



ISO 14001 certification and financial performance: selection-effect versus treatment-effect

Iñaki Heras-Saizarbitoria^{a,*}, José F. Molina-Azorín^{b,1}, Gavin P.M. Dick^{c,2}

^a University of the Basque Country, E.U.E. Empresariales, P.Oñati 1, E-20018 San Sebastian, Spain

^b University of Alicante, Department of Management, Campus de San Vicente, Ap. 99, E-03080 Alicante, Spain

^c Kent Business School, University of Kent Canterbury, Kent, United Kingdom

ARTICLE INFO

Article history:

Received 24 March 2009
Received in revised form
2 September 2010
Accepted 5 September 2010
Available online 15 September 2010

Keywords:

Environmental management
Certification
ISO 14001
Financial performance
Causation

ABSTRACT

The paper explores the bi-directional relationship between ISO 14001 certification and financial performance with the aim of shedding light on whether better performance is due to the beneficial effects of ISO 14001 or due to selection-effects where better performance precedes accreditation. The study uses a five year longitudinal analysis to compare the financial performance of firms in Spain before and after certification. The results of a multivariate panel data analysis find that firms with better than average performance have a greater propensity to pursue accreditation but there is no evidence that improvements in performance follow certification. This suggests that the inference that environmental variables cause improved financial performance may be unwise in research studies that can only measure association.

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1. Introduction

Commitment to the natural environment has become an important variable within current competitive scenarios (Graff, 1997). “Business-led” initiatives such as development of firm-structured environmental management systems (EMSs), participation in trade association programmes emphasizing codes of environmental management, and adoption of international certification standards for environmental management are becoming widespread (Anton et al., 2004; Nakamura et al., 2001). This is illustrated by registrations to the ISO 14001 EMS standard which have grown nearly 50% in recent years with 188,815 firms in 155 countries registered at the end of 2009 (ISO, 2009). This suggests that there is a widespread belief in the international business community of the benefits of ISO 14001 registration.

Although there is a plethora of research articles that study ISO 14001 EMS standard and their association with environmental performance improvement (Dahlström and Skea, 2002; Florida and Davidson, 2001; King and Lenox, 2002; King et al., 2005; NDEMS,

2003; Potoski and Prakash, 2005; Russo and Harrison, 2001; Szymanski and Tiwari, 2004; Schaltegger and Synnestvedt, 2002), there are few articles that examine the relationship between ISO 14001 and financial performance, and there is little of this research that can attribute causality. The inference often drawn is that ISO accreditation leads to higher levels of performance. What tends to be forgotten is that the opposite direction of causality could be true, i.e., successful firms may well have a propensity to pursue certification. Thus, environmental performance and/or its accreditation could be a kind of ‘luxury good’ for a company when it has reached a certain level of economic performance (Schaltegger and Synnestvedt, 2002). In other words, financial performance may influence environmental management (Wagner, 2005) because a firm with a good financial performance can allocate more resources to environmental initiatives. Moreover, it must be taken into account, as has been stressed by other authors (King et al., 2005; Potoski and Prakash, 2005), ISO 14001 accreditation is often market driven, adopted because customers require it, or because competitors have it.

Therefore, the aim of this article is to examine the relationship between ISO 14001 and financial performance with a particular emphasis on trying to establish the direction of causality in that relationship. To achieve this we compare the actual sales and profitability of ISO 14001 accredited firms with their performance prior to registration.

* Corresponding author. Tel.: +34 943 018 354; fax: +34 943 018 361.

E-mail addresses: iheras@ehu.es (I. Heras-Saizarbitoria), jf.molina@ua.es (J.F. Molina-Azorín), g.dick@kent.ac.uk (G.P.M. Dick).

¹ Tel./fax: +34 965903606.

² Tel.: +44 1227 827003; fax: +44 1227 761187.

Furthermore, most quantitative studies are based on surveys in which the ratings were given by respondents that had taken part in the EMS introduction process (e.g. Sulaiman et al., 2002; Hamschmidt and Dyllick, 2001; Summers, 2002; Schylander and Martinuzzi, 2007). Any analyses of the effect of EMSs conducted in this way are subject to possible weakness and methodological distortion, so to avoid this problem we use only objective variables in our analyses.

The paper is structured as follows. First, we present a review of literature that considers environmental management, certification and performance. This is then followed by a description of our research methodology and presentation of our findings. These are then discussed and conclusions drawn.

2. Literature review

Some authors see corporate environmental strategy as a tool which may help organisations gain competitive advantage and improve performance levels (Hart, 1995; Porter and Van der Linde, 1995; Shrivastava, 1995; Trung and Kumar, 2005). Specifically, through environmental management, firms may reduce costs and increase revenues (Ambec and Lanoie, 2008). Others, however, have questioned the optimism of environmental advocates (Jaffe et al., 1995; Walley and Whitehead, 1994), emphasizing that environmental practices and initiatives involve costs and may have few financial benefits.

In order to explore these arguments a computer search of the ABI Inform, Emerald and Science Direct databases was made for works that cited the expressions environmental management, ISO 14000, ISO 14001, performance, results or profitability in the title of the paper. The list of references given in seminal papers was also reviewed. We excluded the many articles that are anecdotal, and the many case study based articles that could not provide quantifiable statistical evidence. Thus, we focus our review on the growing body of recent studies that have tested this linkage between environmental proactivity and a firms' performance using statistical analysis. We summarise these in Tables 1 and 2.

Although the findings are mixed, studies where a significant positive relationship between environment and firm performance is found are predominant. If we view changes in business performance as a treatment-effect of environmental proactivity, then clearly the overall conclusion from the research summarised in Tables 1 and 2 is that gains in business performance are a likely but uncertain effect as there are fourteen positive and six negative performance effects reported.

Looking at the detail it is worthy of note that earlier studies predominantly show a link between an environmental variable and improved financial performance and that Northern American studies tend to be dominant in these earlier years. However we believe geographic differences are not the underlying explanation, but the propensity of USA scholars to use quantitative methods compared to the European tendency to use qualitative approaches in new lines of research (which excludes early European studies from our tables).

Looking at the year of publication, it can be observed that studies published before 2000 report predominantly positive findings, while after 2000 the tables tend to show few performance improvements. Three possibilities for earlier adoption being linked to improved performance suggest themselves. Firstly, it may be due to the sales promotional benefits of being ahead of rivals in signalling good green credentials. Secondly, it may be that early initiatives have the advantage of greater returns on capital investment since firms start with improvements that offer the greatest return on green investment. Finally, the findings may be due to selection-effects where more profitable firms are more likely to

pursue environmental improvements since they have the available funds to do so. The aim of our study is throw more light on this selection-effect possibility.

In the 25 studies we have just summarised there are only three that analyse the relationship between ISO 14001 certified firms and financial performance. Yet, studies that use registration to ISO 14001 as their environmental variable have the substantial advantage that the registration requires third party auditing of the firm's EMS as meeting the standard, thus avoiding the difficulties associated with judging the actual degree of environmental management undertaken in voluntary programmes. The advocates of ISO 14001 claim similar operational, managerial and competitive benefits for organisations as the advocates of the Porter Hypothesis (Porter and Van der Linde, 1995). These include reduced costs of waste management, savings in the consumption of energy and materials, an enhanced corporate image, regulatory cost savings, and improved customer and other stakeholder relationships. Furthermore, those authors who have analysed the content, scope and depth of the ISO 14001 standard have highlighted the potential positive impact of introducing the standard in reducing costs and in improving the economic and financial performance of the firms involved (Cascio, 1996; Marcus and Willig, 1997; Sheldon, 1997; Woodside, 2000; Cheremisinoff and Bendavid-Val, 2001; Morris, 2003).

However, although there are many academic studies that have analysed the motivation for and positive benefits that might result from accreditation to the ISO 14001 standard (e.g. Van Der Veldt, 1997; Sulaiman et al., 2002; Hamschmidt and Dyllick, 2001; Summers, 2002; Morrow and Rondinelli, 2002; Schylander and Martinuzzi, 2007; Fryxell and Szeto, 2002; Klassen and McLaughlin, 1996; Gavronski et al., 2008; Poksinska et al., 2003; Rondinelli and Vastag, 2000; Zutshi and Sohal, 2004, 2005) these tend to be small scale studies or based on surveys using personal ratings for performance improvement by managers who themselves have taken part in the EMS introduction process. This self-reporting introduces the potential for a bias problem that several authors have commented on; among others, Huber and Power (1985) and Podsakoff and Organ (1986) for the general management field, Safizadeh and Ritzman (1997) for the operations management field, Wayhan et al. (2002), Wayhan and Balderson (2007) and Heras et al. (2002) for the case of Quality Management systems, and Nawrocka and Parker (2009) in the case of EMS. These authors underline that performance variables based on perceptual measures of managers, can be biased due to the person providing the information having a personal interest in overvaluing it. Thus, in our research we follow the advice of these authors who suggest that for financial variables it is desirable to use objective data on firms from existing records such as commercial databases containing economic and financial information. However, we acknowledge as Ketokivi and Schroeder (2004) state, that it is the predominant use of single-informant, not the fact that the measures are perceptual, that underlies the problem of inflationary bias in the use of single-informant surveys.

At the time of writing there are few studies that combine the desirable properties we seek of objective financial performance variables and the ISO 14001 EMS accreditation variable. Watson et al. (2004) analyse how the ratios of ROA, business margins and other similar ratios varied in the case of those companies that had introduced a certified EMS and companies that had not, finding that there were no significant differences between them across different economic sectors. Similar lack of proof of performance change is reported by Cañón and Garcés (2006) who assessed the economic impact of ISO 14001 certification by studying whether the announcement of ISO 14001 certification by 80 large Spanish companies was interpreted by the stock market as a sign of environmental pro-activity that would generate

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