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Is Business Performance Related to the Registration of Quality and Environmental-Related Standards?

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Abstract: We investigate the relationship between French firms' business performance and registration of quality (QS) and environmental-related standards (ES). Using a propensity score matching method, we found that QS/ES registered firms report higher sales. However, registration is not significantly related to firms' profits and EBITDA. Our findings also point out the possible synergy between ES and QS, that is, when implemented together, quality and environmental-related standards are more likely to be related to higher sales, profits and EBITDA than when only one of these standards is implemented.

Key words: business performance, environmental-related standards, quality standards.

JEL codes: C01, L15, Q50.

Is Business Performance Related to the Registration of Quality and Environmental-Related Standards?

1. Introductive remarks and related literature

During the last two decades, quality and environmental-related standards have proliferated worldwide. For instance, the number of certificates delivered at the end of 2006 for the two 'famous' standards of the International Organization for Standardization (ISO), that is, the ISO 9000 (created in 1986) and ISO 14000 standards (created in 1996), reached more than 900,000 certificates for the former and more than 100,000 for the later.[1] A quality standard (QS) is frequently depicted as an organizational process involving changes in the fundamental behavior and applied routine of employees that ensures that the quality of goods and services provided by an organization meets customers' demands and regulatory requirements. An environmental-related standard (ES) requires that an organization implements a set of environmental practices and procedures which ensure that risks, liabilities and impacts are properly identified, minimized and managed (Darnall *et al.*, 2000). For QS/ES advocates, these standards provide the necessary meta-framework to eliminate organizational failures and develop routines that stimulate various profitable improvements. These standards are voluntary and can be adopted by all kinds of firms regardless of their size, activity and location.

From a theoretical perspective, QS are likely to increase firms' competitiveness by lowering defect rates, reducing cost of quality, and, increasing productivity, on-time delivery and customer satisfaction. Similarly, organizations implementing an ES are likely to gain competitive advantage. An ES may help a firm to detect and eliminate inefficiencies in resource use. Porter and Van Der Linde (1995; see Jaffe *et al.*, 2005 for the opposite view) provide several theoretical rationales and anecdotal evidence (case studies) of how environmental constraints encouraged firms to use resources more efficiently which resulted in productivity improvement. However, it should be noticed that several scholars suggest that QS/ES registration is costly and mainly motivated by isomorphic pressures (DiMaggio and Powell, 1983). QS/ES are sometimes considered more as necessary 'smokescreens' than drivers of competitiveness. As such, they are more likely to decrease firms' competitiveness (Konar and Cohen, 2001; Corbett *et al.*, 2005).

Empirically, the issue of whether QS and ES are related to business performance (and the level of this influence) is far from resolved. For instance, using US longitudinal panel data from 650 firms in the auto supplier industry, Benner and Veloso (2008) conclude that early adopters of ISO 9000 standard have increased their return on assets, return on sales and Tobin's *q*. Lo *et al.* (2008) analyzed data

[1] ISO website: www.iso.ch.

from 695 US manufacturing firms and found that ISO 9000 certified firms shortened the number of inventory days (*i.e.*, the time required to convert raw materials into products) by 3.68 days one year after ISO 9000 implementation. Furthermore, certified firms continued improvement and shortened the number of inventory days by 8.75 days (8.29% shorter) three years after certification. The authors conclude that ISO 9000 registration improves the material and cash flows in manufacturing supply chains. Terlaak and King (2006) examined 19,713 US facilities from 232 different manufacturing industries and found that registration to ISO 9000 increases sales. Applying event study methodology on 23 software design and development firms, Fuller and Vertinsky (2006) found that ISO 9000 certification of software engineering processes in companies that are primarily focused on developing products leads to improved business performance in the short-term. Using event-study methods from 7,238 US manufacturing firms, Corbett *et al.* (2005, see also Simmons and White, 1999) suggest that ISO 9000 certification leads to an important increase in the return on assets, return on sales and Tobin's *q* sales, cost of goods divided by sales, and sales divided by assets. In the same vein, based on a sample of 252 North American firms, Docking and Dowen (1999) showed that when considering small firms ISO 9000 certification is regarded as positive information by investors.

On the opposite, Martinez-Costa *et al.* (2008) found that ISO 9000 certification in Spanish manufacturing firms (N=700) has little or no explanatory power of the firms' productivity or return on assets. Surveying 204 firms from a wide range of industries, McGuire and Dilts (2007) found no significant effect of ISO 9000 on the stock market valuation. Lima *et al.* (2000) examined data from 129 Brazilian firms in the manufacturing industry on five return indicators (operating income on total assets, net income on total assets, sales to total assets, operating income to sales and net income to sales) and state that no differential levels of performance can be detected between certified and non-certified firms. Analyzing manufacturing companies in Australia (N=962) and New Zealand (N=379), Terziovski *et al.* (1997) have evaluated the impact of ISO 9000 certification on firms' organizational performance, using the following indicators: customers' satisfaction, employees' moral, cost of quality, delivery in full on time, defects rates, warranty costs, productivity, cash flow, employee growth, market share growth, sales growth, export growth and innovation. They found that only cash flow significantly increases with certification.

Moreover, concerning the impact of environmental-related standards on business performance, previous empirical studies are scarcer and offer mixed results too (Filbeck and Gorman, 2004; Telle, 2006).[2] Moreover, these studies differ according to several dimensions such as the measures of environmental and business performances, the period covered, the number and location of firms, the empirical strategy and so on. Clarkson *et al.* (2010) modeled the causal relationship between firms'

[2] A recent literature review regarding the much debated relationship between environmental and economic performance can be found in Cañón-de-Francia and Garcès-Ayerbe (2009).

environmental performance and their financial resources and management capability. Employing longitudinal data from 1990 to 2003 for the US Pulp and Paper, Chemical, Oil and Gas, and Metal and Mining industries, they demonstrate that significant improvement (decline) of the environmental performance in the prior periods can lead to improvements (decline) of financial performance in the subsequent periods. Nishitani (2010) also used panel data on Japanese manufacturing firms between 1996 and 2007 and demonstrates that implementation of an environmental management system mainly for export oriented firms can increase a firm's added value, *e.g.*, through an improvement of productivity. Using event study methodology on a sample of 80 environmental certifications, Cañón-de-Francia and Garcès-Ayerbe (2009) found that ISO 14001 certification has a negative effect on the market value of certain firms, namely less polluting and less internationalized firms. Using survey data from more than 1,000 manufacturing facilities in Canada, Germany, Hungary and United States, Darnall *et al.* (2008) present empirical evidence supporting that facilities which adopt more comprehensive environmental management systems can improve profitability and growth. Konar and Cohen (2001) found that bad environmental performance –measured by the aggregate pounds of toxic chemicals emitted per dollar revenue of the firm and the number of environmental lawsuits pending against the firm – has a significant negative effect on the market value for US publicly traded firms (N=321). Noteworthy, examining 12,463 facilities in US chemical industry, Khanna and Damon (1999) show that firms' participation to the voluntary program 33/50 has a negative impact on their current return on investment, but a positive effect on long-term profitability.[3]

In this paper, we investigate the relationship between business performance and QS/ES registration by French firms. France is one of leading European countries regarding QS/ES registration. With 22,981 firms (respectively 3,476) registered according to the ISO 9000 (respectively ISO 14001) standard, French firms rank the fifth (respectively the sixth), behind Italy, Spain, Germany and UK (respectively Italy, Spain, Germany, UK and Sweden).[4] Providing such an empirical analysis is likely to inform managers and policymakers on whether QS (respectively ES) may be compatible with objectives other than quality (respectively environmental) improvement considerations. The originality of this contribution is fourfold. First, we study the relation between business performance and *both* quality and environmental-related standards. Second, we examine whether quality and environmental standards are more likely to be related to business performance when implemented together than when only one of these standards is implemented. Third, we use a cross-sectional database on a larger sample compared to several previous studies. Fourth, we correct selection bias using the matching

[3] Noteworthy, the previously-mentioned studies differ on several dimensions (date, location, sector, methods, variables used, etc.) which can reduce the accuracy of their comparison.

[4] Source: The 2007 ISO Survey of Certifications.

method. Moreover, as a collateral result of our empirical strategy, we investigate characteristics of the firms that have adopted QS/ES standards, which constitutes *per se* an interesting contribution.

We explore the two following hypotheses:

- ✓ H1: Quality and environmental-related standards registrations are positively related to firm's business performance, *ceteris paribus*. As stressed above, empirical evidence regarding the relationship between QS/ES and business performance is mixed. In short, adopting QS/ES can be considered either as proactive and profitable investments or as quasi-compulsory response measures to isomorphic pressures unable to generate better business performances.
- ✓ H2: Because of their complementarity, quality and environmental-related standards are more likely to be associated to higher business performance when implemented together than when only one of these standards is implemented, *ceteris paribus*. Although these organizational schemes have a similar architecture, quality standards are *privately* oriented, whereas environmental-related ones are mainly *publicly* oriented (Halkos and Evangelinos, 2002). This public orientation can generate positive effects, especially among intrinsically motivated people (*e.g.*, Brekke and Nyborg, 2008; Grolleau *et al.*, 2007b). For instance, key benefits of adopting ISO 14001 by the multinational Dole Food Co. Inc. included strong employee motivation and loyalty, reduced absenteeism, and improved workforce productivity.[5] De Backer (1999) provided anecdotal evidence that ISO 14001 has significant effects on employees' morale and productivity, much more than ISO 9000 certification. In sum, ES may provide complementary aspects leading to good operations which are not included in QS (Corbett and Kirsch, 2001).

The remainder of this paper is organized as follows. Section 2 presents the data and model specification. The results are provided in section 3. Section 4 concludes and suggests policy implications and future directions.

2. Data and model specification

The data is extracted from the French survey called *Changement Organisationnel et Informatisation* (Organizational Changes and Computerization), conducted between November 2005 and April 2006 by researchers and statisticians from the national institute for statistics and economic studies, the ministry of labor and the center for labor studies. While the survey questionnaire was not originally designed to investigate our question, it offers an unexpected opportunity to investigate on a large number of firms whether being registered for quality or environment-related standards is related to

[5] Anonymous, 2001, Dole Reports Motivation, Health and Safety, and Productivity Benefits from ISO 14001, ISO Management Systems –The International Review of ISO 9000 and ISO 14000, December, 56-58 (http://www.staratel.com/iso/ISO/ISO900014000/articles/pdf/casestudy_2-01.pdf).

higher firms' business performance. This survey was created in 1997 and first updated in 2006, by adding some information (*e.g.*, registration to environmental-related standards). 17,000 private firms with 10 or more employees from all industries except agriculture, forestry and fishing were surveyed (the whole population). The questionnaire is self-administrated and describes work organizational practices in 2006 and changes that have occurred since 2003.[6] 13,760 firms have responded (81%). Because three variables, namely the sales, profit and EBITDA (see description below), were not available, we merged our dataset with another French database, that is, the *Enquête Annuelle Entreprises* (Annual Firm Survey) which is an annual, exhaustive and compulsory survey conducted by the French ministry of industry. Therefore, after the deletion of firms that did not answer all the relevant questions for our study, the final database includes 9,411 firms with 20 or more employees, representing 68% of the whole sample.

To measure business performance, we use three continuous variables: the firm's sales (denoted *SALES*), profit (denoted *PROFIT*) and earnings before interest, taxes and depreciation (denoted *EBITDA*)[7] in 2006. Following previous works (*e.g.*, Galdeano-Gómez, 2008; Mazzanti and Zoboli, 2009), we divide all three variables by employees. Specifying firm performance indicators per employee accounts for labor intensification and thus allows for a more careful analysis.

To test the above-mentioned hypotheses, we use the binary variables denoted *QS, ES and QSES. QS* is equal to 1 if the firm was registered according to a quality standard such as the ISO 9001 standard and French quality standard EAQF in 2006. *ES* is equal to 1 if the firm was registered according to ISO 14001 standard, organic labeling or fair trade, in 2006.[8] *QSES* is equal to 1 if the firm had both a quality and environmental-related standards in 2006, and 0 if it was registered according to only one of them.

Nevertheless, being registered according to a quality or environmental-related standard may not be random and may depend on firm's individual characteristics. In other words, a firm may choose to register because of a particular need or specific conditions, which can induce a selection bias. To control such a bias, we compare firms having the same observable characteristics using a propensity score matching method (Rubin, 1974; Rosenbaum and Rubin, 1983). Formally, each firm is either

[6] More details about the design and scope of this survey are available on www.enquetecoi.net. Survey COI-TIC 2006-INSEE-CEE/Treatments CEE.

[7] Here, EBITDA refers to the French EBE (*Excédent Brut d'Exploitation*) which is almost the same thing, since the major difference concerns amortization which is not referred to in the French EBE. Nevertheless, to avoid misunderstanding by non-French readers we name it EBITDA in the manuscript.

[8] Unfortunately, we cannot distinguish between these standards, since they were put together under the same name in the survey.

assigned to a treatment (T=1) or counterfactual (control) group (T=0). This probability is estimated using a logit regression. Here, the treatment corresponds to firm's registration according to a quality standard, environmental-related standard or both. In order to examine specifically quality standards, environmental-related standard or both, we create three sub-samples. In the first model we investigate the possible synergy between quality and environmental-related standards, while in the second and third sub-samples we compare only firms that have QS or ES with firms that are not registered at all. The three models (and three sub-samples) are:

- *Model 1 (N=5,857)*, T = 1 if the firm has adopted both QS and ES; T = 0 if the firm has adopted only one standard, that is, QS or ES.
- *Model 2 (N=6,736)*, T = 1 if the firm has adopted QS; T = 0 if the firm has not adopted QS neither ES.
- *Model 3 (N=3,779)*, T = 1 if the firm has adopted ES; T = 0 if the firm has not adopted ES neither QS.

In order to judge the matching quality, we present histograms and means of sales/profit/EBITDA in the treatment and comparison groups within the groups of QSES, QS and ES (Figures 1 to 9 in Appendix 1). We also report in Appendix 2 sample statistics for the treatment and comparison groups used here for each model which indicates that firms' observable characteristics in the two groups are generally similar. The efficiency of the treatment is measured through the result on the sales, profit and EBITDA. PS-matching technique estimates the average treatment effect (ATE), average treatment on the treated (ATT) effect and the average treatment on the untreated (ATU). In this paper, we concentrate on estimating the average effect of treatment on the treated (ATT) using the Kernel estimator (Heckman *et al.*, 1997; 1998). The standard error of the treatment effect is computed using bootstrap with 100 simulations. Noteworthy, OLS regression identifies the average treatment effect (ATE) for an entire sample or population, which includes the treated and the untreated groups. This approach implicitly assumes that firms are randomly chosen for treatment, *e.g.*, registration for quality and environmental-related standards. In addition, OLS regression also assumes that treatment affects all individuals in a similar manner. According to Heckman *et al.* (1997, p. 647), using OLS regression analysis to examine the ATE among all individuals in a sample may be "comparing the incomparable". Moreover, Fredriksson and Millimet (2004) propose several benefits of matching estimators versus typical parametric (OLS) estimates.

The variables used in estimation, their definitions and sample statistics are presented in Table 1. No problem of multicolinearity has been detected (Appendix 3).

[Insert Table 1 around here]

3. Results

As it is common with PS-matching, we follow two steps (*e.g.*, Black and Smith, 2004). In the first step, we estimate the probability that a firm adopts a quality or environmental-related standard or both, using the following background characteristics: firm size, belonging to a group or a network, export, relocation, customers' demands, and main activity of the firm. The interested reader can find a justification for introducing these variables in previous literature devoted to the registration of quality and environmental-related standards (*e.g.*, Nakamura *et al.*, 2001; Terlaak and King, 2006; Grolleau *et al.*, 2007a; Singh, 2008; Bracke *et al.*, 2008). We included some relevant control variables which were available in the databases, but we are aware that this strategy cannot completely eliminate the omitted variable bias. For example, good managers can both implement quality and environmental-related standards and generate high turnover, meaning that there is no effect of ISO adoption on turnover. Logit estimation results are presented in Table 2 together with goodness-of-fit measures (Maximum-Likelihood estimation). To better interpret the sensitivity of the probability of standards registration with respect to explanatory variables, we also report marginal effects. As it is common for discrete variables, the marginal effect is calculated as the difference between the probabilities estimated at the sample means when the dummy variable takes the values of 1 and 0, respectively. Several versions of the model have been estimated to investigate the robustness of results to the omission of some variables. The main results (not reported) remain unchanged.

[Insert Table 2 around here]

The variables *SIZE* and *RELOCATION* (relocation abroad of a part of its business) are significant for the three models, which is consistent with previous studies (Grolleau *et al.*, 2007a; Terlaak and King, 2006). Belonging to a group (*GROUP*) has a positive impact on firms that have both quality and environmental-related standards or firms that have only a quality standard. The variable *NETWORK* (belonging to a network) is not significant for the first and third model, but is negatively correlated with environmental-related standards registration. Moreover, firms exporting a part of their products abroad would adopt both quality and environmental-related standards or only a quality standard. Surprisingly, the variable *EXPORT* has no impact on environmental-related standards registration. A possible explanation of this result is that foreign customers consider French firms to be as effective as their domestic producers in terms of quality and environmental issues, making ES/QS playing a weaker role as a market signals. The variable *CUSTOMER1* (Customer's demands for product and service certificates) is positively related to quality standards registration, decreases the probability of adopting both quality and environmental-related standards, but has no effect on environmental-related standards registration. This result can be explained by the fact that, for quality standards, the main requirements are defined by customers themselves. Similarly, the variable *CUSTOMER2* (Customer's demands for a contract to assure delivery timeless) is positively related to quality standards registration and negatively related to ES and ES/QS registration. Finally, being a part of energy sector increases firm's probability to adopt both quality and environmental standards. Furthermore, firms in

the cars and equipments and construction sectors are more likely to adopt only quality standards while being a part of agrifood industry and energy increases firm's the probability to adopt environmental-related standards.

In the second step of PS-matching, we compute the so-called 'causal' estimator of the correlation between both practices and the business performance. As it is common, we introduce only significant variables in the second step. PS-matching estimates are presented in Table 3. The findings provide empirical evidence that quality and environmental-related standards registration is only related to higher firms' sales which partly supports hypothesis H1. Registration of a quality (respectively, environmental-related) standard increases sales by 4% (respectively, 13%). Hypothesis H2 is also supported, since the three dependent variables, that is, *SALES*, *PROFIT* and *EBITDA*, are positive and significant. In other words, having both standards is likely to be more beneficial to the firm, in terms of sales, profit and EBITDA increase, than having only one kind of standard. The sales (respectively, EBITDA) is 16% (respectively, 21%) higher in firms that have both quality and environmental-related standards, compared to firms that have only one of these standards.

[Insert Table 3 around here]

A comparison of the findings from an OLS regression (Appendix 4) with the PS-matching findings provides evidence of some selection effects.[9] This is especially the case for the results concerning the first hypothesis. For instance, in Model 3 when comparing firms that have implemented an ES with firms not registered according to an ES (neither QS), the results of OLS indicate that ES certified firms have higher sales, profit and EBITDA, while results from PS-matching reveal that those firms report only higher sales. Moreover, PS-matching produced higher estimates of the ATE (the relation between quality or environmental-standards on sales) than the parameter estimate from the OLS regression model which included the same variables that were used to generate the PS-matching method. The findings are similar to those obtained in previous works that compared PS-matching estimates with OLS regression parameter estimates of the ATE (*e.g.*, Heckman and Li, 2004). This result suggests that firms' decision to adopt quality, environmental standards or both is not random and depends on firms' characteristics, which indicates, at least to some extent, the relevance of using PSM.

Finally, as pointed out by a reviewer, one may argue that high sales, profit and EBITDA allow firms to adopt quality and environmental-related standards. Hence, to control this reverse-causality problem, we repeat the PS-matching with three years period lagged information about quality and environmental-related standards registration. In other words, we restrict the specification only to firms with quality and environmental-related standards since 2003, that is, with exclusion of firms registered in 2006 (Appendix 5). As with the previous findings, we found that quality standards are positively

[9] This point has been appropriately suggested by an anonymous referee.

related only to sales while having both standards is positively associated with all three indicators of firm business performance. Unfortunately, due to the data limitation, we are not able to display results for the environmental standard sample. Indeed, there are only 180 ES registered firms in 2003.

4. Concluding remarks

Given some data constraints documented above (*e.g.*, omitted variable bias and reverse causality or bidirectional causality), our results must not be over-interpreted. Most interpretations are tentative and exploratory and deserve further attention. There is a clear need for additional data and a refined empirical strategy to reach well-supported policy implications. In the following, what seems to be policy implications must be considered more as insights than as clear-cut evidence based on the performed analyses. Using a propensity score matching method, this article offers a refined analysis of the link between QS/ES and business performance among French firms. First, we found that quality and environmental-related standards are positively correlated with French firms' sales but not profit and EBITDA. These findings could mean that profit and EBITDA expectations associated with QS/ES do not compensate implementation costs. They are consistent with the works of several scholars (*e.g.*, Lo *et al.*, 2008; Terlaak and King, 2006; Konar and Cohen, 2001; Cañón-de-Francia and Garcès-Ayerbe, 2009) stating that QS/ES may allow adopting firms to enhance their competitiveness. Our findings are also complementary to previous literature on QS/ES registration (see Halkos and Evangelinos, 2002 and references therein) according to which increasing business performance and competitiveness considerations are important drivers of QS/ES registration and can explain the large diffusion of such standards. Our estimation results echo, to some extent, the predictions of the 'extended' Porter hypothesis (Porter and van der Linde, 1995) –which predicts that well-crafted environmental voluntary approaches may be associated with both environmental and economic performance – and extend it to quality considerations. This finding is consistent with the positive effects attributed to ISO 14001 on the management of human resources found by several case studies in French firms (Phanuel, 2001; Berger-Douce, 2002). Indeed, our estimation results suggest that managers, regulators and promoters of QS (respectively ES) may consider the implementation of such standards as a win-win strategy, that is, not only as a tool of quality (respectively environmental) improvement, but also a leverage to increase firms' business performance and hence competitiveness. Moreover, the findings are consistent with the resource-based view of the firm which underlines positive relationship between quality and environmental standards and firm's business performance (Clarkson *et al*., 2010).

Second, we found that quality and environmental-related standards are more likely to be related to business performance when implemented together than when only one these standards is implemented. In line with previous economic literature (*e.g.*, Milgrom and Roberts, 1995; Ichniowski *et al.*, 1997), this result points out possible the synergy between ES and QS and suggests that complementarity of

different organizational innovations can lead to better business performance. This finding also suggests that, in terms of sales, profit and EBITDA improvement, firms could have vested interest in implementing both standards that have public attributes and those which are mainly privately-oriented. If further analyses establish such findings, it would be also more effective, from the public authorities' point of view, to encourage and help firms to implement both quality and environmental-related standards in order to increase the competitiveness of their fellow firms.

Nevertheless, although we have investigated the positive relationship between QS/ES and firms' business performance, we have not identified the mechanisms by which business performance is enhanced, that is, whether firms improve their sales, profits and EBITDA because of efficiency gains, better human resource management, etc. The identification of such mechanisms could add fruitful result to our contribution. Moreover, investigating additional dimensions of business performance other than sales, profit and EBITDA, and assessing whether the positive relations are sustainable constitute interesting extensions. Furthermore, we have considered firms that were yet registered according to QS and ES in 2006, regardless of the date of registration, and have tested our hypothesis on French firms only. Taking into account these temporal considerations and considering an international setting may also constitute a challenging extension for future research. In addition, taking into account the registration year or using panel data would give us the opportunity to investigate more than the simple and relation between QS/ES registration and business performance. Long-term holding performance should also be considered in order to get empirical answer on how the 'market' perceives the impact of QS/ES.

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Table 1: Definition of variables and sample statistics (N=9,411)

Variable	Definition	Mean	SD	Min	Max
SALES	Logarithm of sales per employee Continuous variable	5.12	0.87	0.97	10.60
PROFIT	Logarithm of net profit per employee Continuous variable	1.46	1.55	-6.81	7.67
EBITDA	Logarithm of EBITDA per employee Continuous variable	2.39	1.29	-4.63	7.72
QS	Firm registration for ISO 9000, EAFQ, etc. Dummy variable (=1 if registered in 2006)	0.60	0.49	0.00	1.00
ES	Firm registration for ISO 14000, organic labeling or fair trade Dummy variable (=1 if registered in 2006)	0.28	0.45	0.00	1.00
QSES	Firm registration for both a QS and ES Dummy variable (=1 if registered in 2006; =0 if registered for only one kind of standard)	0.26	0.44	0.00	1.00
SIZE	Size of the firm				
	SMALL (20 TO 49 employees)	0.20	0.40	0.00	1.00
	SMEDIUM (50 TO 199 employees)	0.22	0.41	0.00	1.00
	MEDIUM (200 TO 499 employees)	0.15	0.36	0.00	1.00
	BIG (more than 500 employees)	0.43	0.49	0.00	1.00
GROUP	Belonging to a group Dummy variable (=1 if yes)	0.70	0.46	0.00	1.00
NETWORK	Belonging to a network Dummy variable (=1 if yes)	0.86	0.34	0.00	1.00
EXPORT	The firm exports a part of its products Dummy variable (=1 if market is European (25 countries) or international (out of European Union))	0.54	0.50	0.00	1.00
RELOCATION	Relocation abroad of a part of the business Dummy variable (=1 if yes)	0.07	0.26	0.00	1.00
CUSTOMER1	Customer's demands for product and service certificates (French NF label, QUALICERT, etc.) Dummy variable (=1 if yes)	0.55	0.50	0.00	1.00
CUSTOMER2	Customer's demands for a contract to assure delivery timeless Dummy variable (=1 if yes)	0.30	0.46	0.00	1.00
AGROFOOD	The main activity of the firm is agrifood Dummy variable (=1 if yes)	0.07	0.26	0.00	1.00
CONSUMPTION	The main activity of the firm is consumption goods Dummy variable (=1 if yes)	0.06	0.24	0.00	1.00
CARS_ EQUIPMENTS	The main activity of the firm is cars and equipments Dummy variable (=1 if yes)	0.11	0.31	0.00	1.00
INTERMEDIATE	The main activity of the firm is intermediate goods Dummy variable (=1 if yes)	0.15	0.36	0.00	1.00
ENERGY	The main activity of the firm is energy Dummy variable (=1 if yes)	0.02	0.13	0.00	1.00
CONSTRUCTION	The main activity of the firm is construction Dummy variable (=1 if yes)	0.07	0.26	0.00	1.00
COMMERCIAL	The main activity of the firm is commercial Dummy variable (=1 if yes)	0.21	0.41	0.00	1.00
TRANSPORT	The main activity of the firm is transport Dummy variable (=1 if yes)	0.08	0.27	0.00	1.00
FINANCIAL_REAL-ESTATE	The main activity of the firm is financial and real-estate activities Dummy variable (=1 if yes)	0.02	0.14	0.00	1.00
SERVICES1	The main activity of the firm is services for firms Dummy variable (=1 if yes)	0.16	0.36	0.00	1.00
SERVICES2	The main activity of the firm is services for individuals Dummy variable (=1 if yes)	0.05	0.19	0.00	1.00

Table 2: Estimates of QS/ES registration

Variables		QSES (Model 1) Estimate	SE	z-value	Marginal effect	QS (Model 2) Estimate	SE	z-value	Marginal effect	ES (Model 3) Estimate	SE	z-value	Marginal effect
Intercept		-0.95***	0.18	-5.11	-	-2.07***	0.18	-13.06	-	-2.14***	0.34	-6.19	-
SIZE	SMEDIUM	0.05	0.12	0.39	0.12	0.47***	0.08	5.73	0.12***	0.06	0.22	0.26	0.00
	MEDIUM	0.59***	0.13	4.62	0.14***	0.99***	0.10	10.13	0.24***	0.48*	0.25	1.89	0.02*
	BIG	1.41***	0.11	12.38	0.32***	1.17***	0.09	13.57	0.28***	0.85***	0.21	4.03	0.04***
GROUP		0.28***	0.08	3.38	0.07***	0.59***	0.07	9.03	0.14***	0.12	0.17	0.74	0.01
NETWORK		0.02	0.12	0.17	0.01	-0.13	0.09	-1.35	-0.03	-0.74***	0.18	-4.07	-0.04***
EXPORT		0.43***	0.08	5.59	0.10***	0.43***	0.07	6.60	0.11***	-0.11	0.17	-0.68	-0.01
RELOCATION		0.35***	0.10	3.47	0.08***	-0.04	0.14	-0.33	-0.01	1.26***	0.26	4.85	0.10***
CUSTOMER1		-0.36***	0.12	-2.87	-0.09***	2.17***	0.11	20.05	0.49***	-0.02	0.21	-0.11	-0.00
CUSTOMER2		-1.12***	0.13	-8.37	-0.24***	0.96***	0.10	9.15	0.23***	-0.46***	0.19	-2.44	-0.02***
AGROFOOD		-0.50***	0.11	-4.46	-0.11***	-0.38***	0.14	-2.75	-0.09***	0.65*	0.34	1.88	0.04*
CONSUMPTION		-0.66***	0.15	-4.42	-0.14***	-1.59***	0.14	-11.53	-0.32***	-0.75***	0.36	-2.06	0.02***
CARS_EQUIPMENTS		0.03	0.10	0.35	0.01	0.23*	0.13	1.73	0.06*	-14.81	0.56	-0.01	-0.00
ENERGY		1.76***	0.26	6.76	0.40***	0.72	0.50	1.43	0.18	1.95**	0.86	2.24	0.20*
CONSTRUCTION		-0.45***	0.14	-3.27	-0.10***	0.33***	0.14	2.44	0.08***	-2.40***	1.04	-2.31	-0.05***
COMMERCIAL		-0.57***	0.12	-4.97	-0.13***	-0.81***	0.11	-7.17	-0.19***	-0.29	0.30	-0.95	-0.01
TRANSPORT		-0.97***	0.14	-6.98	-0.20***	-1.08***	0.12	-8.72	-0.24***	-0.78***	0.38	-2.04	-0.03***
FINANCIAL-REAL-ESTATE		-0.64***	0.26	-2.46	-0.14***	-0.25	0.21	-1.15	-0.06	-0.75	0.55	-1.38	-0.02
SERVICES1		-1.04***	0.10	-9.93	-0.22***	-0.76***	0.11	-6.99	-0.18***	-0.57*	0.32	-1.81	-0.02***
SERVICES2		-0.20	0.21	-0.96	-0.05	-1.76***	0.19	-9.15	-0.34***	-0.38	0.37	-1.04	-0.01
Max Rescaled R2		0.24				0.35				0.11			
-2 log L		6799.740				7234.337				1551.900			
-2 log L (Intercept only)		7963.538				9319.024				1705.831			
Likelihood ratio		1163.7980				2084.6876				153.9309			
Percent concordant		74.5				80.5				73.1			
Number of observations		5857				6736				3779			
Number of registered firms		2450				3182				225			

(*), (**) and (***) indicate parameter significance at the 10, 5 and 1 percent level, respectively.

Table 3: PS-matching estimates

	Global	SD	Treated	SD	Non-treated	SD
			SALES			
QSES (N=5857)	0.14***	0.02	0.16***	0.02	0.14***	0.02
QS (N=6736)	0.08***	0.02	0.04*	0.02	0.12***	0.03
ES (N=3779)	0.19***	0.07	0.13***	0.05	0.19***	0.08
			PROFIT			
QSES (N=5857)	0.23***	0.04	0.21***	0.05	0.25***	0.04
QS (N=6736)	0.02	0.05	-0.02	0.05	0.05	0.05
ES (N=3779)	0.13	0.13	0.17	0.12	0.13	0.14
			EBITDA			
QSES (N=5857)	0.20***	0.04	0.21***	0.04	0.19***	0.04
QS (N=6736)	0.02	0.04	-0.04	0.04	0.07	0.04
ES (N=3779)	0.22**	0.10	0.12	0.09	0.23**	0.10

The standard error (SE) of the treatment effect is computed using bootstrap with 100 simulations. (*), (**) and (***) indicate parameter significance at the 10, 5 and 1 percent level, respectively.

QSES (SALES) min=5233; max=5608; mean=5409.92; SD=114.62.

QS (SALES) min=5690; max=6176; mean=5994.32;SD=94.03.

ES (SALES) min=2537; max=3563; mean=3252.73; SD=226.88.

QSES (PROFIT) min=5171; max=5622; mean=5396.21; SD=112.90.

QS (PROFIT) min=5774; max=6174; mean=5989.56; SD=87.47.

ES (PROFIT) min=2617; max=3656; mean=3247.40; SD=222.44.

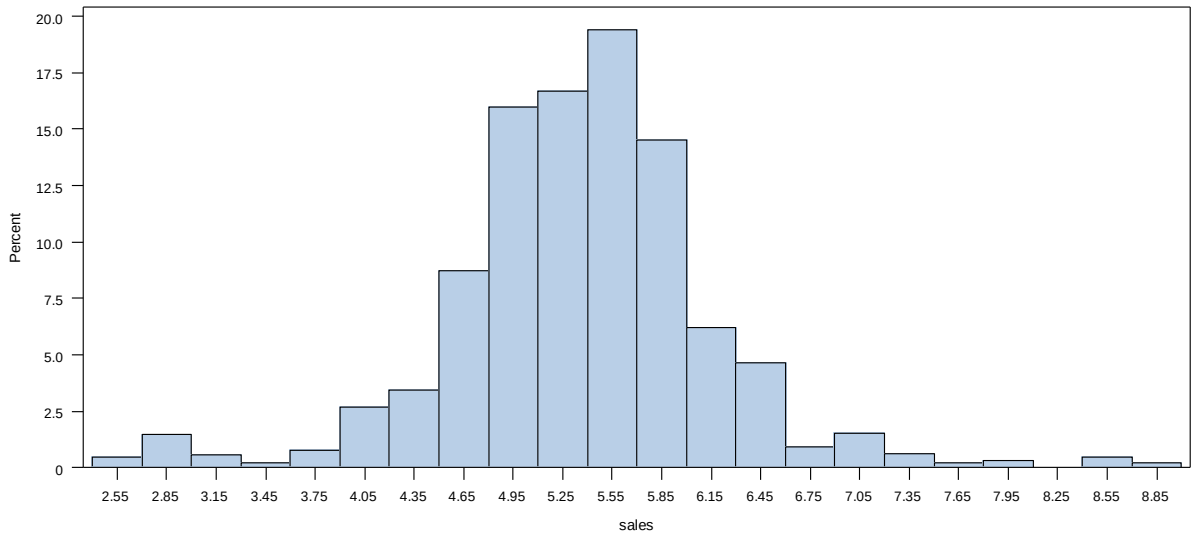
QSES (EBITDA) min=5189; max=5654; mean=5423.11; SD=122.09.

QS (EBITDA) min=5712; max=6182; mean=5979.52;SD=88.09.

ES (EBITDA) min=5189; max=5654; mean=5423.11; SD=122.09.

Appendix 1: Histograms and means of sales/profit/EBITDA in the treatment and comparison groups

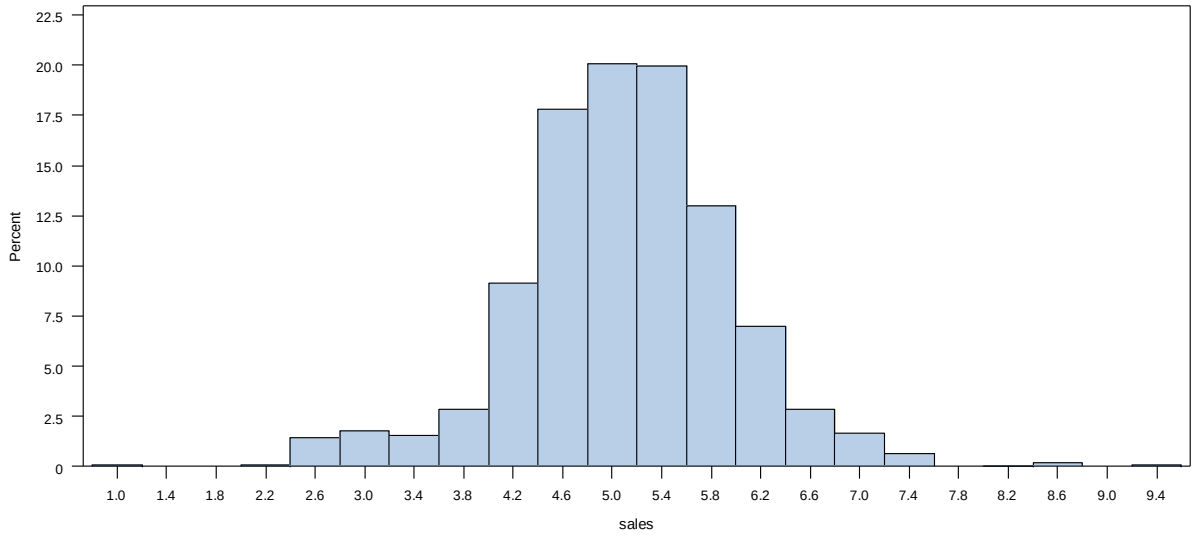
Figure 1a: Histogram of Sales when QSES=1 (N=2450)



Basic Statistical Measures

Mean	5.359706
Median	5.389752
SD	0.80898

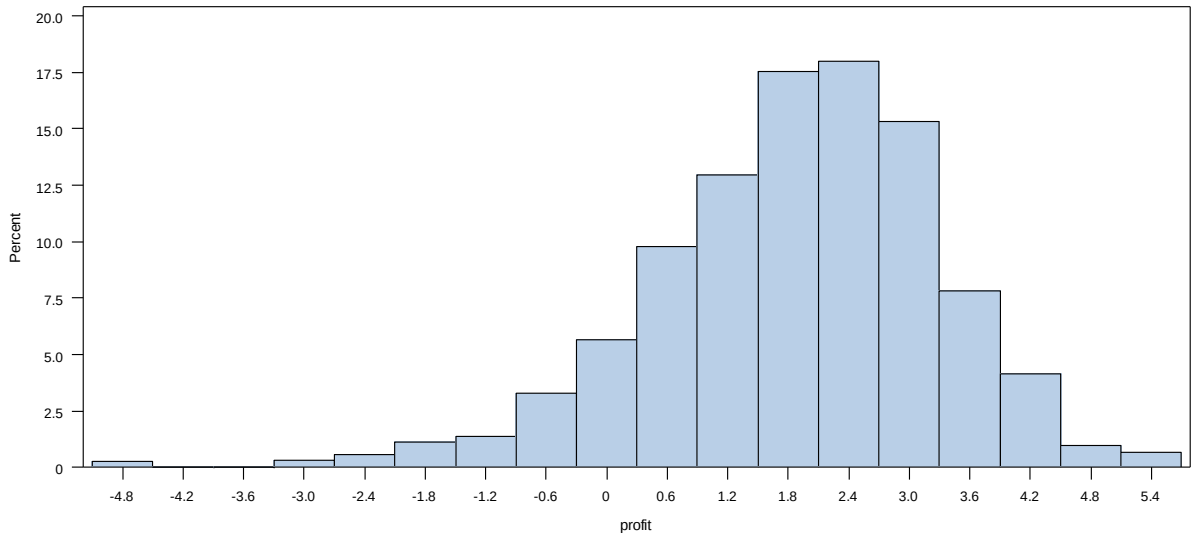
Figure 1b: Histogram of Sales when QSES=0 (N=3408)



Basic Statistical Measures

Mean	5.089741
Median	5.089370
SD	0.86285

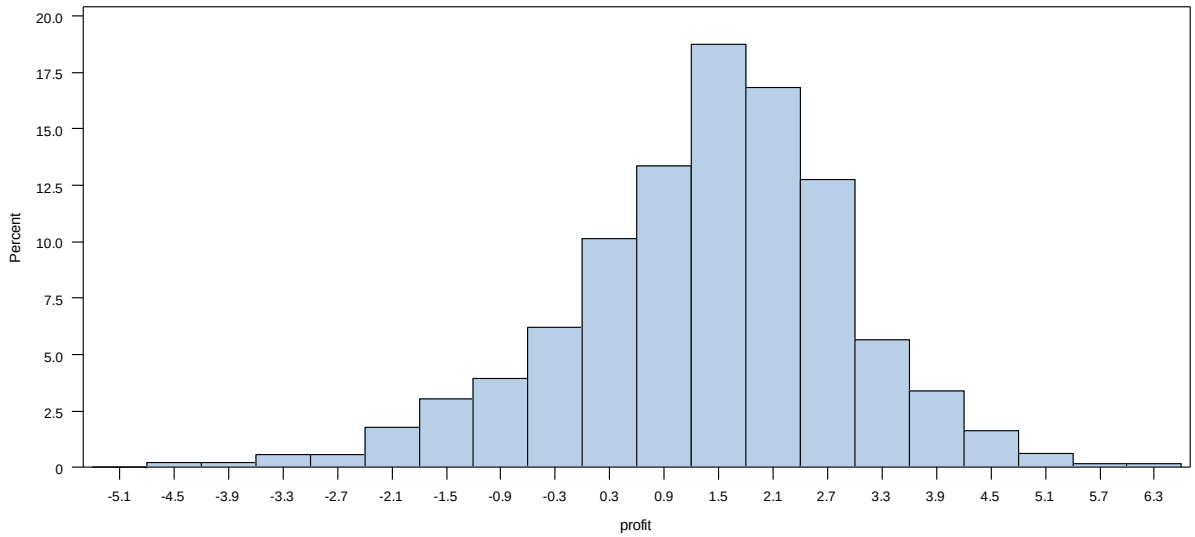
Figure 2a: Histogram of Profit when QSES=1 (N=2450)



Basic Statistical Measures

Mean	1.858607
Median	1.977863
SD	1.43848

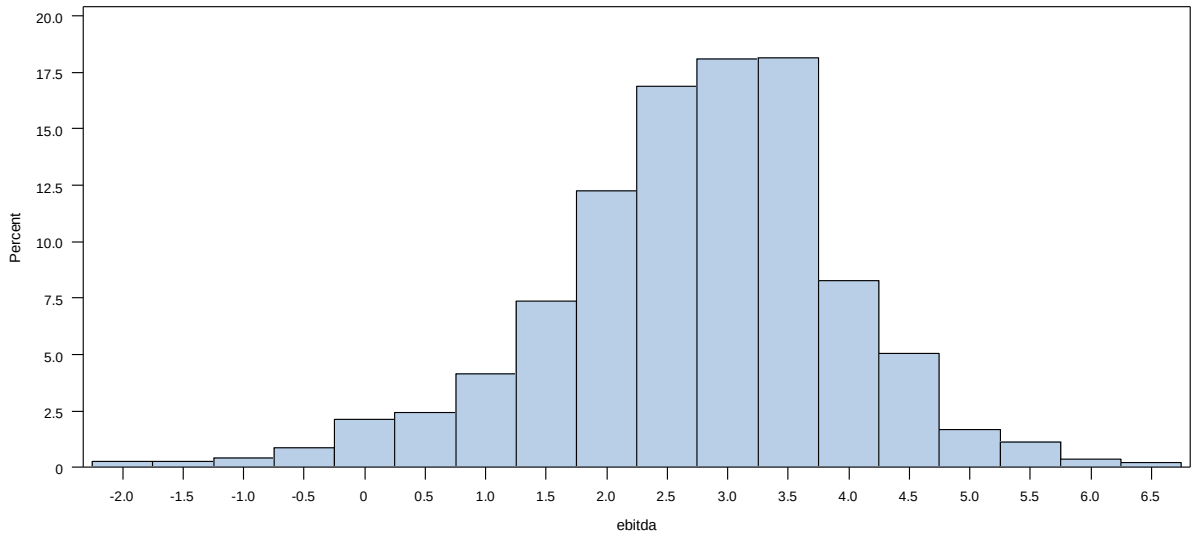
Figure 2b: Histogram of Profit when QSES=0 (N=3408)



Basic Statistical Measures

Mean	1.384683
Median	1.514450
SD	1.54180

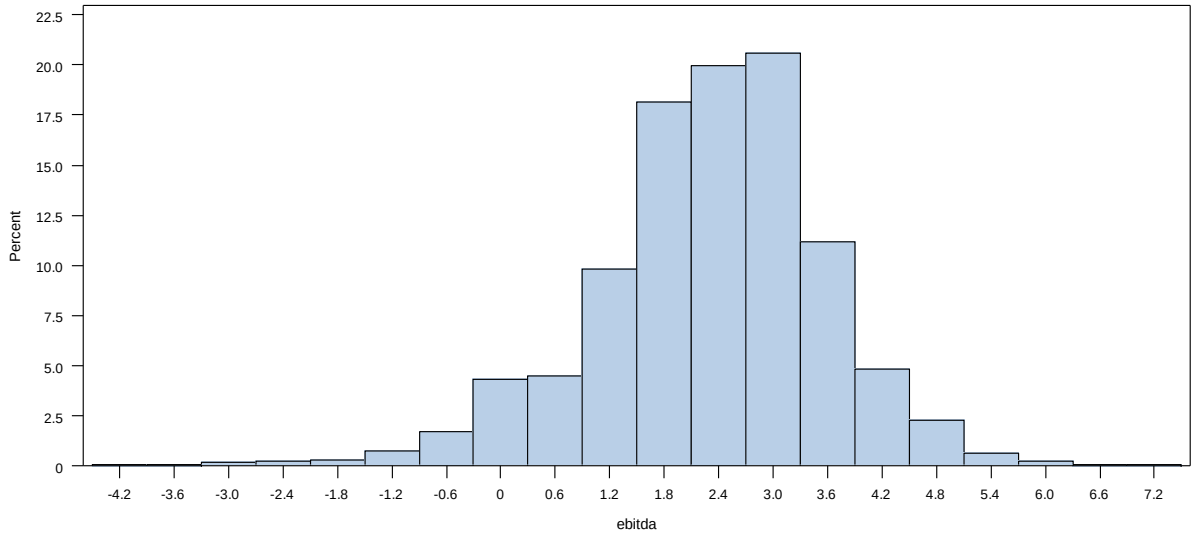
Figure 3a: Histogram of EBITDA when QSES=1 (N=2450)



Basic Statistical Measures

Mean	2.73204377
Median	2.864922
SD	1.22092

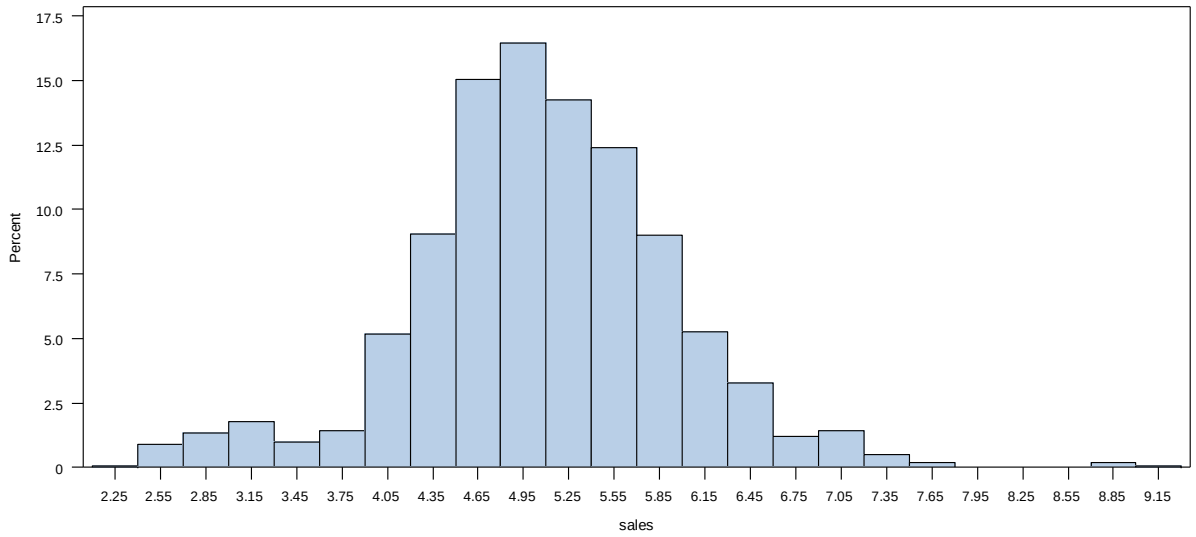
Figure 3b: Histogram of EBITDA when QSES=0 (N=3408)



Basic Statistical Measures

Mean	2.298013
Median	2.370143
SD	1.29198

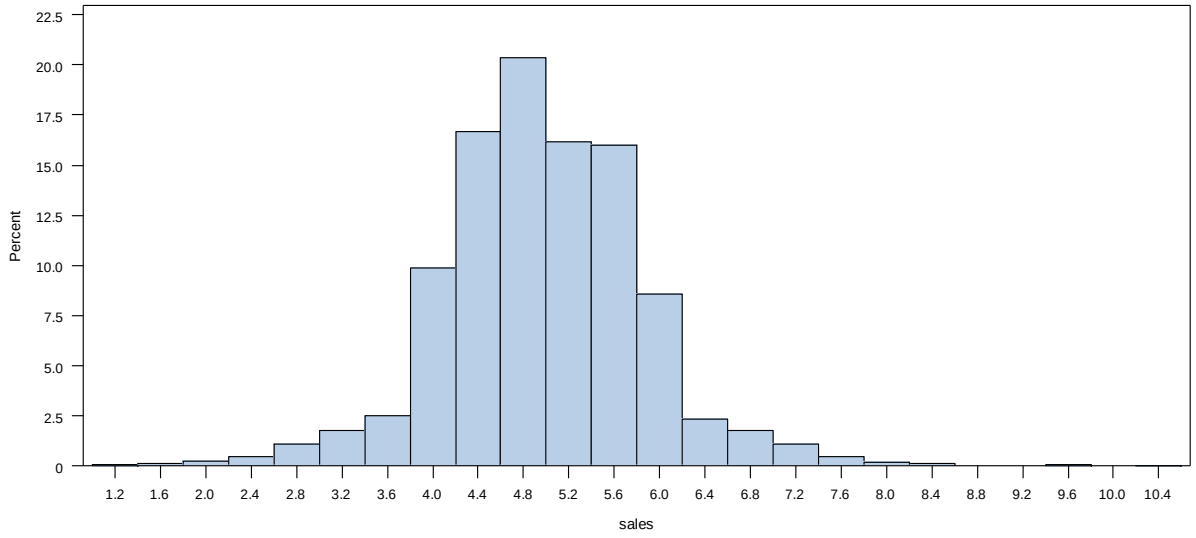
Figure 4a: Histogram of Sales when QS=1 (N=3182)



Basic Statistical Measures

Mean	5.073944
Median	5.050384
SD	0.86398

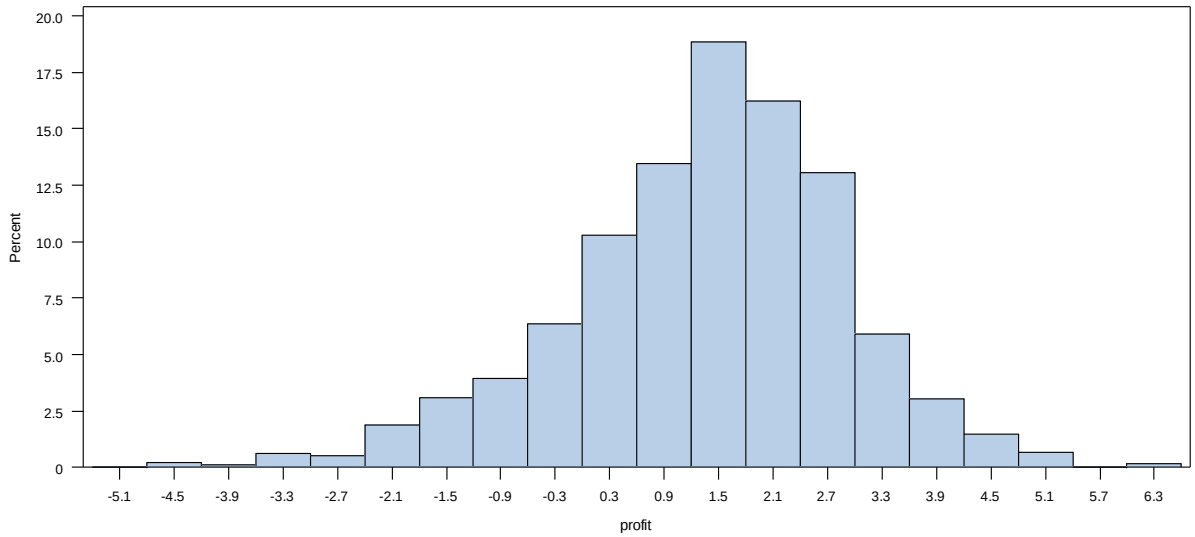
Figure 4b: Histogram of Sales when QS=0 (N=3554)



Basic Statistical Measures

Mean	4.977388
Median	4.937392
SD	0.88315

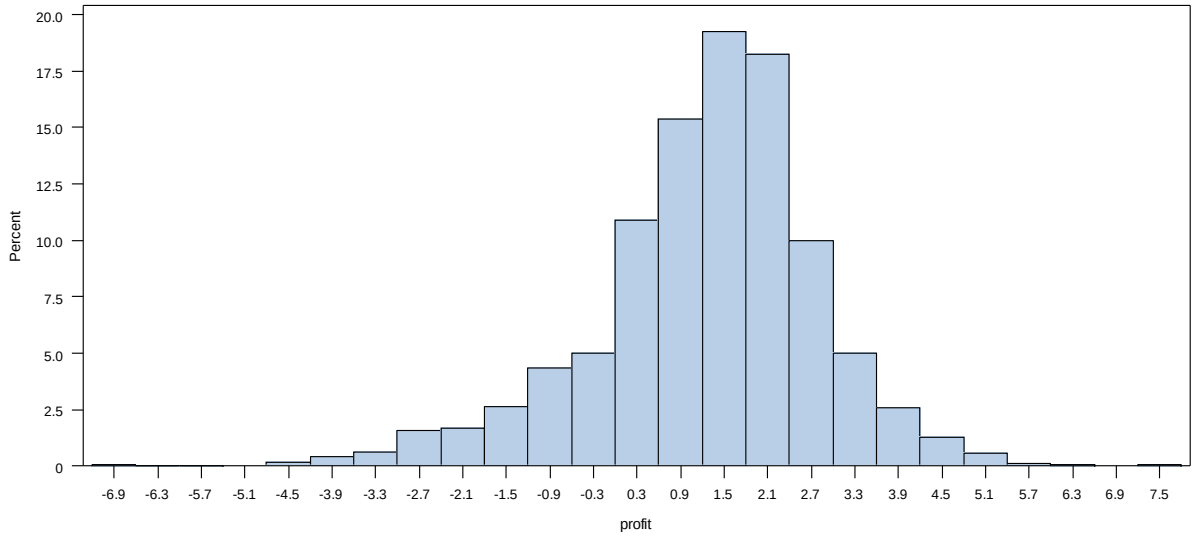
Figure 5a: Histogram of Profit when QS=1 (N=3182)



Basic Statistical Measures

Mean	1.367830
Median	1.508460
SD	1.53114

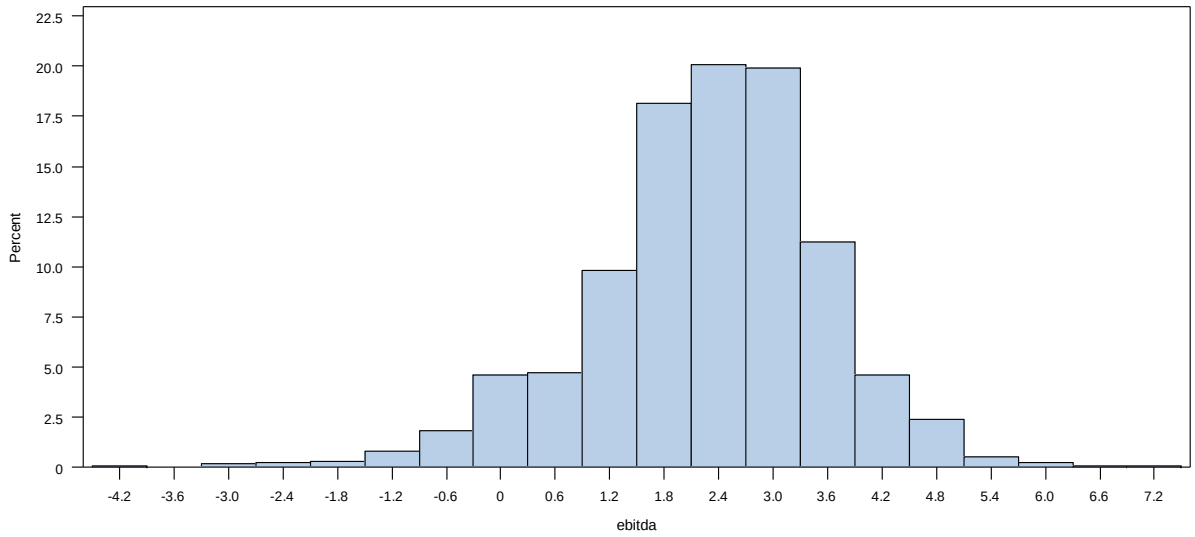
Figure 5b: Histogram of Profit when QS=0 (N=3554)



Basic Statistical Measures

Mean	1.26189
Median	1.44706
SD	1.57502

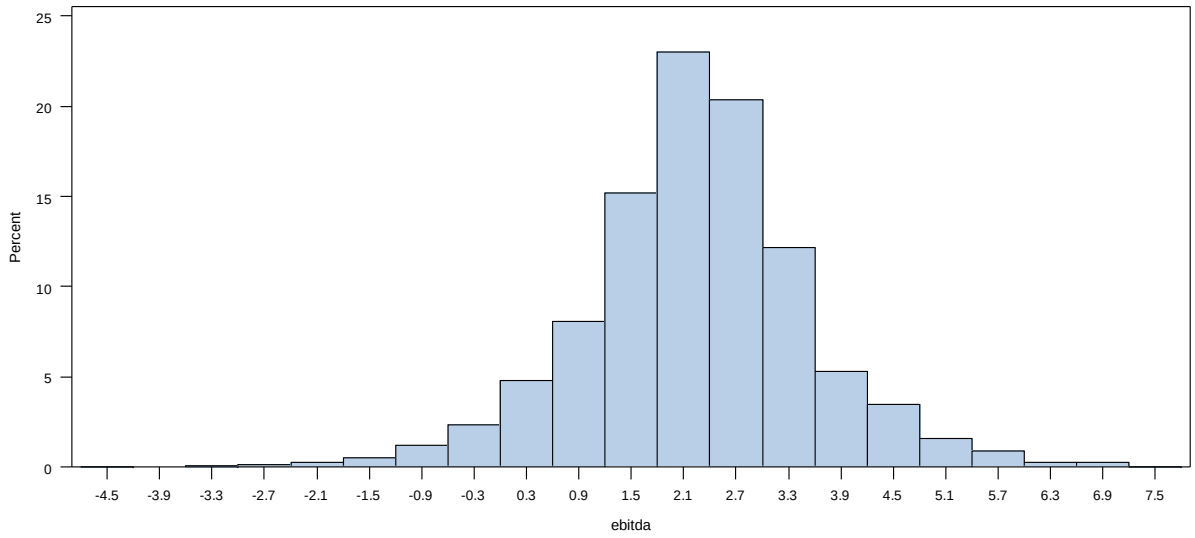
Figure 6a: Histogram of EBITDA when QS=1 (N=3182)



Basic Statistical Measures

Mean	2.276968
Median	2.338247
SD	1.29543

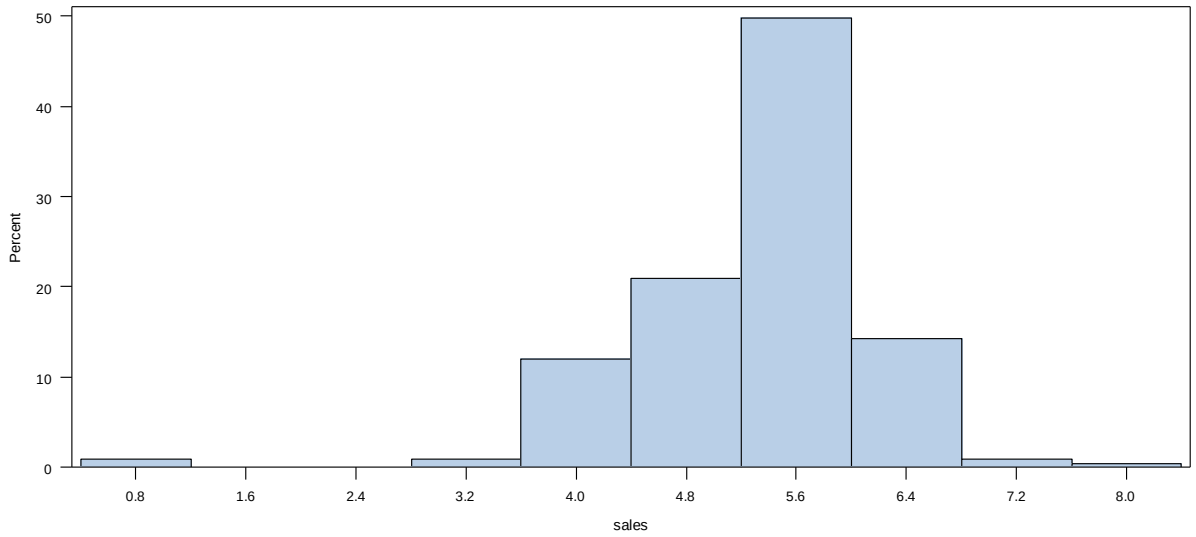
Figure 6b: Histogram of EBITDA when QS=0 (N=3554)



Basic Statistical Measures

Mean	2.24466
Median	2.25220
SD	1.30241

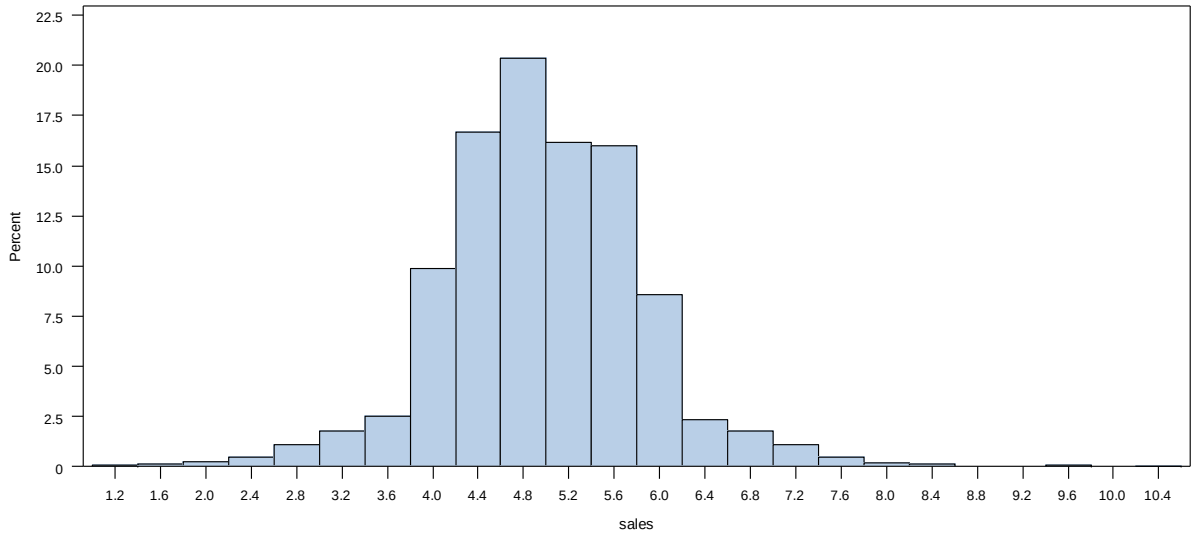
Figure 7a: Histogram of Sales when ES=1 (N=225)



Basic Statistical Measures

Mean	5.313160
Median	5.424409
SD	0.81640

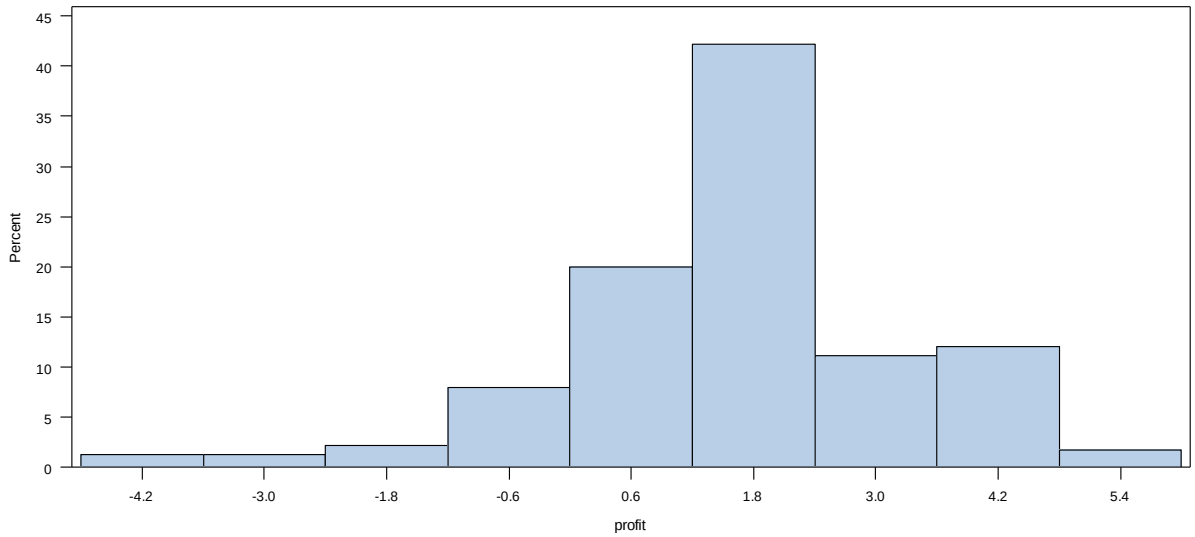
Figure 7b: Histogram of Sales when ES=0 (N=3554)



Basic Statistical Measures

Mean	4.977388
Median	4.937392
SD	0.88315

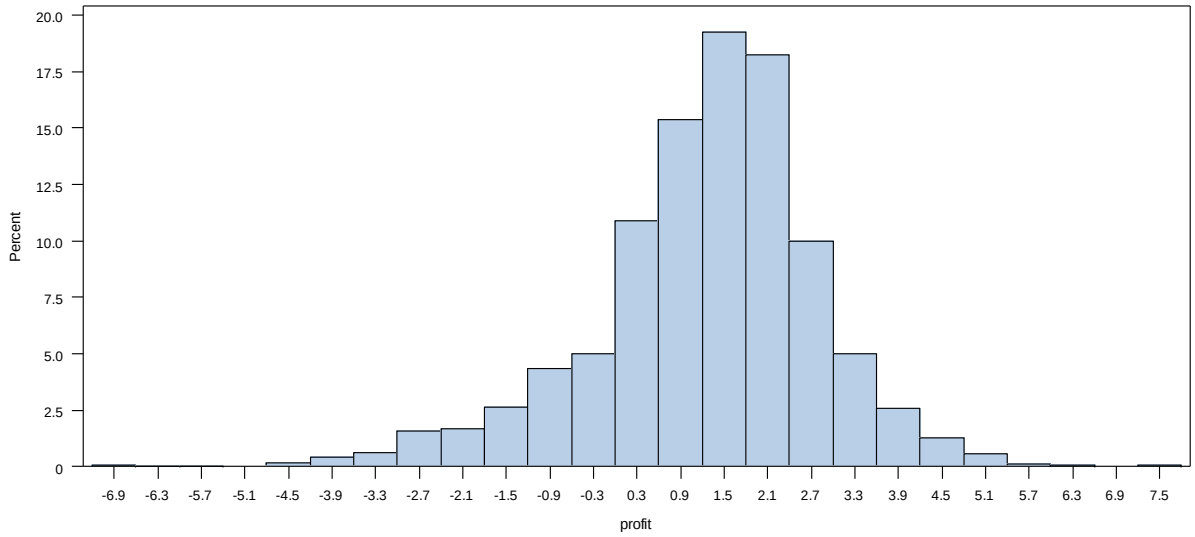
Figure 8a: Histogram of Profit when ES=1 (N=225)



Basic Statistical Measures

Mean	1.635354
Median	1.834468
SD	1.66189

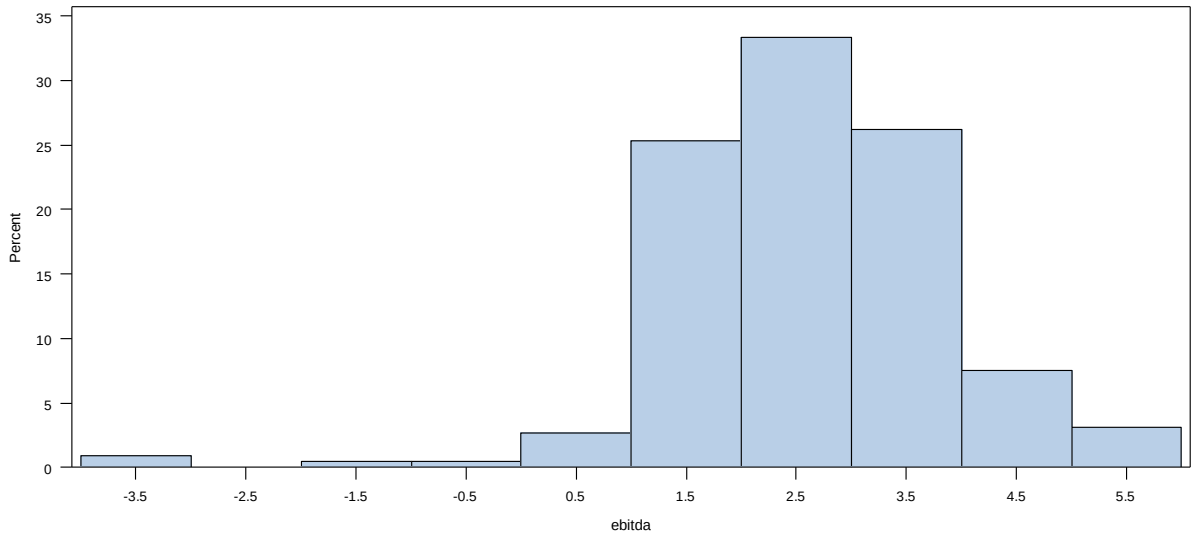
Figure 8b: Histogram of Profit when ES=0 (N=3554)



Basic Statistical Measures

Mean	1.26189
Median	1.44706
SD	1.57502

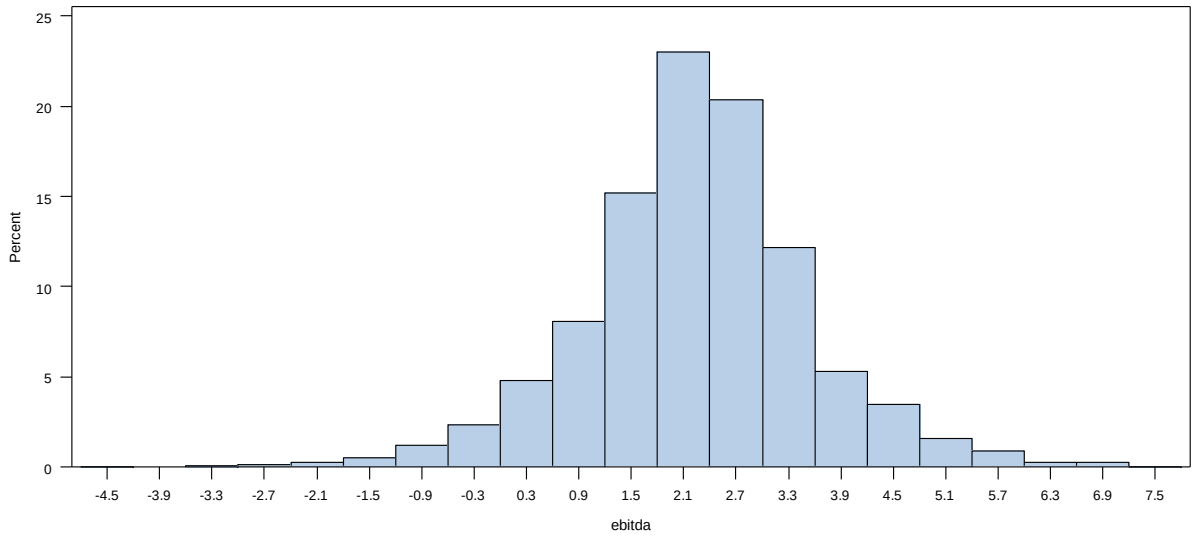
Figure 9a: Histogram of EBITDA when ES=1 (N=225)



Basic Statistical Measures

Mean	2.595629
Median	2.736981
SD	1.20598

Figure 9b: Histogram of EBITDA when ES=0 (N=3554)



Basic Statistical Measures

Mean	2.24466
Median	2.25220
SD	1.30241

Appendix 2: Sample statistics for the treatment and control groups for Model 1 (N=5857)

		QSES=1 (N=2450)				QSES=0 (N=3407)			
Variable		**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
SALES		5.36	0.81	2.41	8.97	5.09	0.87	-0.20	9.24
PROFIT		1.86	1.44	-4.85	5.65	1.38	1.54	-5.13	6.45
EBITDA		2.73	1.22	-2.13	6.44	2.29	1.29	-4.30	7.17
QS		1.00	0.00	1.00	1.00	0.93	0.24	0.00	1.00
ES		1.00	0.00	1.00	1.00	0.07	0.25	0.00	1.00
QSES		1.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00
SIZE	SMALL	0.05	0.23	0.00	1.00	0.17	0.37	0.00	1.00
	SMEDIUM	0.10	0.29	0.00	1.00	0.24	0.43	0.00	1.00
	MEDIUM	0.15	0.35	0.00	1.00	0.19	0.39	0.00	1.00
	BIG	0.70	0.46	0.00	1.00	0.40	0.49	0.00	1.00
GROUP		0.88	0.33	0.00	1.00	0.75	0.43	0.00	1.00
NETWORK		0.93	0.25	0.00	1.00	0.89	0.32	0.00	1.00
EXPORT		0.76	0.43	0.00	1.00	0.57	0.50	0.00	1.00
RELOCATION		0.14	0.34	0.00	1.00	0.07	0.25	0.00	1.00
CUSTOMER1		0.78	0.41	0.00	1.00	0.65	0.47	0.00	1.00
CUSTOMER2		0.14	0.34	0.00	1.00	0.26	0.44	0.00	1.00
AGROFOOD		0.09	0.29	0.00	1.00	0.10	0.30	0.00	1.00
CONSUMPTION		0.04	0.20	0.00	1.00	0.05	0.22	0.00	1.00
CARS_EQUIPMENTS		0.21	0.40	0.00	1.00	0.11	0.31	0.00	1.00
INTERMEDIATE		0.25	0.43	0.00	1.00	0.17	0.37	0.00	1.00
ENERGY		0.05	0.22	0.00	1.00	0.01	0.08	0.00	1.00
CONSTRUCTION		0.05	0.23	0.00	1.00	0.09	0.29	0.00	1.00
COMMERCIAL		0.11	0.32	0.00	1.00	0.17	0.38	0.00	1.00
TRANSPORT		0.04	0.20	0.00	1.00	0.08	0.27	0.00	1.00
FINANCIAL_REAL-ESTATE		0.01	0.12	0.00	1.00	0.02	0.12	0.00	1.00
SERVICES1		0.10	0.30	0.00	1.00	0.18	0.39	0.00	1.00
SERVICES2		0.02	0.14	0.00	1.00	0.02	0.14	0.00	1.00

Appendix 2: Sample statistics for the treatment and control groups for Model 2 (N=6736)

		QS=1 (N=3182)				QS=0 (N=3554)			
Variable		**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
SALES		5.07	0.87	-0.20	9.24	4.98	0.88	1.00	10.60
PROFIT		1.37	1.53	-5.13	6.45	1.26	1.57	-6.81	7.67
EBITDA		2.27	1.30	-4.30	7.17	2.24	1.30	-4.63	7.72
QS		1.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00
ES		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QSES		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SIZE	SMALL	0.21	0.41	0.00	1.00	0.34	0.47	0.00	1.00
	SMEDIUM	0.20	0.40	0.00	1.00	0.28	0.45	0.00	1.00
	MEDIUM	0.14	0.34	0.00	1.00	0.12	0.32	0.00	1.00
	BIG	0.45	0.50	0.00	1.00	0.26	0.44	0.00	1.00
GROUP		0.65	0.48	0.00	1.00	0.53	0.50	0.00	1.00
NETWORK		0.63	0.48	0.00	1.00	0.79	0.41	0.00	1.00
EXPORT		0.38	0.48	0.00	1.00	0.36	0.48	0.00	1.00
RELOCATION		0.11	0.31	0.00	1.00	0.04	0.19	0.00	1.00
CUSTOMER1		0.30	0.46	0.00	1.00	0.29	0.45	0.00	1.00
CUSTOMER2		0.29	0.46	0.00	1.00	0.44	0.50	0.00	1.00
AGROFOOD		0.09	0.29	0.00	1.00	0.04	0.20	0.00	1.00
CONSUMPTION		0.07	0.26	0.00	1.00	0.09	0.29	0.00	1.00
CARS_EQUIPMENTS		0.00	0.00	0.00	0.00	0.04	0.20	0.00	1.00
INTERMEDIATE		0.08	0.28	0.00	1.00	0.07	0.26	0.00	1.00
ENERGY		0.01	0.09	0.00	1.00	0.01	0.04	0.00	1.00
CONSTRUCTION		0.01	0.07	0.00	1.00	0.31	0.46	0.00	1.00
COMMERCIAL		0.44	0.50	0.00	1.00	0.11	0.31	0.00	1.00
TRANSPORT		0.06	0.23	0.00	1.00	0.10	0.31	0.00	1.00
FINANCIAL_REAL-ESTATE		0.02	0.15	0.00	1.00	0.03	0.17	0.00	1.00
SERVICES1		0.13	0.34	0.00	1.00	0.17	0.38	0.00	1.00
SERVICES2		0.08	0.27	0.00	1.00	0.06	0.24	0.00	1.00

Appendix 2: Sample statistics for the treatment and control groups for Model 3 (N=3779)

		ES=1 (N=225)				ES=0 (N=3554)			
Variable		**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
SALES		5.31	0.82	0.97	8.19	4.98	0.88	1.00	10.60
PROFIT		1.63	1.67	-4.11	5.87	1.26	1.57	-6.81	7.67
EBITDA		2.59	1.20	-3.60	5.72	2.24	1.30	-4.63	7.72
QS		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ES		1.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00
QSES		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SIZE	SMALL	0.17	0.37	0.00	1.00	0.34	0.47	0.00	1.00
	SMEDIUM	0.24	0.43	0.00	1.00	0.28	0.45	0.00	1.00
	MEDIUM	0.19	0.39	0.00	1.00	0.12	0.32	0.00	1.00
	BIG	0.40	0.49	0.00	1.00	0.26	0.44	0.00	1.00
GROUP		0.75	0.43	0.00	1.00	0.53	0.50	0.00	1.00
NETWORK		0.90	0.29	0.00	1.00	0.79	0.41	0.00	1.00
EXPORT		0.58	0.49	0.00	1.00	0.36	0.48	0.00	1.00
RELOCATION		0.06	0.24	0.00	1.00	0.04	0.19	0.00	1.00
CUSTOMER1		0.68	0.46	0.00	1.00	0.29	0.45	0.00	1.00
CUSTOMER2		0.26	0.44	0.00	1.00	0.44	0.50	0.00	1.00
AGROFOOD		0.10	0.30	0.00	1.00	0.04	0.20	0.00	1.00
CONSUMPTION		0.05	0.21	0.00	1.00	0.09	0.29	0.00	1.00
CARS_EQUIPMENTS		0.12	0.32	0.00	1.00	0.04	0.20	0.00	1.00
INTERMEDIATE		0.17	0.38	0.00	1.00	0.07	0.26	0.00	1.00
ENERGY		0.01	0.08	0.00	1.00	0.01	0.04	0.00	1.00
CONSTRUCTION		0.10	0.30	0.00	1.00	0.31	0.46	0.00	1.00
COMMERCIAL		0.16	0.36	0.00	1.00	0.11	0.31	0.00	1.00
TRANSPORT		0.08	0.27	0.00	1.00	0.10	0.31	0.00	1.00
FINANCIAL_REAL-ESTATE		0.01	0.12	0.00	1.00	0.03	0.17	0.00	1.00
SERVICES1		0.19	0.40	0.00	1.00	0.17	0.38	0.00	1.00
SERVICES2		0.02	0.13	0.00	1.00	0.06	0.24	0.00	1.00

Appendix 3: Pearson correlation coefficients on the whole sample (N=9,411) (Because of the table's length we do not report results concerning the variable ACTIVITY)

	SALES	PROFIT	EBITDA	QS	ES	SMALL	MEDIUM	SMEDIUM	BIG	GROUP	NETWORK	EXPORT	RELOCATION	CUSTOMER1	CUSTOMER2
SALES	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PROFIT	0.58	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-
EBITDA	0.68	0.75	1.00	-	-	-	-	-	-	-	-	-	-	-	-
QS	0.11	0.09	0.08	1.00	-	-	-	-	-	-	-	-	-		
ES	0.17	0.15	0.16	0.41	1.00	-	-	-	-	-	-	-	-	-	-
SMALL	-0.09	-0.06	-0.09	-0.26	-0.21	1.00	-	-	-	-	-	-	-	-	-
MEDIUM	-0.06	-0.07	-0.05	-0.12	-0.17	-0.27	1.00	-	-	-	-	-	-	-	-
SMEDIUM	0.02	-0.01	0.01	0.07	-0.01	-0.21	-0.22	1.00	-	-	-	-	-	-	-
BIG	0.10	0.11	0.11	0.26	0.33	-0.44	-0.46	-0.36	1.00	-	-	-	-	-	-
GROUP	0.21	0.17	0.17	0.28	0.22	-0.36	-0.13	0.09	0.33	1.00	-	-	-	-	-
NETWORK	-0.06	0.06	0.05	0.20	0.09	-0.08	-0.08	0.05	0.10	0.14	1.00	-	-	-	-
EXPORT	0.18	0.18	0.22	0.29	0.24	-0.22	-0.10	0.04	0.23	0.21	0.23	1.00	-	-	-
RELOCATION	0.06	0.05	0.07	0.10	0.15	-0.09	-0.04	0.00	0.11	0.11	0.08	0.22	1.00	-	-
CUSTOMER1	-0.05	-0.03	-0.05	0.43	0.24	-0.14	-0.05	0.06	0.11	0.20	0.28	0.27	0.10	1.00	-
CUSTOMER2	0.00	0.03	0.02	-0.24	-0.21	0.12	0.07	-0.04	-0.12	-0.12	-0.02	-0.09	-0.05	-0.72	1.00

Appendix 4.1: The relation between QSES, QS and ES registration and firms' performance (Ordinary Least Square)

		SALES			PROFIT			EBITDA		
Variables		Estimate	SE	z-value	Estimate	SE	z-value	Estimate	SE	z-value
Intercept		4.53***	0.04	116.71	0.87***	0.08	10.86	2.03***	0.06	31.39
QSES		0.19***	0.05	4.15	0.32***	0.05	6.69	0.23***	0.04	6.10
QS		0.06***	0.02	2.98	0.03	0.04	0.86	-0.00	0.03	-0.17
ES		0.12***	0.04	2.42	0.26***	0.10	2.59	0.21***	0.08	2.63
SIZE	SMEDIUM	-0.00	0.02	-0.14	-0.17***	0.05	-3.57	-0.02	0.04	-0.60
	MEDIUM	0.04	0.03	1.40	-0.21***	0.05	-3.89	-0.03	0.04	-0.79
	BIG	-0.01	0.02	-0.53	-0.13***	0.05	-2.82	-0.05	0.04	-1.37
GROUP		0.30***	0.02	17.01	0.49***	0.04	13.38	0.37***	0.03	12.41
NETWORK		-0.04*	0.02	-1.83	0.15***	0.05	3.02	0.11***	0.04	2.75
EXPORT		0.33***	0.02	17.74	0.52***	0.04	14.31	0.51***	0.03	17.38
RELOCATION		0.00	0.03	0.19	-0.07	0.06	-1.17	-0.03	0.05	-0.53
CUSTOMER1		0.05*	0.03	1.83	-0.21***	0.05	-3.85	-0.27***	0.04	-6.15
CUSTOMER2		0.19***	0.02	17.43	0.12***	0.05	2.25	0.04	0.04	1.03
AGROFOOD		0.37***	0.03	11.59	-0.09	0.07	-1.34	0.02	0.05	0.31
CONSUMPTION		0.08***	0.03	2.32	0.18***	0.07	2.58	0.06	0.06	1.09
CARS_EQUIPMENTS		0.04	0.03	1.49	-0.02	0.06	-0.30	-0.09**	0.05	-1.97
ENERGY		0.74***	0.06	12.86	0.88***	0.12	7.39	0.59***	0.09	6.18
CONSTRUCTION		0.01	0.03	0.37	-0.03	0.07	-0.44	-0.51***	0.06	-8.84
COMMERCIAL		0.72***	0.02	25.22	0.27***	0.06	4.53	0.06	0.05	1.27
TRANSPORT		-0.30***	0.03	-8.94	-0.67***	0.07	-9.84	-0.59***	0.05	-10.93
FINANCIAL_REAL-ESTATE		0.75***	0.06	12.92	1.25***	0.12	10.32	1.80***	0.10	18.55
SERVICES1		-0.68***	0.03	-12.92	-0.56***	0.06	-9.90	-0.77***	0.05	-17.01
SERVICES2		-0.52***	0.04	-11.79	-0.66***	0.09	-7.23	-0.42***	0.07	-5.78
Max Rescaled R2			0.36			0.14			0.20	
Number of observations			9411			9411			9411	

(*), (**) and (***) indicate parameter significance at the 10, 5 and 1 percent level, respectively.

Appendix 4.2: The relation between QSES registration and firms' performance (Ordinary Least Square)

		SALES			PROFIT			EBITDA		
Variables		Estimate	SE	z-value	Estimate	SE	z-value	Estimate	SE	z-value
Intercept		4.65***	0.05	84.79	0.85***	0.11	7.53	2.14***	0.09	23.49
QSES		0.15***	0.02	7.41	0.25***	0.04	6.06	0.23***	0.03	6.97
SIZE	SMEDIUM	-0.04	0.03	-1.22	-0.24***	0.07	-3.39	-0.09	0.06	-1.62
	MEDIUM	0.02	0.04	0.47	-0.21***	0.07	-2.85	-0.08	0.06	-1.35
	BIG	-0.01	0.03	-0.15	-0.02	0.07	-0.35	-0.02	0.07	-0.35
GROUP		0.23***	0.02	9.48	0.42***	0.05	8.24	0.24***	0.04	5.77
NETWORK		-0.04	0.03	-1.31	0.22***	0.07	3.18	0.21***	0.06	3.65
EXPORT		0.39***	0.02	17.11	0.58***	0.05	12.39	0.55***	0.04	14.66
RELOCATION		-0.02	0.03	-0.57	-0.06	0.06	-0.97	-0.07	0.05	-1.35
CUSTOMER1		-0.01	0.03	-0.24	-0.24***	0.08	-3.06	-0.37***	0.06	-5.83
CUSTOMER2		0.19***	0.04	4.88	0.32***	0.08	3.86	0.13*	0.08	1.98
AGROFOOD		0.44***	0.03	12.33	-0.02	0.07	-0.35	0.06	0.06	1.04
CONSUMPTION		0.17***	0.05	3.65	0.26***	0.10	2.71	0.16***	0.08	2.12
CARS_EQUIPMENTS		0.04	0.03	1.17	-0.06	0.06	-0.91	-0.12	0.05	-2.40
ENERGY		0.63***	0.06	10.51	0.75***	0.12	6.04	0.46***	0.10	4.55
CONSTRUCTION		0.01	0.04	0.25	-0.01	0.08	-0.09	-0.58***	0.07	-8.52
COMMERCIAL		0.76***	0.03	21.75	0.14***	0.07	1.91	-0.03	0.06	-0.53
TRANSPORT		-0.30***	0.04	-7.17	-0.65***	0.08	-7.69	-0.61***	0.07	-8.90
FINANCIAL_REAL-ESTATE		0.69***	0.08	8.70	0.82***	0.16	5.03	1.26***	0.13	9.48
SERVICES1		-0.67***	0.03	-20.77	-0.58***	0.07	-8.73	-0.86***	0.05	-16.10
SERVICES2		-0.72***	0.07	-10.61	-0.64***	0.14	-4.65	-0.84	0.06	-1.62
Max Rescaled R2			0.36			0.14			0.22	
Number of observations			5857			5857			5857	
Number of registered firms			2450			2450			2450	

(*), (**) and (***) indicate parameter significance at the 10, 5 and 1 percent level, respectively.

Appendix 4.3: The relation between QS registration and firms' performance (Ordinary Least Square)

		SALES			PROFIT			EBITDA		
Variables		Estimate	SE	z-value	Estimate	SE	z-value	Estimate	SE	z-value
Intercept		4.54***	0.04	100.63	0.82***	0.09	8.87	1.99***	0.07	26.68
QS		0.07***	0.02	3.43	0.05	0.04	1.26	0.01	0.03	0.39
SIZE	SMEDIUM	-0.00	0.02	-0.20	-0.20***	0.05	-3.84	-0.02	0.04	-0.62
	MEDIUM	0.05*	0.03	1.68	-0.21***	0.06	-3.48	-0.05	0.05	-1.11
	BIG	-0.02	0.03	-0.99	-0.24***	0.05	-4.49	-0.10***	0.04	-2.32
GROUP		0.31***	0.02	15.48	0.49***	0.04	11.91	0.38***	0.03	11.48
NETWORK		-0.06**	0.03	-2.28	0.17***	0.06	3.01	0.11***	0.04	2.36
EXPORT		0.30***	0.02	14.79	0.53***	0.04	12.49	0.51***	0.03	14.94
RELOCATION		0.09	0.04	2.24	0.03	0.08	0.38	0.12*	0.07	1.76
CUSTOMER1		-0.01	0.03	0.16	-0.20***	0.06	-3.14	-0.29***	0.05	-5.69
CUSTOMER2		0.16***	0.03	5.63	0.07	0.06	1.20	0.01	0.04	0.16
AGROFOOD		0.41***	0.04	9.68	-0.02	0.09	-0.28	0.11	0.07	1.61
CONSUMPTION		0.02	0.04	0.53	0.12	0.09	1.37	0.02	0.07	0.27
CARS_EQUIPMENTS		0.02	0.04	0.39	-0.07	0.08	-0.86	-0.20***	0.07	-3.01
ENERGY		0.60***	0.14	4.11	0.72***	0.29	2.46	0.60***	0.24	2.53
CONSTRUCTION		0.07**	0.04	1.80	0.06	0.09	0.72	-0.37***	0.07	-5.39
COMMERCIAL		0.73	0.03	20.91	0.39	0.07	5.39	0.15***	0.07	2.59
TRANSPORT		-0.21***	0.04	-5.43	-0.54***	0.08	-6.78	-0.55***	0.06	-8.56
FINANCIAL_REAL-ESTATE		0.81***	0.07	12.35	1.48***	0.13	10.94	1.88***	0.11	17.25
SERVICES1		-0.57***	0.03	-16.98	-0.42***	0.07	-6.13	-0.63***	0.06	-11.30
SERVICES2		-0.45***	0.05	-8.65	-0.49***	0.11	-4.57	-0.23***	0.09	-2.72
Max Rescaled R2			0.33			0.11			0.18	
Number of observations			6736			6736			6736	
Number of registered firms			3182			3182			3182	

(*), (**) and (***) indicate parameter significance at the 10, 5 and 1 percent level, respectively.

Appendix 4.4: The relation between ES registration and firms' performance (Ordinary Least Square)

		SALES			PROFIT			EBITDA		
Variables		Estimate	SE	z-value	Estimate	SE	z-value	Estimate	SE	z-value
Intercept		4.58***	0.06	74.42	0.84***	0.12	6.78	1.83***	0.09	18.72
ES		0.16***	0.05	3.19	0.27***	0.10	2.62	0.20***	0.08	2.43
SIZE	SMEDIUM	-0.01	0.03	-0.23	-0.13**	0.06	-2.06	-0.01	0.05	-0.31
	MEDIUM	0.01	0.04	0.23	-0.27	0.09	-3.20	-0.07	0.07	-1.09
	BIG	-0.02	0.03	-0.63	-0.34	0.07	-4.69	-0.11	0.06	-2.03
GROUP		0.38***	0.03	14.51	0.59***	0.05	10.94	0.49***	0.04	11.65
NETWORK		-0.06*	0.03	-1.78	0.14**	0.07	2.07	0.09	0.05	1.62
EXPORT		0.25***	0.03	8.76	0.47***	0.06	8.33	0.43***	0.04	9.63
RELOCATION		0.21***	0.06	3.34	0.13***	0.13	1.06	0.30***	0.10	2.99
CUSTOMER1		0.01	0.04	0.37	-0.10	0.07	-1.44	-0.09	0.06	-1.56
CUSTOMER2		0.08***	0.03	2.43	0.08***	0.03	2.43	-0.04	0.05	-0.85
AGROFOOD		0.22***	0.07	2.97	-0.18***	0.15	-1.22	-0.04	0.11	-0.39
CONSUMPTION		0.00	0.06	0.02	0.13	0.12	1.07	0.05	0.09	0.57
CARS_EQUIPMENTS		0.01	0.07	0.19	-0.33	0.15	-2.21	-0.29***	0.11	-2.43
ENERGY		0.31	0.26	1.19	-0.26	0.53	-0.48	1.14***	0.42	2.71
CONSTRUCTION		0.07	0.07	1.00	-0.02	0.14	-0.13	-0.35***	0.11	-3.24
COMMERCIAL		0.64***	0.05	11.94	0.46***	0.11	4.26	0.29***	0.08	3.39
TRANSPORT		-0.24***	0.06	-4.07	-0.59***	0.12	-5.00	-0.48***	0.09	-5.25
FINANCIAL_REAL-ESTATE		0.78	0.09	9.08	1.54	0.17	8.90	2.15	0.14	15.83
SERVICES1		-0.46***	0.05	-8.61	-0.27***	0.11	-2.51	-0.40***	0.08	-4.73
SERVICES2		-0.42***	0.07	-6.24	-0.40***	0.14	-2.98	0.01	0.11	0.11
Max Rescaled R2			0.30			0.12			0.20	
Number of observations			3779			3779			3779	
Number of registered firms			225			225			225	

(*), (**) and (***) indicate parameter significance at the 10, 5 and 1 percent level, respectively.

Appendix 5: PS-matching estimates with lagged Quality and Environmental-Related Registration

	Global	SD	Treated	SD	Non-treated	SD
			SALES			
QSES/2003 (N=5393)	0.13***	0.02	0.15***	0.02	0.11***	0.02
QS/2003 (N=7362)	0.10***	0.02	0.05**	0.02	0.13***	0.03
			PROFIT			
QSES/2003 (N=5393) (N of registrated firms=1869)	0.20***	0.04	0.20***	0.05	0.20***	0.05
QS/2003 (N=7362) (N of registrated firms=(3344)	0.06	0.05	0.00	0.06	0.10*	0.05
			EBITDA			
QSES/2003 (N=5393) (N of registrated firms=1869)	0.20***	0.04	0.21***	0.04	0.19***	0.04
QS/2003 (N=7362) (N of registrated firms=(3344)	0.03	0.04	-0.04	0.04	0.08*	0.04

The standard error (SE) of the treatment effect is computed using bootstrap with 100 simulations. (*), (**) and (***) indicate parameter significance at the 10, 5 and 1 percent level, respectively.

QSES (SALES) min=4779; max=5143; mean=5043.22; SD=73.99.

QS (SALES) min=6288; max=6737; mean=6538.54; SD=87.50.

QSES (PROFIT) min=4333; max=5138; mean=5010.65; SD=105.37.

QS (PROFIT) min=6276; max=6733; mean=6532.40; SD=101.10.

QSES (EBITDA) min=4767; max=5141; mean=5030.92; SD=81.40.

QS (EBITDA) min=6217; max=6796; mean=6527.01; SD=110.26.