How Do Investors Value Firms' Decisions on Obtaining an Eco-label? Evidence from the Fishing Industry

Manuel Luna, Myriam García-Olalla, and José L. Fernández Sánchez, *University of Cantabria*

ABSTRACT

In a context of a pressing need for more sustainable practices, the fishing industry still has doubts about whether the benefits resulting from adopting them outweigh the associated costs. With the aim of providing insights to answer that question, this study presents an analysis of the "it pays to be green" hypothesis by measuring the stock market reaction to the public announcements of compliance with voluntary environmental standards. To this end, an event study has been carried out to investigate whether the announcement that a seafood company has been certificated by the Marine Stewardship Council Chain of Custody Standard influences its shareholders' decisions and, therefore, the company's market value. Results show positive average abnormal returns following that event; these returns are greater in the case of those companies with larger size or lower profitability.

Key words: Eco-label, eco-labeling, event studies, fisheries, food industry, MSC.
JEL codes: G14, Q22, Q57.

INTRODUCTION

The unprecedented growth that the demand for fish products has experienced in the past decades has resulted in benefits to both the companies and the society at large. However, this has also led to unsustainable development patterns such as, for example, overfishing and destructive fishing practices that cause a more rapid depletion of marine resources. In recent years, governmental and nongovernmental organizations have implemented different policies and tools to encourage companies to implement environmental management practices (Nikolaou, Chymis, and Evangelinos 2013), such as (1) market-based instruments (e.g., environmental taxes, subsidies, and tradable permits), (2) command and control instruments, and (3) some voluntary tools (e.g., environmental management systems). Furthermore, the growing consumer concern about the origin of products and their environmental impact has played a critical role in influencing the producers' decision to adopt sustainable practices (Jackson 2005; Tukker et al. 2010). All this has increased the focus on the sustainability of the seafood industry but, at the same time, it has made clear the need for procedures to eliminate the confusing and asymmetric information about the environmental impact of products (King, Lenox, and Terlaak 2005).

Manuel Luna is a PhD researcher, Department of Business Administration, University of Cantabria, Av. Los Castros s/n, 39005 Santander, Spain (email: manuel.luna@unican.es). **Myriam García-Olalla** is a full professor of finance, Department of Business Administration, University of Cantabria, Av. Los Castros s/n, 39005 Santander, Spain (email: myriam.garcia@unican.es). **Jose Luis Fernández Sánchez** is a professor of business administration, Department of Business Administration, University of Cantabria, Av. Los Castros s/n, 39005 Santander, Spain (email: jluis.fernandez@unican.es).

We would like to thank the European Commission from financial support through the Jean Monnet Module in *EU Finance and Institutions: New Social and Environmental Challenges* (620132-EPP-1- 2020-1-ES-EPPJMO-MODULE).

Received August 27, 2020; Accepted March 10, 2021; Published online May 26, 2021. http://dx.doi.org/10.1086/714519

Marine Resource Economics, volume 36, number 3.
0738-1360/2021/3603-0001$10.00

In this context, a series of voluntary programs for eco-labels on seafood products have emerged to contribute to the health of the world's oceans by recognizing and rewarding sustainable fishing practices (Gudmundsson and Wessells 2000). The Marine Stewardship Council (MSC) is the leading organization promoting the use of these voluntary tools, in terms of brand recognition and number of products certified (Roheim, Asche, and Santos 2011; Stemle, Uchida, and Roheim 2016). Since 1997 this nongovernmental organization has provided two certification programs in which a team of independent experts (third-party audit) determine whether a fishery or a supply chain company can be certified according to the MSC's Fisheries or Chain of Custody Standards, respectively (Cummins 2004). In particular, certification to the MSC Chain of Custody Standard not only guarantees consumers that any product bearing the MSC eco-label (i.e., the blue fish label) can be traced back to a fishery that meets the MSC Fisheries Standard, but also ensures that those products are identifiable along the seafood supply chain, adequately managed and clearly separated from noncertified products.

The work of the MSC reflects the increasing importance of nongovernmental organizations as stakeholders in fisheries management in the entire production cycle, engaging with fishers, processors, wholesalers, retailers, and consumers (Potts and Haward 2007). However, the requirements of these organizations as part of their certification processes also imply more complex and costly production processes, which sometimes hampers the wide-scale adoption of these initiatives (Roheim 2008; Pérez-Ramírez et al. 2015; Pérez-Ramírez et al. 2012). Furthermore, there are social, regulatory, and governance issues that directly affect the effectiveness of these schemes (Symes 2000). For those reasons, the question as to whether voluntary activities of a firm to protect the natural environment or to comply with environmental standards (also known as the "it pays to be green" hypothesis) are economically beneficial to it has been of vital interest for corporate management in recent times (Oberndorfer et al. 2013).

Regarding the economic effects of eco-labels and certifications of seafood products, many studies have already proven their capacity to generate some economic opportunities that may extend these practices, adding value to seafood products and creating a market advantage over noncertified products by increasing the customers' willingness to pay (Bronnmann and Asche 2017; Zander and Feucht 2018). Particularly, the MSC standards have repeatedly proven to be a source of environmental, social, and economic effects, as reviewed by Arton et al. (2018). In this respect, several researchers have quantified the power of the MSC certifications to give rise to price premiums in the retail market (Roheim, Asche, and Santos 2011; Wakamatsu 2014; Asche and Bronnmann 2017). Moreover, although there was not much research on whether the premium is transmitted throughout the fishing industry, new studies have shown evidence that it is actually passed back, such as in the Swedish Baltic Sea cod fishery (Blomquist, Bartolino, and Waldo 2020) or in the Spanish octopus market (Fernández Sánchez, Fernández Polanco, and Llorente García 2020).

On the other hand, the judgment of the financial markets about the current and future costs and benefits of the decision to adopt a specific environmental standard is also crucial for listed companies. In this respect, several researchers have found different factors by which corporate environmental policies and actions can influence positively on firms' financial performance. First, it indicates that the company has a long-term vision, anticipates market expectations, and creates sustainable value for the society, all of which could be positively valuated by the financial markets (Prieto-Sandoval et al. 2016). Furthermore, different studies have found that eco-labeling points to some community empowerment and reputational aspects (Melnyk, Sroufe,

and Calantone 2003; Peng and Lin 2008; Carlson and Palmer 2016). This could lead to an increased market share and to better firm performance even in difficult situations, such as an economic crisis (Jacobs, Singhal, and Subramanian 2010). However, while in the last years some studies have analyzed the financial market's reaction to the implementation of different environmental certifications (Jacobs, Singhal, and Subramanian 2010; Paulraj and de Jong 2011; Sebastianelli, Tamimi, and Iacocca 2015), it has not been analyzed in the seafood industry despite its economic importance to the world.

Therefore, the main aim of this study is to test the "it pays to be green" hypothesis in the industry of seafood products by measuring the stock market reaction associated with public announcements of compliance with a voluntary environmental standard. To this end, an event study has been carried out to investigate whether the announcement that a listed company is certificated by the MSC Chain of Custody Standard influences its shareholders' decisions and, therefore, the company's market value. The event study methodology—popularized by Fama et al. (1969)—was designed to determine how information about an event is reflected into any extraordinary/abnormal return for the company's shareholders (MacKinlay 1997). In this regard, although according to the efficient market hypothesis security prices immediately reflect all available relevant information (Fama 1970), the financial markets, which are not fully efficient, have lags in the processing of relevant information—that is, the expected costs and benefits—causing abnormal returns that are here analyzed. Thus, stock prices will reflect all available information regarding the compliance with environmental standards (Pham, Ramiah, and Moosa 2019). These methods have been extensively used in corporate finance with very useful results; however, there is a research gap regarding how eco-certifications affect a company's market valuation. In this way, some event studies, such as those of Flammer (2013) or Clacher and Hagendorff (2012), found that shareholders react positively to the announcement of eco-friendly or corporate social responsibility (CSR) initiatives in different industries, but only a few studies used that methodology to investigate the effect of following a specific standard, such as the ISO 14001 (Feng, Lai, and Zhu 2020; Noh 2019).

The event study methodology has the advantage of avoiding the need to analyze accounting-based measures of profit related to this event, which may be subject to manipulation by insiders, by focusing the analysis on stock prices (McWilliams and Siegel 1997). To do so, it requires the utilization of a benchmark index of the fishing industry, which is currently missing, so we have created one by grouping the stock prices of nearly 300 publicly traded companies and adjusting them based on their market capitalization. In addition, it has also made it possible to analyze the influence of different indicators of the companies' situation that may enhance or moderate the effect of the decision under study, such as the previous year's profitability, the company size, or the sales.

The present manuscript is structured as follows. After this introduction, the next section introduces the methodologies and techniques employed for this analysis. The third section presents the main findings and analyses of their robustness. The final section contains the discussion and main conclusions of the work carried out and the results achieved.

MATERIALS AND METHODS

With the aim of addressing the main objectives of the present research question, already explained in the introduction, we have tested the following two hypotheses:

H1: The stock market reacts positively to the obtainment of the MSC eco-label in the industry of seafood products.

H2: This market reaction is influenced by the economic and financial activity of the companies.

For this purpose, we first applied an event study methodology over an appropriate sample of firms from the fishing industry, and then we carried out a cross-sectional analysis.

DATA

The sampling frame of the present study is the Datastream database of Eikon (Thomson Reuters), which has been used to collect the financial information of the industries of interest. The specific search performed was focused on companies in seven industries of the Thomson Reuters Business Classification (TRBC), with the extensive requirement that ensures the presence of the terms "fish," "seafood," or "marine" in the company description.

As can be seen in table 1, this search resulted in a list of 435 companies in the fishing industry. These companies are all involved in the supply chain of seafood products at various levels of operation, although they are unequally distributed by their main activities.

After that, we accessed the public list posted by the Marine Stewardship Council, which contains the companies certified by the MSC Chain of Custody Standard and their certification date. Within this sample, we have found 102 companies that have been certificated by that standard. Among these companies, we have selected those that were publicly traded in the financial markets, published their daily prices around the certification date, and presented all the required information.

These requirements are met by a total of 58 companies that adopted the certification between 2006 and 2019; these companies constitute the sample of our study. Table 2 shows the distribution of the companies by geographical regions, with more than half of the companies, both in the database and in the final sample, drawn from Asia.

In addition to the daily prices and the industry, the sample has been enriched with information at the company level, such as the market cap (USD) and the yearly evolution of some economic variables such as the return on assets, the return on equity, and the company sales (from Orbis, Bureau Van Dijk, database). Table 3 shows the distribution of those variables.

EVENT STUDY METHODOLOGY

To analyze the investors' response to the decision of adopting the MSC Chain of Custody Standard, this paper applies the event study methodology.

Table 1. Number of Companies by Main Activity

TRBC Sector	Database	MSC Certified	Sample
Aquaculture[a]	84	0	0
Commercial fishing	41	8	3
Fishing and farming (NEC)	56	7	3
Fishing and farming wholesale	23	8	7
Food processing (NEC)	100	15	8
Seafood product preparation and packaging	117	62	37
Seafood product preparation	14	2	0

Note: [a] Aquaculture companies cannot be certified by MSC.

Table 2. Number of Companies by Continent

Continent	Total Companies	MSC Certified	Sample
Asia	226	64	41
Europe	125	25	10
America	55	8	4
Africa	14	2	1
Oceania	15	3	2

The event study methodology has been used mainly in the field of corporate finance, but it has been extended to other disciplines, such as management. It examines the stock market reaction to the reception of new information, since it might change the expected value of the affected firms and thereby cause abnormal returns (MacKinlay 1997). In this way, this methodology avoids the need to analyze accounting-based measures of profit, which may be subject to manipulation by insiders, by focusing the analysis on stock prices (McWilliams and Siegel 1997).

This technique is based on the efficient market hypothesis, which assumes that the market's reaction is caused by a change in investors' expectations (e.g., when new measures are announced and not only when those measures are implemented). The underlying idea is that changes in the market value of companies around an event date can be interpreted as the net present value of expected future costs and benefits associated with that event. In practice, markets are not fully efficient, so they have lags in the processing of relevant information (i.e., the expected costs and benefits), causing abnormal returns that are analyzed here.

To analyze the change in stock prices, the event study methodology estimates abnormal returns as the deviation of the actual return from the predicted or expected return according to the market model proposed by Sharpe (1963). Implicitly, the expected return is the one that would have occurred in the absence of the news. In this regard, if a positive reaction of share prices is found to be associated with the certification by the MSC standard, it will mean that investors consider the certification to be valuable. Otherwise, if investors consider that the future benefits do not outweigh the costs, the company's market valuation will drop (i.e., the abnormal returns will be negative).

First, this model takes into account the specific security's past performance and its sensitivity to general market movements reflected by a stock market index,[1] represented by a global, regional, or local equity index, which is used as a benchmark. In this way, with the aim of determining the impact of the analyzed events, we have estimated the market model for each firm's returns compared with the market portfolio return represented by a benchmark index of the fisheries sector that we have developed.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \qquad t = -240, \ldots, -21, \tag{1}$$

$$\mathrm{E}(R_{it}) = \alpha_i + \beta_i \mathrm{E}(R_{mt}), \tag{2}$$

1. Different approaches have been developed to explain how stocks move together. For example, multifactor models (Fama and French 1993) attempt to capture some of the nonmarket influences that account for common movement in stock prices beyond that accounted for by the market index itself. However, the market model is the most frequently used method employed in the literature for computing abnormal returns. MacKinlay (1997), Clacher and Hagendorff (2012), or Feng, Chen, and Tseng (2018) are some examples.

Table 3. Descriptive Statistics for the Sample

	Market Cap. (million US$)	Sales (thousand US$)	ROA (%)	ROE (%)
Min.	0.15	3.39	–26.50	–54.50
1st qu.	21.68	37.15	2.17	2.67
Median	94.91	193.29	5.70	6.59
Mean	875.80	712.01	5.90	8.65
3rd qu.	521.60	971.17	8.61	15.60
Max.	12,910.00	4,185.28	34.00	96.50

where R_{it} is the return of the firm i on day t. R_{mt} is the return on a representative market portfolio, α and β are the model parameters, and ε_{it} is the error term, with $\mathrm{E}(\varepsilon_{it}) = 0$. $\mathrm{E}(R_{it})$ is the return that the market model estimates for a certain firm on a certain date.

Then, we calculate the abnormal returns (AR) as established above, which are assumed to reflect the stock market's reaction to the arrival of new information. Positive values of AR imply that the stock prices "abnormally" increase following the event, and negative values indicate that the stock prices decrease. Next, we compute the average abnormal return (AAR) across all firms from our sample:

$$AR_{it} = R_{it}^{\star} - \mathrm{E}(R_{it}), \tag{3}$$

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} \mathrm{AR}_{it}, \tag{4}$$

where $R_{it}^{\star}$ is the real return of the firm i on day t, and N is the number of firms.

With the aim of assessing the price reaction over a longer period of time, we sum all the AR over an event window (t_1, t_2) around the event date in order to get the cumulative abnormal return (CAR). Lastly, the average abnormal return across the event window is aggregated (CAAR).

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it}, \tag{5}$$

$$CAAR(t_1, t_2) = \frac{1}{N}\sum_{i=1}^{N} CAR_i. \tag{6}$$

In the present work, the model is estimated from the daily returns, calculated according to the closing prices of each security listed on the Thomson Eikon Datastream. For each security, we have estimated the expected returns over a period of 240 days to 21 days before the reception of the new information—event date ($t = 0$)—to diminish the influence of confounding events. Therefore, the "estimation period" is (–240, –21).

Then, we estimate the cumulative abnormal returns (CAR) over different event windows around the event date ($t = 0$). The "event window" is defined as the entire length of time over which one may look for a stock price reaction to the news. In the present work, we examine the return during an event window of 20 days before to 20 days after the event date (–20, +20) to

determine whether these returns were abnormally positive or negative. Within this event window, we analyze more windows of different lengths (McWilliams and Siegel 1997; Clacher and Hagendorff 2012; García-Olalla and Luna 2020). They must be short enough to avoid the problems of overlapping events and long enough to capture the effect of the analyzed event. The shorter one is 1 day after the event (0, + 1), while the longest one covers 20 days (0, +20) to include the case in which the investors' reaction does not take place immediately but is prolonged for several days. It is also necessary to consider the possibility of the market reacting before the event to possible information or rumors, and not only when the certification comes into force. In this respect, we have considered a period before the event to compute all of the market reaction. We focused on four more windows around the event date: (–1, +1), (–3, +3), (–7, +7), and (–20, +20). We subsequently calculated the cumulative average abnormal returns (CAAR) as the mean of our estimates for each of the windows.

To verify the statistical significance of the CAAR, we have first applied two parametric tests based on normalized abnormal returns: the cross-sectional *t*-test (Brown and Warner 1980, 1985) and Patell's Z-test (Patell 1976). On the other hand, some nonparametric tests can be used as a complement to the previous ones, since they are based on medians and do not require distributional assumptions. In this case, we have applied the Corrado rank test and the sign test, both calculated as described in Corrado and Zivney (1992). However, it should be noted that the application of nonparametric tests to a multiple-day analysis of CAAR has given rise to some problems that caused researchers to normally rely more on parametric tests (Kolari and Pynnonen 2011).

Lastly, since the developed methodology requires the use of a benchmark global/regional equity index that represents a market portfolio to estimate each firm's abnormal returns, a benchmark index of the fisheries sector has been created. This index groups the stock prices of all the above-mentioned publicly traded companies and adjusts them based on their market capitalization. Therefore, this index is formed by 295 companies that act as a representation of this sector globally throughout the last 15 years (figure 1).

Figure 1. Fisheries Industry Index

CROSS-SECTIONAL ANALYSIS

To test the second hypothesis concerning the effect of some variables that may enhance or moderate the investors' reaction, a cross-sectional analysis has been developed. From our point of view, this analysis constitutes the most appropriated method since it not only looks for the variables that may be relevant for explaining the abnormal returns, but also quantifies their average impact.

In this way, hidden areas of strength and weakness in the sector can be exposed throughout this analysis. Therefore, it could both help companies to understand the potential effect of some decisions and support investors to understand the main aspects that impact the studied variable in order to make good investment decisions.

Regarding the explanatory variables, it is usually recommended to base the assumptions taken to analyze the effect of different variables on previous theory or practical experience. For that reason, we based this process on previous knowledge about event studies in different sectors (Black and Khanna 2007; Larcker, Ormazabal, and Taylor 2011; Nguyen, Hagendorff, and Eshraghi 2015; Feng, Chen, and Tseng 2018) and on the effects of eco-labels in the commercial results of fishing companies. This led us to select four variables at the company level, which represent their economic and financial situation, and two variables referring to the main activity and the country of domicile of each company as potential determinants of the CAR (table 4).

Lastly, the ordinary least squares technique in R has been used to test the hypothesis on the effect of any of those independent variables included in the dataset on the dependent ones. These were the windows where there was a significant and robust effect both before and after the event in order to determine the variables influencing the reaction. Therefore, the initially proposed model was the following:

$$CAR_i = \alpha + \beta_1 \cdot MARKETCAP_i + \beta_2 \cdot ROA_i + \beta_3 \cdot ROE_i + \beta_4 \cdot SALES_i + \beta_5 \cdot ACTIVITY_i + \beta_6 \cdot COUNTRY_i + \varepsilon_i.$$

RESULTS

This section presents the results obtained in the analysis of the event of gaining an MSC Chain of Custody certification in the fishing industry. To this end, it presents the main findings of the event study carried out, the analysis developed to verify these findings, and the process followed to look for variables at sectoral or company level that may moderate or enhance them.

EVENT ANALYSIS

The analysis of the market reaction to the MSC Chain of Custody certification begins with the study of the cumulative average abnormal return (CAAR) in different windows around the event dates.

Table 4. Definition of Variables

Variable	Definition
CAR	Cumulative abnormal return over the (−20, +20) window around the event
MARKETCAP	Total market value of the company's shares of stock
ROA	Return on assets = pretax profits / total assets
ROE	Return on equity = net profits / total equity
SALES	Total sales
Country	Country of domicile
Activity	Main activity inside the fishing industry

As explained in the introduction, this reaction could be understood as the result of the evaluation made by the market to the expected benefits and cost of obtaining this certification. A positive reaction reflects, on average, investor confidence that the decision to adopt those environmental practices improves the reputation of the company, adds value to the fishing products, or results in any other advantage for the company over their competitors. Otherwise, the investor expects that these benefits would not offset the costs of this decision.

Regarding the analysis of the statistical significance of that reaction, the tables below present the results according to Patell's Z-test. Furthermore, given that a nonstationarity condition generally biases against finding a result associated with an event (Konchitchki and O'Leary 2011), we have confirmed the stationarity of the data sample using the Dickey-Fuller and Phillips-Perron tests (Perron 1988; Said and Dickey 1984).

In this regard, the analysis carried out has proven that the market reacts significantly to each of the selected windows. This is an indication of how important this event is for fishing companies. Furthermore, the average abnormal market reaction is positive for all the windows considered in the study, which means that the shareholders usually made a positive assessment of a firm obtaining this certification of environmental sustainability. This reaction does not imply that every company in the sample has experienced a positive reaction from their shareholders, but it is possible to state that, on average, there was a significantly positive effect, as can be seen in figure 2.

With respect to the full sample, the analysis shows that shareholders have obtained increasing positive returns in the windows between 0 and 20 days after the announcement of the certification (table 5, panel A). In this way, it is possible to observe that the certification effect started off as a significant and positive abnormal return around 1.08% in the first week after the event and grew to its maximum market reaction 20 days after the event, with a return of 2.64%. In addition, if we eliminate some members of the sample (namely outliers) that present abnormal returns that do not follow the common patterns,[2] we also observe positive abnormal returns, although to a lesser extent. In this way, the results obtained in this new analysis not only confirm the previously observed effects, but also enhance the robustness of the present study.

On the other hand, as sometimes investors had advance information about the decisions taken by the company, we have also analyzed the market reaction when a period prior to the event in the study is included (table 5, panel B). Once again, significant abnormal returns are observed, especially in the long window of 20 days before and after the certification date, in which a return of 3.48% has been registered. These results are again confirmed for the sample without outliers, with a return about 1.83%.

Regarding the possibility of obtaining different results for each company's activity or TRBC code inside the fishing industry, we have repeated the event analysis for a reduced sample of even more similar companies. This sample was constituted by the food processing (NEC) and the seafood product preparation and packaging companies, thus making a sample of 45 companies (41 if we eliminate the outliers). In this way, we retest the results for the companies that constitute the main group of the sample, confirming again that, as shown in Table 6, panel A, the market reacts with positive and significant returns, which account for 1.29% in the largest window after the event.

2. Seven companies of the sample were eliminated because they presented abnormal returns that were out the interval $[\mathrm{E}(AR_{it}) \pm \sigma(AR_{it})]$.

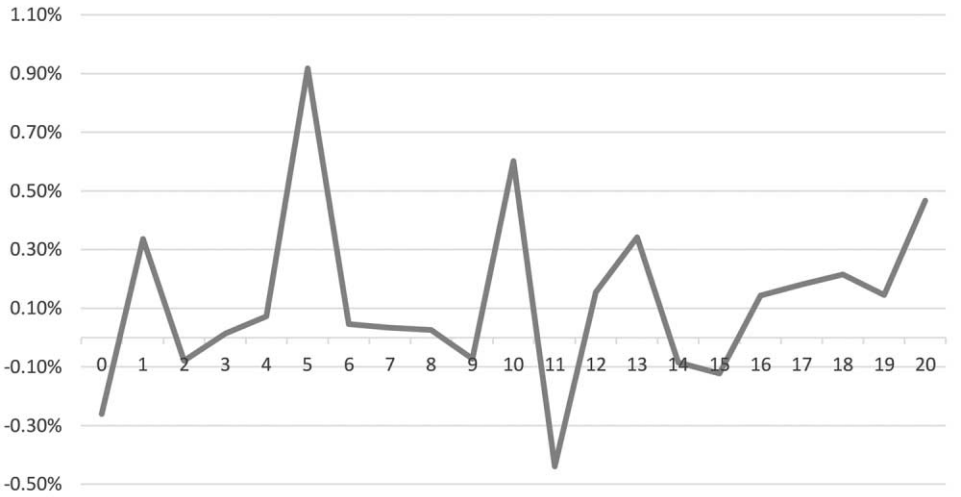

Figure 2. Daily Average Abnormal Returns from the Certification Date

Table 5. Stock Market Reaction

Event Window	Full Sample ($N = 58$) CAAR (%)	Without Outliers ($N = 51$) CAAR (%)
	A. After the Event	
(0 . . . 1)	0.08**	0.27*
	(0.035)	(0.060)
(0 . . . 3)	0.01***	0.48***
	(0.000)	(0.000)
(0 . . . 7)	1.08***	0.85***
	(0.000)	(0.000)
(0 . . . 10)	1.64**	1.24*
	(0.012)	(0.061)
(0 . . . 15)	1.49**	1.25*
	(0.017)	(0.099)
(0 . . . 20)	2.64**	1.99
	(0.042)	(0.145)
	B. Around the Event	
(–1 . . . 1)	0.58	0.84
	(0.887)	(0.829)
(–3 . . . 3)	1.17*	1.66*
	(0.090)	(0.097)
(–7 . . . 7)	2.99**	2.62*
	(0.011)	(0.053)
(–20 . . . 20)	3.48***	1.83***
	(0.000)	(0.000)

Note: *P*-values are provided in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6. Stock Market Reaction (Reduced Sample)

Event Window	Reduced Sample ($N = 45$) CAAR (%)	Without Outliers ($N = 41$) CAAR (%)
A. After the Event		
(0 . . . 1)	0.00***	0.20***
	(0.005)	(0.009)
(0 . . . 3)	–0.53	0.18***
	(0.100)	(0.000)
(0 . . . 7)	0.09***	0.20***
	(0.000)	(0.000)
(0 . . . 10)	0.70***	0.82***
	(0.002)	(0.002)
(0 . . . 15)	0.48***	1.21**
	(0.002)	(0.029)
(0 . . . 20)	1.29***	1.83**
	(0.004)	(0.031)
B. Around the Event		
(–1 . . . 1)	0.50	0.93
	(0.650)	(0.892)
(–3 . . . 3)	0.81**	1.77**
	(0.024)	(0.083)
(–7 . . . 7)	2.31***	2.67***
	(0.005)	(0.004)
(–20 . . . 20)	0.60***	1.47***
	(0.000)	(0.000)

Note: *P*-values are provided in parentheses. *** and ** indicate statistical significance at the 1% and 5% levels, respectively.

Moreover, when we considered that the investors had advance information about the decisions taken by the company, a reaction of about 2.31% in the seven-day window around the event, or 2.67% if the outliers are eliminated, was observed for the reduced sample (Table 6, panel B).

Based on those results, as will be discussed in the final section, it can be confirmed that the announcement of MSC Chain of Custody certification of a supply chain company is more likely to be positively received by investors, since the market reaction is significantly positive. This could point toward the existence of other benefits (whether commercial, reputational, or any other), which had not been quantified, on the decision to follow this standard.

ROBUSTNESS CHECK

With respect to the robustness of the main findings, the overall results have been tested in order to prove that they are not the result of weaknesses in data or methodology and they are indeed driven by the event analyzed.

In this regard, unexpected or exceptional results in specific companies/dates could be attributed to other events or sampling errors. For that reason, the present study requires an analysis of the presence of confounding events, certain biases, or outliers that could lead to misinterpretations.

Regarding confounding events, it is necessary to check the existence of other announcements related to a specific date or with one or more companies of the sample, such as dividends payments,

mergers and acquisitions, or the release of new information about the company. To avoid this possibility and to isolate the event of interest from other events that may substantially affect stock prices, previous studies have already recommended excluding some dates or companies from the sample (Foster 1980; Pham, Ramiah, and Moosa 2019). In this case, we have looked for other announcements at the company level, thus confirming that none have been affected by dividends announcements or payoffs around the analyzed dates. Furthermore, the events analyzed occur on a different date for each company, so the existence of other sectoral news and circumstances on the same date is far less likely. All this almost excludes any possible abnormal returns originated by other events concerning the dates or the industry.

In addition, while most of the companies present small daily variations, it is possible to find some observations that exhibit an extremely different behavior. Those atypical observations that are outside of the distribution and therefore without context value are called outliers, and the average is very sensitive to them. In this way, the presence of outliers has been highlighted in different studies as a disruptive influence on the accuracy and the understanding of most models (Yohai 1987). Therefore, this points to a need for a proper treatment of the outliers with the aim of obtaining a better perspective regarding the results. However, in event studies, simply excluding outliers from the analysis could sometimes be negative because many of the outliers comprise the event-related sample and carry important information for the research (Sorokina, Booth, and Thornton 2013). For those reasons, as shown in the previous subsection, the analysis of all the windows has been developed both for the total sample and for the sample without outliers. Tables 5 and 6 show that this analysis has not only confirmed the findings of the study but has contributed to observe a market reaction in additional windows.

On the other hand, although the literature on this subject is not fully conclusive, selection biases could lead to erroneous results. In this regard, the study of Ahern (2009) showed that, in contrast with the results of Brown and Warner (1985), the underlying characteristics of firms selected for an event study may lead to biased predictions. Thus, the one-to-one matching method (Noh 2019; Feng, Lai, and Zhu 2020) has been applied to assess self-selection bias risk by pairing each sample firm (MSC-certified firm) with a very similar control firm (non-MSC-certified) in terms of size, origin, and stock price performance. The new sample abnormal returns during the event period were not significant, which makes the presence of self-selection biases highly unlikely. In the same way, we conducted two placebo tests, both 20 days before and after the estimation window—(–40, –20) and (+20, +40), respectively—reaching nonsignificant coefficients that, furthermore, have opposing +/– signs. Lastly, the results of the initial analysis were confirmed again by replacing the previous benchmark index with an international portfolio, the MSCI World Index. In this way, all the results obtained were consistent with our previous analysis and our conclusions. Therefore, the checks carried out tested the reliability of the results and confirmed that our main findings are robust.

CROSS-SECTIONAL ANALYSIS

Once it was determined that investors had a positive reaction to the MSC certification, we investigated the existence of different indicators of the situation of the company that may enhance or moderate that reaction.

With this aim, we have carried out a cross-sectional analysis, taking the market reaction in the window (–20, +20) as an independent variable, which not only was significant according to the parametric tests but also presented the highest results. Prior to introducing them as regressors

in the model, we standardized the economic/financial variables (i.e., we centered them [subtracting their mean] and divided them by their standard deviations). Furthermore, we have confirmed the consistency of the results using the method developed by Zeileis (2004).

First of all, the size of the company, measured by the market capitalization, has been included as a control variable that is expected to have a positive effect on the investor reaction. The size of the enterprises is a common variable in many studies because of its importance for all aspects regarding company activity. Furthermore, in the present case, the increase in costs and complexity that organic production usually implies could have a larger impact on small companies' profitability in the short term (Miret-Pastor et al. 2014). The results confirm the expectations, showing a more positive average abnormal return and, therefore, a more positive investor expectation regarding the certification effect the larger a company is. Therefore, "large" companies are expected to obtain more profit from these types of certifications than are other companies.

In addition, the economic/financial situation of a company can also have a direct effect on investors' assessment of some decisions. As performance measures, we take into account both financial profitability (ROE) and economic profitability (ROA), assuming a more positive reaction to the eco-label for the less profitable firms. In the same way, we assume that companies with a lower level of business, measured by the amount of sales, value the expected benefits of certification more. As shown in table 7, all three variables have a negative relation with the abnormal returns presented after obtaining an MSC certification. This finding confirms that the investor assesses obtaining an eco-label in companies with less profitability or sales to be better, since it could be a source of profits.

Regarding the variables that refer to the main activity and the country of domicile of each company, there was no evidence of a statistically significant effect.

For this reason, they were not included in the final estimated model, which is as follows:

$$CAR_i = 0.163 + 0.410 \cdot MARKETCAP_i - 0.240 \cdot ROA_i - 0.226 \cdot ROE_i - 0.223 \cdot SALES_i + \varepsilon_i.$$

DISCUSSION AND CONCLUSIONS

Although a number of years have gone by since economic growth was at its best, society is still suffering from the consequences of unsustainable development patterns in many industries. In

Table 7. Determinants of CARs at the Eco-label Certification

Standardized Regressors	(1)	(2)	(3)	(4)
ROE	–0.326***	–0.356***	–0.205**	–0.226**
	(0.0004)	(0.0000)	(0.0473)	(0.0202)
Market cap.		0.258***	0.290***	0.410***
		(0.0017)	(0.0004)	(0.00001)
ROA			–0.228**	–0.240**
			(0.0309)	(0.0156)
Sales				–0.223***
				(0.0086)
Constant	0.163**	0.163**	0.163**	0.163**
	(0.0484)	(0.0372)	(0.0300)	(0.0204)
R^2	0.2457	0.3973	0.4599	0.5425

Note: *P*-values are provided in parentheses. *** and ** indicate statistical significance at the 1% and 5% levels, respectively.

particular, in the fishing industry, the importance of some aspects, such as sea pollution or the depletion of marine natural resources, makes the negative environmental effects even more problematic and urgent. However, the fact that in this industry producers already face many challenges to ensure their companies' profitability is hampering the wide-scale adoption of more sustainable practices.

To overcome this problem, an increasing number of organizations, both public and private, are actively working toward sustainable change with new production models, policies, and even legislation (FAO 2018). Nevertheless, to succeed in this challenge and make the added costs and risks worthwhile, stakeholders, and especially consumers, have to be the real drivers of that shift (Jackson 2005; Tukker et al. 2010). With this idea in mind, environmental certifications and ecolabels were created to provide market-based incentives for sustainable practices (UN 2015) and help producers to communicate the adoption of those practices to consumers through reliable and credible labels (Asche et al. 2015). According to different studies (Roheim, Asche, and Santos 2011; Wakamatsu 2014; Bronnmann and Asche 2017; Asche and Bronnmann 2017), those certifications are actually resulting in some commercial benefits, such as a boost to the sales or margins of a company; however, they could not be sufficient to outweigh their added costs.

In this regard, the present work constitutes an important contribution to the study of the "it pays to be green" hypothesis, measuring the stock market reaction associated with public announcements of compliance with a voluntary environmental standard, the MSC Chain of Custody Standard. This standard guarantees both that any product bearing the MSC eco-label (i.e., the blue fish label) can be traced back to a fishery that meets the MSC Fisheries Standard and that those products are identifiable along the seafood supply chain, adequately managed and clearly separated from noncertified products. With this aim, a sample of 58 fishing companies, publicly traded and certified by the MSC Chain of Custody Standard, has been analyzed in pursuit of abnormal returns related to the certification announcement.

Regarding this objective, although a further period of time could elapse from the certification date to the collection of other benefits, such as the price premiums, the investors' reaction is usually observed in a few days or even in a few hours in highly liquid and almost perfect markets (Marshall, Nguyen, and Visaltanachoti 2019). For that reason, we have analyzed windows between 1 and 20 days both before and after the date when this certification is obtained and announced. In this respect, the event study carried out has shown the existence of positive abnormal returns in the days around the event date. Furthermore, these findings have been strengthened by a robustness analysis, which has discarded the possibility that this conclusion responds to only some unexpected and exceptional results in specific companies (outliers) that can be attributed to confounding events or sampling errors. Therefore, we can state with certainty that investors respond positively to sustainable schemes in fisheries, producing a gain for the companies in the financial markets, which confirms our first hypothesis.

In addition, we have also analyzed through a cross-sectional analysis how a company's situation may influence the market reaction to obtaining the certification. Results show that the positive market reaction is intensified for those with a greater presence in the market (i.e., with a greater market capitalization). However, a negative relationship between the market reaction and the performance of the company was observed. In this way, we can conclude that the shareholders of fishing companies consider the advantages of certification to be especially positive for the companies in a more complex situation, with lower profitability ratios and lower sales value. Regarding other variables, such as the country of domicile and the main activity of the company, they have not shown any significant results, probably because of the unbalanced sample.

All of this allowed us to reach a number of theoretical and practical conclusions. First, these findings are in line with the previous literature using event study methodology, which has already proven the fact that important events usually show cumulative abnormal returns over different windows around the announcement date (McWilliams and Siegel 1997). Similarly, they also coincide with the main results of other event studies related to CSR or sustainable practices (Flammer 2013; Noh 2019; Feng, Lai, and Zhu 2020). In this way, this study fills a research gap and serves as the basis for future developments in understanding the effect of key decisions in the stock value of fishing companies. Furthermore, the existence of abnormal returns that persist after a particular type of event led us to the conclusion that the seafood market is less efficient than those in which they do not generally last as long (Busse and Green 2000).

On the other hand, the decision to adopt a standard of sustainable behavior has proven to be a strategic decision for seafood production companies, with effects in the performance of the companies at many levels. In this respect, the evidence found in this study suggests that, despite doubts about the existence of commercial benefits, obtaining an eco-label will be wealth-increasing for shareholders. This allows us to conclude that such a decision contributes to improving the economic/financial situation of companies, especially for those in a poor economic situation. In this way, this decision could reduce conflicts of interest between managers and shareholders by aligning their objectives.

Lastly, the results obtained not only lead to some important practical conclusions for the fishing industry, but also point toward some recommendations for the certifying organizations. These results provide tangible examples and statistics in support of the utility of these types of certifications. These facts could be included in the set of certifying organizations' reasons to support the wide-scale adoption of these certifications, since they prove that the investors react positively to the decision to allow a third party to evaluate and control the implementation of smart, safe, and sustainable production practices. Accordingly, producers should pay special attention to internal and external communication, which are traditionally ignored in sustainable agriculture management (Gunarathne and Lee 2020).

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