



Contents lists available at ScienceDirect

Int. J. Production Economics

journal homepage: www.elsevier.com/locate/ijpe

Uncovering the links between regulation and performance measurement

Kim Hua Tan ^{a,*}, Rosalind H. Rae ^b

^a Nottingham University Business School, UK

^b Aberdeen Business School, Robert Gordon University, UK

ARTICLE INFO

Available online 21 June 2009

Keywords:

Regulation
Performance measurement
Unintended consequences
Productivity

ABSTRACT

The aim of the research was to explore and evaluate previous work focusing on the relationship and links between regulation and performance measurement. The objectives were to seek out examples in the literature on the unintended consequences of performance measurement and regulation. Several explanatory frameworks are developed and discussed. It is intended that the frameworks can be developed and used: (a) to assist our conceptual understanding of the unintended consequences of regulation and performance measurement at the firm level; (b) to guide regulators in policy making by showing the issues and opportunities that exist as a result of regulation and performance measurement; and (c) to serve as a platform to identify and recommend areas for future research.

© 2009 Elsevier B.V. All rights reserved.

1. Introduction

Unintended consequences as a result of regulation and performance measurement (PM) on the firm are undervalued in terms of their impact on firm performance and as a consequence, regulators can unwittingly cause a negative or positive impact on the firm through the implementation of regulations and the requirement to measure, monitor and report performance measurement information. This can potentially have significant consequences for the firm, the industry sector, and potentially the UK as a whole. For example, it is commonplace to hear news stories that tell us of what we think is quite bizarre behaviour, ‘hospitals told to delay treatment’ we hear. News reports inform us that ‘Hospitals are being told to delay treatment provision to patients for 8 weeks otherwise the hospital would not receive funding for them.’ This ‘minimum’ delay period is being enforced by

some local primary care trusts because of the drive to meet government waiting time targets is costing too much money. A letter sent to all the chief executives of one trust said routine patients should not be seen ‘too promptly’. It concluded that if hospitals failed to reduce the level of routine referrals to less than 8 weeks, the strategic health authority would not pay for these consultations and operations.

An unintended consequence of consultants successfully exceeding government waiting list targets is that the government underestimated how well the professionals would respond to the new performance measures and it is now costing far too much money, as all the pre-allocated budgets are being used up, these pre-allocated budgets having been formulated based on past performance. As a result, the consultants are informed they need to get longer waiting lists (performance criteria for budget allocation), and until that time there will be no money to perform consultations and operations. A performance measure was set (waiting list targets), it was exceeded beyond all expectations, and then the successful implementers (the consultants) were told to go back to the

* Corresponding author.

E-mail address: Kim.Tan@nottingham.ac.uk (K.H. Tan).

Table 1
Intended and unintended consequences of regulation and performance measurement.

	Intended consequences	Unintended consequences
Regulation	Competition Price Quality Safety Environmental Customer protection/choice	Decreases productivity Increases administration/bureaucracy Increases costs Reduces innovation Creates barriers to entry Forces small players to exit
Performance measurement	Improves performance of the firm Increases focus on what's important Translation of strategy to action A measure of performance/success or failure—a trigger for action Monitor progress Increases accountability	Dysfunctional behaviour Perform to the measure not to the goal Too many measures/too much information Measure the wrong thing/inaccurate Objective measurements do they exist? Internal and external influences

'poorer' performance of old, i.e. long waiting lists and times, otherwise their work would not be funded.¹ There are several issues resulting in these unintended consequences. Firstly, past performance has influenced what the future performance might look like. A result of this is that it is not accurate and the success of meeting this target has been insufficient budget to meet the new performance measures. Some consultants have risen to the challenge and exceeded the government's expectations but are now being told to go back to the performance standards of old because the budget cannot meet the new measures that have been set. This is a contemporary example of the unintended consequences that can arise through the use and application of performance measures.

The definition adopted for unintended consequences is 'an activity that has produced a consequence that was not planned with any intent or purpose.'² The result is something which could have a positive or negative effect on the firm and its environment. To assist in our understanding of what are intended and unintended consequences, through literature we have developed a framework outlining some examples of what we believe are intended and unintended consequences resulting either from regulation or performance measurement or as a result of the relationship between the two (see Table 1).

¹ Story from *BBC News*: Published: 23 November 2006 <http://news.bbc.co.uk/go/pr/fr/1/hi/england/61769944.stm>

² Definition from 'The Concise Oxford English Dictionary', 11th revised edition, Oxford University Press.

Table 2
Key characteristics of performance measurement and regulation.

	Performance measurement	Regulation
Domain	Firm level: corporate governance Within organisations: performance measurement systems	Transcends industry sectors and individual organisations
Origination	Decided through private processes	Decided by legislative, executive and judicial branch of government
Purpose	To generate shareholder wealth through improving the performance across the firm	Competition Safety Quality Price
Enforcement	Company performance Performance related pay contractual	Regulatory bodies Audits and reporting
Relevant academic disciplines	Business and management, accounting, economics, law	Economics, law

While performance measurement has as its domain the specific organisation in which it is applied, regulation generally transcends individual organisations, and often defines and shapes incentives for organisations as a whole. Several other obvious differences and communalities exist between the two (Table 2).

Clearly, from the domain side, regulation can have an impact on performance measurement. But this raises some potential issues and provokes enquiries like: What is the scope and extent of the impact? What are the links between regulation and performance measurement? Our ability to understand the links between regulation and performance measurement are vital—especially the unintended consequences on firms' performance. In particular, one area of investigation might focus on how firms react and what translation mechanism they use as a result of regulation and performance measures?

However, the evidence found in previous research that has focused on the unintended consequences of regulation and performance measurement appears to be sparse. The research conducted has been focused on single case studies in particular industry sectors, which makes it difficult to gain a clear overview of the area of investigation. Another challenge which previous work fails to address is the classification of the consequences of regulation and performance measurement into intended and unintended. On many occasions the differences were not made clear. The evidence provided little information on the unintended consequences.

A study conducted by *Adcroft and Willis (2005)* looked at the (un)intended consequences of performance measurement in the public sector and found that the result was a commodification of services and deprofessionalisation of the workers. *Humphreys and Francis (2002)* looked at airport performance measurement and found that there

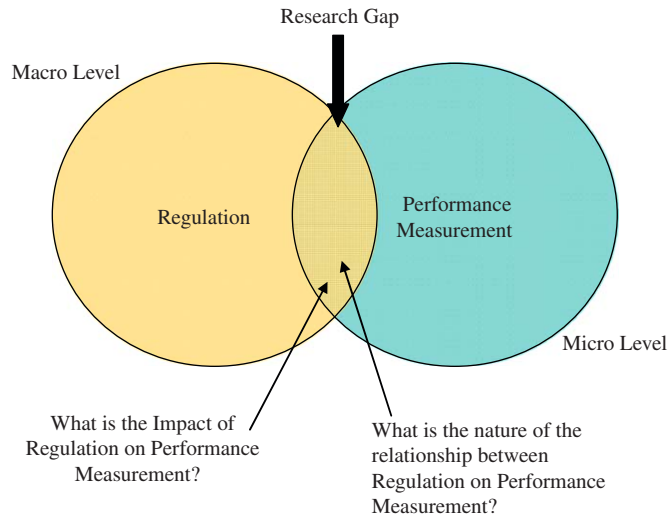


Fig. 1. The research gap.

were significant dysfunctional effects related to performance measurement resulting from regulation and commercialisation. For instance, the achievement of one performance measure had a negative impact on the achievement of another, so the two measures were at conflict with one another. They also found that as a result of heavily regulated activities, the firm focused on unregulated activities to generate wealth and to meet shareholders requirements.

Overall the research identified and explored was relatively thin on the ground with respect to the unintended consequences, and the link between regulation and performance measurement. In light of this, this paper presents a systematic literature review on the links between regulation and performance measurement specifically focusing on the unintended consequences resulting from regulation requirements and performance measures designed to meet these regulations (see Fig. 1). The purpose is to develop a conceptual framework of the link between regulation and performance measurement. It is intended that the frameworks can be used:

- To serve as a platform to identify and recommend areas for future research. In the following section, we outline the specific methodology we adopt to conduct this particular research.
- To assist our conceptual understanding of the unintended consequences of regulation and performance measurement at the firm level.
- To guide regulators in policy making by showing the issues and opportunities that exist as a result of regulation and performance measurement.

2. Research methodology

Regulation, productivity, and performance measurement have been researched widely with vast amounts of information located in their respective fields. The study's

aim was to explore the literature for research on the relationship between regulation and performance measurement on a micro level and to identify the research gaps in this area. The scope of the research involved a systematic review exploring aspects of the literature and empirical evidence to identify themes relating to the relationship between regulation and performance measurement on a micro level.

The goal of the study was to get more of an overview of what work had been carried out previously and to explore the links present, and not to focus on one particular measurement technique and one particular firm located in a particular industry. The objective of this approach was to enable a 'helicopter view' to be developed of the general consequences (including positive and negative) and the unintended consequences of what had been researched previously.

The review of the literature was made up of a number of stages and the review of the literature was designed with the scope of the study in mind. The research steps involved identification of keywords through brainstorming; then the keywords were used independently and then as part of a more advanced search connected with other keywords in database searches, for example regulation and performance measurement. The literature search was carried out as a subject search criteria initially, and if zero items were found then as general text search within the databases. Eight search engines were used. These included EBSCO Business Source Premier; ABI Proquest; Web of Science and specific operations management journal databases. Once the articles were identified which matched the search criteria, the abstract was read and evaluated and a decision was made as to whether the article fitted into one of three categories: category 'A' for being of direct relevance; category 'B' for being vaguely relevant but not directly and category 'C' for being interesting but not really relevant for this particular study. The list of 'A' articles were read and evaluated as to whether they could contribute to the study in question.

3. The evidence and discussion

The majority of the literature located has been very specific in its focus and has been carried out on a case-by-case basis. This in itself provides challenges and opportunities. The search highlighted the lack of presence of relevant material in key operations management journals in covering links of performance measurement and regulation. For example, Neely et al. (1996), Waggoner et al. (1999) and Unahabhokha et al. (2006) mainly explored how can performance measurement system be developed, or the forces that influence its structure. Performance measurement is a huge field in operations management literature but when trying to explore links with regulation the material is somewhat thin on the ground.

The literature review identified a small number of articles that mentioned unintended consequences of performance measurement and regulation. Only a few of these journals actually concentrated on the unintended consequences as the main focus for research, the remaining research mentioned the presence of unintended consequences but it was not the focal point of the research in the journal.

However, a number of articles have made some interesting observations relating to the consequences of regulation and performance measurement (see Table 3). The key points of the findings are split into the following sections:

- (a) the positive and negative consequences of regulation and performance measurement;
- (b) change in management behaviour as a consequence of regulation and performance measurement;
- (c) unintended and intended consequences.

(a) *The positive and negative consequences of regulation and performance measurement*: Governments have a number of instruments they can use to change the way the markets operate, regulation being one of them which can control the behaviour of firms and individuals. Regulation can be used to protect the consumer through

price controls, competition (giving consumer choice), enforce quality and health and safety standards across industry sectors, and provide information for the public domain in which the consumer can make more informed choices. Examples illustrated by Viscusi et al. (2005) are: the setting of prices for the public utilities, the control of pollution emitted from production processes, the allocation of operating licences, product safety standards and 'the menu of products available to consumers'.

Meyer (2004) suggested that performance measurement is useful in so far as it can 'tell an organisation where it stands in its efforts to achieve goals'. Drucker (1991) suggested that performance measurement generated new and additional resource, clearer understanding of economic chains and generated wealth. Kaplan and Norton (1992) in discussing the balanced scorecard, they stated that the benefits were in the translation of the 'company's strategy and mission statement into specific goals and measures', allows products to get to market sooner and innovative products are tailored to customer needs. Ness and Cucuzza (1995) stated that the average quality of decisions made day in day out will be vastly higher than before. Other benefits outlined were: to reduce variations in performance and service provided; to share best practice; acts as a motivation to individuals to meet certain performance targets and helps to deliver an improvement in standards.

Adcroft and Willis (2005) found that from a national perspective performance measurement has allowed comparison across hospitals and health care trusts in terms of their performance whether it is good or bad, the aim being to raise standards, focusing on certain activities and outputs through increased transparency, more accountability and to create competition between hospitals and trusts. As a reward, hospitals that performed well attracted more funding. Humphreys and Francis (2002) found that management required information to enable them to identify areas that are performing well and those where appropriate corrective action needs to take place. Shaffer (1995) outlined some competitive gains for businesses resulting from public policies outlined as: increasing total market size; advantages over rivals;

Table 3

Key authors and journal summary.

Authors	Year	Summary
Adcroft and Willis	2005	Looked into the (un)intended outcome of public sector performance measurement, in the NHS and the education sector. They found that an increased usage of performance measurement techniques in the public sector resulted in the commodification of services which was delivered by an increasingly deprofessionalised public sector workforce
Brigham and Fitzgerald	2001	Analyze the relationship between individual and organisational performance management and measurement within a regulated water company. They propose four dimensions of control constitute the social relations of economic regulation: mediation and negotiation; visibility of reporting; prioritisation of performance measures and perception of control
Humphreys and Francis	2002	Looked at the past, present and future of airport performance measurement and focused on the changing ownership of airports from public to private interests on performance measurement systems. They found that measurement systems were developed in response to changing organisational contexts. They concluded that airport performance measures are important for day to day business and operational management, regulatory bodies, government and other stakeholders such as passengers and airlines
Shaffer	1995	Focuses on the consequences of public policies for the competitive environment of the firm. Firm level responses can be strategic adaptation and attempts to influence policy. Organisations protect and advance their political interests through environmental scanning, lobbying, political actions committees, and coalition building (like trade associations)

reducing the threat of rivals and product substitutes and gaining bargaining power over suppliers and customers.

Consequences of regulation and performance measurement: Many authors pointed out that government intervention in the market can itself lead to problems. ‘The case for non-intervention (*laissez-faire*) or limited intervention is when the problems generated by this intervention are greater than the problems overcome by that intervention’ as outlined by [Sloman and Sutcliffe \(2001\)](#). Poor information is another drawback of government intervention. It is possible that the government does not know the full costs and benefits of its policies, and it may be unaware of people’s wishes or misinterpret their behaviour. Government intervention can create an increase in bureaucracy and inefficiency through an increase in administrative costs. If the intervention is wide reaching and detailed, the likelihood of requiring more people and resources to deal with this are greater. A lack of market incentives is another drawback. Government intervention may remove market forces or cushion their effect. Subsidies may allow inefficient firms to continue operating. In addition, if there is a shift in government policy and it changes too frequently then it becomes difficult for firms to plan and the economic efficiency of industry may suffer as a result.

[Meyer \(2004\)](#) points out that performance measurement is less useful in explaining what the organisation should do differently. [Adcroft and Willis \(2005\)](#) argued that performance measures do not take into account the softer measures and therefore it is more difficult to quantify which measures still have influence on the performance and delivery of the goals. Performance can be affected by external factors as well as internal factors like market conditions, industry structures and social settlements. They found that the individual elements measured are rarely independent of one another; therefore they pose the question, does it really give a true measure? Other weaknesses have been identified as: improving performance in one area may result in worsening performance in another (especially if resource is moved); scientific approaches to measurement assume objectivity achieved through dispassionate analysis of the available evidence but subjective interpretation of the evidence is often the case; it is impossible to get a 100% objective measurement; the use of results on a national scale for comparison purposes (like league tables) assumes everybody starts from the same point.

[Humphreys and Francis \(2002\)](#) found that airport operational performance measures that relate passenger level of service to international standards are still widely used. The major weakness for this kind of measure is that it is too crude. As [Gosling \(1999\)](#) highlighted there is a tension in data collection between what is easy to measure and what is useful to measure but potentially more difficult.

[Ittner and Larcker \(1998\)](#) stated that businesses that do not address and identify what the ‘fundamental drivers’ of their unit’s performance’ will face potential problems. They can then fall into the trap of measuring far too many things and try to cover every perceivable angle. The consequence is an array of ‘peripheral, trivial or irrelevant

measures’. Amid this mass of measures the company is unable to identify which measures contribute to the overall success of the performance of the organisation. For [Ittner and Larcker](#), it is about identifying and proving what the basic causality is and determining the relative importance of the measures.

Proposition 1. *Regulation and performance measurement can have positive and negative implications for the firm.*

(b) *A Change in management behaviour:* [Argyris \(1986\)](#) stated that most organisations behaved in a way which was defensive to protect them from any threat. He defined defensive routines as ‘any policy or action that prevents the organisation experiencing pain or threat’. At the same time he said by doing this it would prevent any learning taking place on how to solve the issues associated with the causes and therefore the threat never goes away. [Argyris](#) found when employees were surveyed in the organisation, they responded by saying that the managers said one thing (‘what they valued and taught’) but behaved then in a completely different manner, and there was a mismatch between the two. The culture supported this behaviour. Managers effectively behaved inconsistently with the company policies, this became embedded in everyday actions, which had become concealed.

[Shaffer \(1995\)](#) focused on the consequences of public policies for the competitive environment of the firm. He stated that firm level responses can be a strategic adaptation and attempts to influence policy. Organisations protect and advance their political interests through environmental scanning, lobbying, political actions committees, coalition building (like trade associations) and advocacy advertising. Many managers view attention to governmental affairs as a vital part of their jobs both as a defence against regulatory intrusions and as a means of gaining corporate advantage. Firms attempt to control the political agenda for competitive gain. [Oster \(1982\)](#) put forward the concept of the formation of industry sub-groups that firms use regulatory processes to hurt rivals, even when the collective welfare of the industry is damaged—he went to outline that ‘a firm may even encourage passage of regulation which reduces industry demand or increase costs. The firm may encourage such regulations because they differentially damage its rivals, and thus rearrange market shares at the same time they reduce the total market’. [Adcroft and Willis \(2005\)](#) stated that the managers had options to choose as a response to the interpretation of the measures and targets that had been set and could potentially distort what was measured and what the outcome was.

Proposition 2. *Management behaviour will adapt and respond to regulatory requirements through decision making on the performance measures used and reported in the interests of themselves and the firm.*

(c) *Unintended and intended consequences:* The Hawthorne experiment is a classic case study which illustrates a number of things. [Gillespie \(1991\)](#) surmised that the most striking characteristic of the Hawthorne experiments were the comfortable assumptions which

had been formed pre-experiment, which were ‘dramatically overturned by the force of unexpected and irrefutable experimental evidence’. In other words, they had produced unintended consequences from the experiment which they had not anticipated. One of the experiments was to prove that improvements in the working environment (a change to the level of lighting provided, for example) would improve the productivity of the workforce. An increase in productivity was seen but could not be isolated to just being down to the lighting, as when the conditions were returned to their original state, productivity stayed at the new higher level. The Hawthorne experiments illustrated that the managers had to look beyond the technical organisation of the factory, as their productivity was influenced as much by personal attitudes and informal social organisation, as they were by the formal lines of organisation and authority.

Adcroft and Willis (2005) looked into the (un)intended outcome of public sector performance measurement, in particular looking at examples from the NHS and the education sector. They found an unintended consequence resulting from an increased usage of performance measurement techniques in the public sector resulted in the commodification of services which was delivered by an increasingly deprofessionalised public sector workforce (an additional unintended consequence) both resulting from regulatory requirements to measure performance. They found the unintended outcomes were:

- the increased use of performance measurement and the importation of private-sector management principles and practices will have the dual effect of commodifying services and deprofessionalising public sector workers;
- deprofessionalisation would be the result of ‘worth into exchange value’ and the conversion of the highly skilled knowledge worker into paid wage labourers;
- commodification is seen as transformation of relationships into quasi-commercial relationships with an emphasis on economic activity of buying and selling and the management activity of performance measurement;
- transformation through commodification changes the basis of decision-making such that values become much less important than the rules, regulations and performance measures of the organisation.

Meyer (2004) concluded that ‘the long held view of what gets measured gets done has spurred managers to react to intensifying competition by piling more and more measures on their operations in a bid to encourage employees to work harder. As a result, team members end up spending too much time in collecting data and monitoring their activities and not enough time managing.’

An unintended outcome found by Humphreys and Francis (2002) was the difficulty in producing a performance measurement which was useful at the right levels. Airports are complex organisations and what their study illustrated was that a performance measurement pro-

duced at one level was often of little use throughout the rest of the organisation. Another unintended outcome found that regulation of airport activity by the government and the performance measure’s that accompany it can have dysfunctional effects. The regulation introduced as part of the UK’s privatisation policy and the impacts of this on the environment are in conflict. BAA view their retail activity as a core competency and have purposefully diversified their efforts into increased airport retail activity. The commercial pressure for increased retail activity (due to a price cap imposed by the government on the level of aeronautical charges) within BAA’s terminals may conflict with the United Kingdom policy to maximise the use of airport capacity. The need for a new terminal may be reduced if the retail space was used for passenger processing.

Dysfunctional effects of performance measures can exist and can be seen as when one measure negatively impacts on another. For example, Humphreys and Francis (2002) found that aircraft noise restrictions were imposed in an operational day to protect the local community, but caused stacking, which had a negative impact on the environment through increased levels of emissions from queuing traffic. It is much more difficult to measure the consequences of emissions. Performance measurements need monitoring in order to identify and correct such dysfunctional effects. In addition, due to environmental restrictions which restrict the take-off and landings on runways, runways operate less efficiently and often at the expense of environmental pollution. Ridgway (1956) surmised that quantitative measures of performance as tools were extremely useful but ‘indiscriminate use and undue confidence and reliance’ were a result of the manager’s lack of knowledge of the full effects and consequences of using these measures. The result being that the costs could outweigh the benefit of using the performance measures. In his paper, Ridgway reviewed the ‘dysfunctional consequences resulting from the imposition of a system of performance measurements.’ Both Ridgway and Argyris found examples in firm’s of the existence of an accounting period adversely affected the overall goal accomplishment of the organisation. Employees used ‘easy jobs’ to meet the targets when time was running out towards month end. So jobs were prioritised according to how long they took rather than how important they were to the organisation and the customer.

There are unintended consequences of regulation too. Shaffer (1995) found a number of authors outlining some unintended consequences. They found that government intervention may enhance the relative position of one party at the expense of the other. Pashigan (1984) found that environmental regulation favoured the survival of the large plants at the expense of the small plants. Dean and Brown (1995) showed that rules for compliance for pollution regulation lead to capital requirements that discourage new firms from entering the market. These studies suggest that firms adapt to regulatory incentives and they do not suggest that large firms intentionally sought regulations to deter small firms. Russo (1992) showed that electric utilities diversified and vertically

integrated into unregulated business sectors in response to increasingly hostile regulatory constraints.

Regulation can have asymmetric effects on competing firms (Leone, 1986) found. As a result firms with superior capability for adapting to regulatory dictates may also attain a position of competitive advantage over their rivals.

Knight et al. (2005) compared the manufacture of and source of materials in reinforced wood doors and steel doors. The focus was on the environmental impact of the two processes. The aim of producing more steel doors and reducing the production of wood doors was to reduce the usage of wood and therefore achieve positive environmental results through saving forests, reducing carbon dioxide emissions and decreasing soil erosion. However, an unintended consequence of trying to achieve one set of environmental targets, negatively impacted on others through the increase in energy needed to manufacture the steel doors.

McKinney and Miller (1998) looked at the results of a survey completed by over 200 manufacturing firms in the USA, to determine the effects of compliance with environmental regulations on manufacturing operations. They found that many companies did not achieve full compliance with the environmental regulations. Some of the challenges facing the companies were:

- staying up-to-date with the huge volume of regulations;
- the complexity and confusing nature of the regulations themselves;
- most significantly for this research they found that

compliance with some regulations were in direct conflict with the achievement of other regulations.

They concluded that environmental regulations were difficult to implement and that more funding was consistently needed for the maintenance of and future changes to regulation.

Proposition 3. *Some of the outcomes of regulation and performance measurement are intended and expected but relatively little is known regarding the unintended consequences of regulation and performance measurement at firm-level.*

4. Concluding remarks and further research implications

Some unintended consequences of regulation and performance measures have been identified through the literature review. The existence of unintended consequences has been proven. A significant research gap exists in exploring in more depth the scale of the unintended consequences and what could be done to account for these. It is believed that there are strong links between regulation and performance measurement (Propositions 1–3). However, whilst this literature review found evidence of links between regulation and performance measurement, they were far from being exhaustive in nature and could not be quantified through this particular study.

In this research, we found the relationship of regulation and performance measurement is an area relatively unexplored. This review found that strong links exist

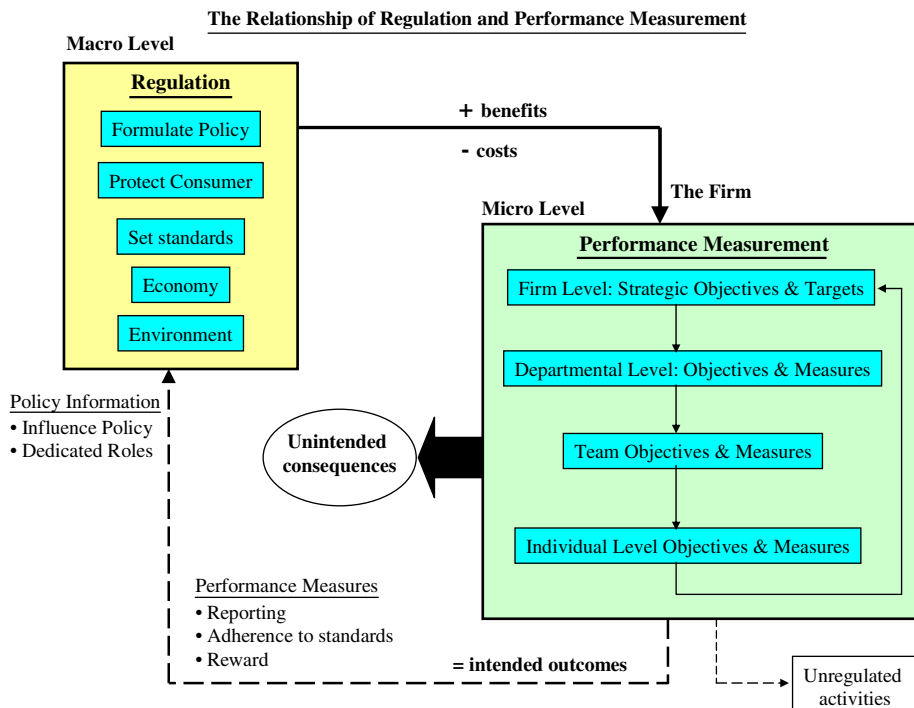


Fig. 2. The relationship of regulation and PM.

between regulation and performance measurement at firm level, in which regulation can have significant impact on the performance of the firm and the performance measures it uses. It might also be argued that the outcomes of performance measures can influence regulation. Moreover, from the research, we identified that regulation impacts on the firm on different levels and has influence on the performance measurement systems used by the firm, from the strategic level to the individual employee level (see Fig. 2).

Regulation and performance measurement can impact on the firm in different ways. The impact can be dependent on firm size, the environmental context the firm sits in and the social context the firm has located itself in. It is argued that in addition to this, the short-term

implications of regulation and performance measurement on the firm can be very different when comparing with the long term implications. For instance, it could be said that in the short-term, regulation and performance measurement increases costs and reduces efficiency both for a large firm and a small firm (see Fig. 3). The impact of increased costs and reduced efficiency is much greater for the smaller firm. Larger firms may see no significant difference. However, it is argued that in the longer-term, firms will attempt to find ways to reduce the costs and increase efficiency (reduce the impact of regulation) through process improvement and innovation but this will be achieved a lot quicker by the bigger firm who has more resources to dedicate to these type of activities—as demonstrated in Fig. 4. The review found limited evidence to support this; however, it is believed to be an important area for future research in terms of developing best practice and understanding the impact on different firms, and why this difference exists.

The scope of the study was limited and as a result the data collected on the benefits, weaknesses, and unintended consequences have been far from comprehensive. The review has found literature which focused on the more negative effects of regulation and performance measurement. The data explored has suggested that the area is not well researched especially when looking at the unintended consequences of regulation and performance measurement at a micro level and consequently, its effect on productivity. The research has been industry and firm specific and there is no clear classification between the intended and the unintended consequences. The scope for extending the literature review and for conducting further research in this field is enormous.

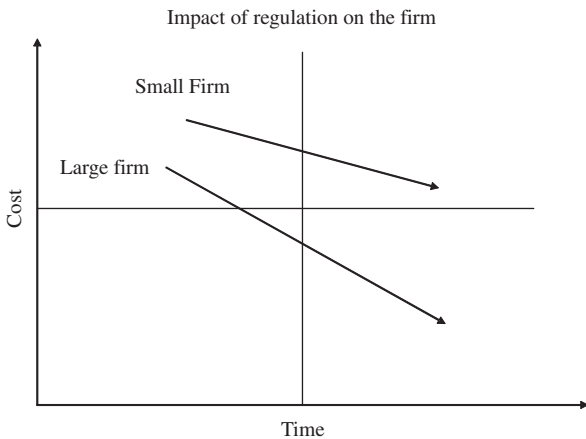


Fig. 3. Cost versus time.

Links between Regulation and Performance Measurement			
		Firm Size	
		Large Firm	
		Small Firm	
Impact of regulation	Industry Level	<ul style="list-style-type: none"> • Political influence • Shape regulation • Competitive Advantage • Can take advantage of regulation through following a strategy which competitors are not 	<ul style="list-style-type: none"> • Less political influence • Have to form coalitions with other small firms to influence • Difficult to benchmark with larger organizations • Could mean business becomes not viable or new barriers to entry apply
	Firm-Level	<ul style="list-style-type: none"> • Can absorb costs better • Still costs more but has less impact on overall picture • Can commit resources to improvement in costs and process • Resources to automate performance measurement system 	<ul style="list-style-type: none"> • Impact on costs & efficiency is greater • Still costs more but has less impact on overall picture • Costs too much resource to improve costs and process especially over the short-term

Fig. 4. Links between regulation and PM—firm size versus impact.

The review of the evidence concerning the links between performance measurement and regulation especially the unintended consequences highlights the need of a more extensive review of the literature and additional research to be carried out. The evidence has provided confirmation of the presence of a substantial research gap that exists when looking at the links between regulation and performance measurement and especially the identification of unintended consequences of this relationship. The focus of previous research has been firm and industry specific, with a few journals specifically focusing on the unintended consequences. The research for regulation and performance measurement are vast in their own fields but little evidence was found of extensive research on the relationship between these two and their link and impact on productivity. Another area for future research is the classification and clarification of what are the intended and unintended consequences.

Further research will contribute significant knowledge to an emerging, and yet important area in productivity related research. A good understanding of the linkages between performance measurement and regulation will assist policy makers by providing knowledge about the unintended consequences and how policy might take these into consideration when setting policy frameworks by minimising the negative effects and being able to take advantage of the positive consequences.

A good understanding of the linkages between performance measurement and regulation could also assist firms and the managers within them to understand the issues that arise and to try and design performance measures which are realistic, useful and satisfy a number of stakeholders. The issues generated from conflicting performance measures can then be understood and minimised.

Further research would seek additional evidence for the propositions made. Research would look at how companies respond to regulatory requirements and how this was translated into performance measures throughout the different levels within the firm. In the first instance, a case study approach would be used to explore the relationship between regulation and performance measurement and the unintended consequences in detail and the study would be performed on multiple levels to allow data to be gathered from different perspectives. A heavy regulated industry sector would be used for the study to try and flesh out some of the themes and issues that exist.

Acknowledgements

We would like to thank EPSRC/ESRC AIM 'Closing the Gap' programme (EP/D505674/1), and The University of

Nottingham Business School for the funding support given to this project.

References

- Adcroft, A., Willis, R., 2005. The (un)intended outcome of public sector performance measurement. *International Journal of Public Sector Management* 18 (5), 386–400.
- Argyris, C., 1986. Reinforcing organizational defensive routines: an unintended human resource activity. *Human Resource Management* 25 (4) Winter.
- Dean, T.J., Brown, R.L., 1995. Pollution regulation as a barrier to new firm entry: initial evidence and implications for future research. *Academy of Management Journal* 38, 288–303.
- Drucker, P.F., 1991. *Management*. Butterworth-Heinemann, Oxford.
- Gillespie, R., 1991. *Manufacturing Knowledge: A History of the Hawthorne Experiments*. Cambridge University Press.
- Gosling, G., 1999. *Aviation Systems Performance Measures*. In: Working Paper UCB-ITS-WP-99-1, Berkeley, California.
- Humphreys, I., Francis, G., 2002. Performance measurement: a review of airports. *International Journal of Transport Management* 1, 79–85.
- Ittner, C.D., Larcker, D.F., 1998. Innovations in performance measurement: trends and research implications. *Journal of Management Accounting Research* 10, 205–238.
- Kaplan, R.S., Norton, D.P., 1992. *The balanced scorecard—measures that drive performance*. Harvard Business Review Jan–Feb, 71–79.
- Knight, L., Stockhausen, J.I., Ross, R.J., 2005. Comparing energy use and environmental emissions of reinforced wood doors and steel doors. *Forest Products Journal* 55 (6), 48–52.
- Leone, R.A., 1986. *Who Profits: Winners, Losers, and Government Regulation*. Basic Books, Inc., New York.
- McKinney, M.M., Miller, P.E., 1998. Environmental compliance in manufacturing: interpreting industry perceptions. *Industrial Management and Data Systems* 8, 352–355.
- Meyer, M.W., 2004. *Rethinking Performance Measurement*. Cambridge University Press, UK.
- Neely, A., Mills, J., Platts, K., Gregory, M., Richards, H., 1996. Performance measurement system design: should process based approaches be adopted. *International Journal of Production Economics* 46/47 (3), 423–431.
- Ness, J., Cucuzza, T., 1995. Tapping the full potential of ABC. *Harvard Business Review* 73 (4), 47–72.
- Oster, S.M., 1982. The strategic use of regulatory investment by industry sub-groups. *Economic Inquiry* 20, 614–618.
- Pashigan, B.P., 1984. The effect of environmental regulation on optimal plant size and factor shares. *Journal of Law and Economics* 27, 1–27.
- Ridgway, V.F., 1956. Dysfunctional consequences of performance. *Administrative Science Quarterly*, 240–247.
- Russo, M.V., 1992. Power plays: regulation, diversification and backward integration in the electric utility industry. *Strategic Management Journal* 13, 13–27.
- Shaffer, B., 1995. Firm-level responses to government regulation: theoretical and research approaches. *Journal of Management* 21 (3), 495–514.
- Slooman, J., Sutcliffe, M., 2001. *Economics for Business*, second ed. Prentice-Hall, New Jersey.
- Unahabhokha, C., Platts, K., Tan, K., 2006. A framework for developing and using a predictive delivery performance measurement system. *International Journal of Manufacturing Technology and Management* 8 (4), 308–329.
- Viscusi, W.K., Harrington Jr., J.E., Vernon, J.M., 2005. *Economics of Regulation and Antitrust*, fourth ed. MIT Press, Massachusetts, 1–52.
- Waggoner, D., Neely, A., Kennerley, M., 1999. The forces that shape organisational performance measurement systems: an interdisciplinary review. *International Journal of Production Economics* 60/61 (3), 53–60.