from regulators are similar to those for Model A in both size and significance, whereas the interaction of *preSD* with other sources of funding is inconclusive.

In summary, Table 3 provides support for Hypothesis 1 that financial reporting quality is positively associated with the dependence on funding from regulators.

TABLE 4 Deficit reporting avoidance

Dependent variable	DA
<i>preSD</i>	-0.569 ^{***}
<i>preDef</i>	0.007
<i>preSD</i> × <i>preDef</i>	-0.445 ^{**}
<i>Surplus</i> _{<i>t</i>-1}	0.058
<i>DA</i> _{<i>t</i>-1}	-0.035 [*]
Constant	0.002
Year control	Yes
Observations	1,683
R-squared	0.624
Number of universities	143

Note: This table presents the results from panel data regression estimations of the impact of pre-discretionary deficit on the level of discretionary accruals. The regressions use fixed effect with year control included. Robust standard errors are reported in the table.

***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \alpha_2 preDef_{it} + \alpha_3 preSD_{it} * preDef_{it} + \alpha_4 Surplus_{it-1} + \alpha_5 DA_{it-1} + \epsilon_{it}$$

All variables are defined in Table 2 Panel D

TABLE 5 Comparison of surplus/deficit before and after pre-discretionary accruals

	Reported deficit (after discretionary accruals)	Reported surplus (after discretionary accruals)	Total
Pre-discretionary deficit	93	381	474
	20%	80%	100%
Pre-discretionary -surplus	106	1,103	1,209
	9%	91%	100%

Pearson $\chi^2_1 = 38.47$ Pr = 0.000.

7.2.3 | Hypothesis 2: University financial reporting quality is negatively associated with the presence of a pre-discretionary deficit

Table 4 reports the results from Equation 5 that investigates whether financial reporting quality is low in the presence of a pre-discretionary deficit. The coefficient on the pre-discretionary surplus/deficit is negative (-0.569 , $p < 0.01$) and, as predicted, the coefficient on the interaction is also negative, and large at -0.445 ($p < 0.05$). The results indicate that, in the presence of a pre-discretionary deficit a university would increase discretionary accruals from 57% of the pre-discretionary deficit to 101% (0.569 ± 0.445), which would transform the pre-discretionary deficit into a small reported surplus.

These findings support Hypothesis 2 that university financial reporting quality is negatively associated with the presence of a pre-discretionary deficit, a proxy for the threat of regulatory intervention.

Table 5 sheds further light on this phenomenon by showing a comparison of the surplus or deficit before and after discretionary accruals. It can be seen that 80% (381 out of 474) of observations with a pre-discretionary deficit reported a surplus ($\chi^2_1 = 38.5$, $p = 0.00$).

7.2.4 | Hypothesis 3: The positive association between financial reporting quality and the dependence of funding from regulators is mitigated in the presence of a pre-discretionary deficit

Table 6 shows the results of Equation 6 that tests Hypothesis 3. The coefficient on the pre-discretionary surplus/deficit

TABLE 6 Interaction of external monitoring and deficit reporting avoidance

Dependent variables	DA
<i>preSD</i>	−0.826***
<i>preDef</i>	−0.003
<i>preSD</i> × <i>preDef</i>	−0.166**
<i>RF</i>	−0.001***
<i>preSD</i> × <i>RF</i>	0.020***
<i>preDef</i> × <i>RF</i>	0.001***
<i>preDef</i> × <i>RF</i> × <i>preSD</i>	−0.022**
<i>Surplus</i> _{<i>t</i>−1}	0.075**
<i>DA</i> _{<i>t</i>−1}	−0.033
Constant	0.011***
Year control	Yes
Observations	1,683
R-squared	0.673
Number of universities	−0.826***

Note: ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

$$DA_{it} = \alpha_0 + \alpha_1 preSD_{it} + \alpha_2 preDef_{it} + \alpha_3 RF_{it} + \alpha_4 preSD_{it} * RF_{it} + \alpha_5 preSD_{it} * preDef_{it} + \alpha_6 preSD_{it} * preDef_{it} * RF_{it} + \alpha_7 Surplus_{it-1} + \alpha_8 DA_{it-1} + \varepsilon_{it}$$

All variables are defined in Table 2 Panel C.

(*preSD*) is similar to that in Table 3 (−0.826, $p < 0.01$) as is the interaction with *RF* (0.020, $p < 0.01$). The combined interaction term, *preDef***preSD***RF*, is however negative (−0.022, $p < 0.01$) and is greater in magnitude than the positive coefficient on the interaction term (*preSD***RF*, coefficient 0.020). Thus in the presence of a pre-discretionary deficit, financial reporting quality actually decreases with increased funding from regulators such as HEFCE. The net effect is that discretionary accruals are 0.2% (0.022−0.020) higher in relation to pre-discretionary deficits for every additional unit¹³ of funding from regulators.¹⁴

In summary our findings indicate that, dependence on funding from regulators (which is also a proxy for monitoring intensity) has a beneficial impact on university financial reporting quality but that this is more than offset in the presence of a pre-discretionary deficit, a proxy for the threat of regulatory intervention.

7.2.5 | Robustness testing

We have conducted a number of robustness checks on our findings. First, we test for multicollinearity by examining the Variance inflation factors (VIFs) for each of the regression models. None of the VIF scores is above 10, and we therefore conclude that multicollinearity is not a serious concern (Kennedy, 1998). Second, we test whether the findings reported in Tables 3–6 are robust to the choice of estimator for discretionary accruals (panel vs. Ordinary Least Squares (OLS)) and to the alternative accrual model represented by Model 1 in the Appendix. Third, we test the influence of possible outliers by winsorising discretionary accruals and pre-discretionary surplus/deficit at the 1st and 99th percentiles. We find that, in all cases, the results are similar in both economic and statistical significance.

Then, albeit that universities are a relatively homogenous group of not-for-profit entities, we test the robustness of the findings to the inclusion of other control variables. We control first for the age of the University, measured from the date of its establishment as a University. Older universities tend to be better endowed, more financially stable, and less dependent on student-related revenues than younger universities and there may be other distinctive features that additionally influence their propensity to manage reported financial performance. The findings in Tables 3–6 are robust, for each of statistical and economic significance, to the inclusion of first, a continuous age variable and second,

a categorical variable based on the three main periods of expansion in the university sector: prior to 1960, from 1960 to 1992 and from 1992 onwards. We further investigate whether there might be a London effect, as London is a significant attraction for many students, particularly overseas students. There was no such effect. Similarly, we include a variable that, at least partially, controls for organisational heterogeneity by including a dummy variable if the University is one which is primarily an arts or music institution. These institutions tend to be smaller and have a much narrower curriculum than other universities. The inclusion of this variable had no impact on the findings.

8 | DISCUSSION AND CONCLUSIONS

In this paper we extend the literature on not-for-profit and public sector financial reporting quality by investigating the impact of funding from regulators on university financial reporting quality. While agency problems arise in both not-for-profit and for-profit settings we recognise the limitations of agency theory in a not-for-profit setting (Steinberg, 2010; Van Puyvelde et al., 2012) by adopting both agency and resource dependence theories as complementary frameworks for our analysis. A distinctive feature of our study is the investigation, for the first time in the not-for-profit setting, of the interaction of the monitoring and incentive effects of regulation.

Our setting is U.K. universities, data for which were accessed over a period of 14 years from 2002 to 2015. These institutions derive a significant proportion of their revenue from the sector regulators such as HEFCE. The funding bodies and regulators operate a risk-based regulatory regime of progressive monitoring and intervention. An assessment of organisational financial sustainability, of which surplus/deficit is a key indicator, is a significant part of this regime.

In summary we find that, consistent from both agency and resource dependence perspectives, financial reporting quality is positively associated with the dependence of funding from regulators (Hypothesis 1), a proxy for both resource dependence and monitoring intensity, and that financial reporting quality decreases to avoid deficit reporting, a proxy for the threat of regulatory intervention (Hypothesis 2). Further, the positive association between financial reporting quality and the dependence on funding from regulators is highly mitigated by the presence of a pre-discretionary deficit (Hypothesis 3). The results show that these effects combine to result in the conversion of most pre-discretionary deficits into reported surpluses.

This study provides a robust framework for explaining the impact of regulatory monitoring on financial reporting quality and demonstrates the value of combining agency and resource dependency perspectives to explain short-term tactical accounting choices in response to regulatory threats. The evidence presented here indicates that, in terms of financial reporting quality, short-term responses to regulation can act in tension to longer term responses. More specifically, for those most resource dependent, the strength of the short-term response to preserve managerial autonomy can exceed the longer term strategic response of generating a reputation for good financial reporting quality and sound financial management. This interaction between short-term and long-term responses to resource dependency is worthy of further empirical and analytical investigation.

There are some limitations to our research. Accruals based methods of investigating earnings management have been subject to criticism (see for example, Walker, 2013). However, this method is widely adopted in both for-profit (Dechow et al., 2010; Walker, 2013) and not-for-profit settings. Further, in the absence of a capital markets setting, other empirical archival methods for investigating earnings management are not available for the public and not-for-profit sectors. Nonetheless, further empirical research in the university setting adopting alternative methods, whether quantitative or qualitative, would be beneficial to our understanding of the factors influencing financial reporting quality. Access to TRAC information for example would facilitate a study of the management of cost allocations as has previously been conducted in a US not-for-profit setting (Jones & Roberts, 2006; Krishnan & Yetman, 2011; Krishnan, Yetman, & Yetman, 2006).

The findings of this study are not only of interest for the regulation of higher education sector internationally, but also have implications that go beyond this sector with similar funding and regulatory mechanisms. In the ongoing search

for more efficient and effective public services (Hyndman & Lapsley, 2016) the delivery of public services is increasingly being devolved to not-for-profit, for-profit, and semi-autonomous public sector entities (Office of Fair Trading, 2010, p. 4; Wollman & Marcou, 2010). To protect public money there has been, alongside this trend, a corresponding growth in regulatory bodies whose aim is to ensure that recipients of public funding are financially sound and that the funds provided are used for the purposes intended (Black, 2005; Black & Baldwin, 2010; HM Treasury, 2013). The effectiveness of these regulatory regimes is dependent, *inter alia*, upon the quality of financial reporting by regulated entities. Our findings thus have a number of policy and practice implications for the regulators and auditors of public sector and not-for-profit entities, and to service commissioning bodies such as central government departments, local authorities, and municipalities. In particular, regulatory reliance on financial reporting may need to be tempered when there is heavy dependence on funding from regulators and when entities report performance close to financial thresholds of regulatory significance.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the HESA database. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the corresponding author with the permission of HESA.

CONFLICT OF INTEREST

None.

NOTES

¹ There are four different funding bodies in the United Kingdom which are responsible to allocate government funding to higher education institutions. They are Higher Education Funding Council for England (HEFCE, replaced by Office for Students (OFS) in April 2018); Scottish Funding Council for Scotland (SFC); Higher Education Funding Council for Wales (HEFCW); and the Department for Economy (DfE, for Northern Ireland).

² This remains the case under the OFS system where a range of interventions are available to the OFS ranging from additional monitoring to "suspension" and "de-registration" (OFS 2018 p. 53, HERA 2017, s19) effectively preventing an institution from operating as a higher education provider.

³ In December 2009 HEFCE threatened to withdraw funding from London Metropolitan University after the misreporting of student numbers. By July 2010 only 4 of the 15 Governors of the University had survived. Included in resignations were the Chair of the Governing Body, the Vice-Chancellor, the Chair of the Audit Committee, and the Chair of the Finance Committee.

⁴ See for example, the University of Cambridge mission statement, <https://www.cam.ac.uk/about-the-university/how-the-university-and-colleges-work/the-universitys-mission-and-core-values>

⁵ In the context of English Universities the recent public debate about Vice Chancellor pay, the HEFCE intervention at the University of Bath, and evidence that the adverse publicity has had an impact on student applications, provides evidence that private sector type reward packages can be counter-productive in a public/not-for-profit setting. (<http://www.bathchronicle.co.uk/news/bath-news/something-gone-very-wrong-probe-260701>;

⁶ See <https://www.theguardian.com/education/2018/aug/17/prestigious-universities-edge-out-rivals-uk-battle-for-students>. University admissions clearing house, Ucas, reported that record numbers had been recruited a day after hundreds of thousands of students received their A-level results across England, Wales and Northern Ireland. See <https://www.theguardian.com/education/2018/aug/17/prestigious-universities-edge-out-rivals-uk-battle-for-students>.

⁷ See <https://www.bbc.co.uk/news/education-46059457>.

⁸ Funding from regulators declines over the period of our study but this does not of itself imply that the regulators/funding bodies has reduced the intensity of its scrutiny. The evidence suggests the opposite (Lapsley & Miller, 2004; Parker, 2013). Thus, by measuring each University's funding in relation to the sample annual mean we investigate the relative impact of funding from regulators as between those with relatively high levels and those with relatively low levels of funding at any point in time. Further, from a theoretical perspective, this procedure provides efficient estimations whilst allowing for

explanatory variables that are relatively low in variability (Wooldridge, 2010). An example of the application of this technique can be found in Chang, Dasgupta, & Hilary, 2009).

⁹ If the sample annual mean for funding from regulators is 30% and the observation has a value of 33%, the value of the variable *RF* will be +3.

¹⁰ When $\text{preDef} = 1$ (ie there is a pre-discretionary deficit) and α_3 is also negative, the combined effect is to demonstrate that there has been an incremental reduction in financial reporting quality ($\alpha_1 + \alpha_3 + \alpha_1$).

¹¹ HESA is the designated body used by HEFCE and OfS for the collection and dissemination of data relating to Higher Education Institutions. Universities submit data in relation to finance, staff and student to HESA annually. See <http://hesa.ac.uk/about/regulation/statutory>.

¹² From Table 3, the coefficient on *preSD* is (-0.85) and the coefficient on the interaction with *RF* is +0.015. Thus, when funding from regulators (*RF*) as a percentage of total revenue is 10 percentage points above the sample annual mean, *DA* is $-0.85 + 0.015 \times 10 = -0.70$. When *RF* is 10 percentage points below the mean *DA* is $-0.85 + 0.015 \times (-10) = -1.00$.

¹³ One unit is 1/100 of total revenue.

¹⁴ Similarly discretionary accruals will increase by 0.2% for every unit of funding from regulators below the sample annual mean. In these circumstances, $\text{preSD} \times \text{RF} = -0.020$ and $\text{preDef} \times \text{RF} \times \text{preSD} = +0.022$. ($-0.020 + 0.022 = 0.002$).

ORCID

Margaret J. Greenwood  <https://orcid.org/0000-0002-7550-1307>

Lei Tao  <https://orcid.org/0000-0002-5182-1891>

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APPENDIX

TABLE A1 Accrual models regression results

Variables	Model 1 ΔWC	Model 2 As model 1 but including change in long term provisions and depreciation	Model 3 Jones model	Model 4 Modified Jones model
CFO _{it-1}	0.148***	0.121***		
CFO _{it}	-0.270***	-0.313***		
CFO _{it+1}	0.147***	0.064**		
ΔREV _{it}	-0.010 [*]	-0.145***	-0.021***	
PPE	-0.038***	-0.048***	-0.038***	-0.041***
ΔREV _{it} - ΔREC _{it}				-0.205***
Constant	0.025**	-0.002 [*]	0.213**	0.024 [*]
Year Control	Yes	Yes	Yes	Yes
Observations	1827	1827	1827	1827
R-squared	0.094	0.111	0.056	0.072

Note: The results are from accrual models regression. Robust standard errors are reported in the table. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

Model 1:

$$\frac{\Delta WC_{it}}{TA_{it-1}} = \alpha_0 + \alpha_1 \left(\frac{CFO_{it-1}}{TA_{it-1}} \right) + \alpha_2 \left(\frac{CFO_{it}}{TA_{it-1}} \right) + \alpha_3 \left(\frac{CFO_{it+1}}{TA_{it-1}} \right) + \alpha_4 \left(\frac{\Delta REV_{it}}{TA_{it-1}} \right) + \alpha_5 \left(\frac{PPE_{it}}{TA_{it-1}} \right) + \varepsilon_{it}$$

$$\Delta WC_{it} = \Delta CA_{it} - \Delta CASH_{it} - \Delta CL_{it}$$

where ΔWC_{it} is the change in working capital accrual, ΔCA_{it} means the change in current assets, $\Delta CASH_{it}$ presents the change in cash in hand, ΔCL_{it} stands for the change in current liabilities, TA_{it-1} is the total assets, CFO_{it} is the operating cash flow, ΔREV_{it} represents change of total income from year t to year $t-1$, PPE_{it} is the property, plant, and equipment in year t and ε_{it} is the residual.

Model 2 is similar to Model 1. The dependent variable in Model 2 ΔWC_{it} includes the change of long-term provision and depreciation.

The Jones Model used is:

$$\frac{ACC_{it}}{TA_{it-1}} = \alpha_1 \left(\frac{1}{TA_{it-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{it}}{TA_{it-1}} \right) + \alpha_3 \left(\frac{PPE_{it}}{TA_{it-1}} \right) + \varepsilon_{it}$$

where ACC_{it} means total accruals in year t , ΔREV_{it} represents change of total income from year t to year $t-1$, PPE_{it} is the property, plant, and equipment in year t . The error term from the equation can be treated as a measure of discretionary accruals.

The Modified Jones Model used is:

$$\frac{ACC_{it}}{TA_{it-1}} = \alpha_1 \left(\frac{1}{TA_{it-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{it} - \Delta REC_{it}}{TA_{it-1}} \right) + \alpha_3 \left(\frac{PPE_{it}}{TA_{it-1}} \right) + \varepsilon_{it}$$

where ΔREC_{it} represents the changes in receivables.