

Research and concepts

The impact of ISO registration on New Zealand firms' performance: a financial perspective

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Keywords

New Zealand, ISO 9000, Financial performance

Abstract

The question that this study addresses is whether the shareholders of New Zealand firms benefit from the process of gaining ISO registration. Three major questions with regard to ISO registration within the New Zealand business context are raised. First, how do New Zealand public firms' stock prices react to the announcement of ISO registration? Secondly, do ISO registered firms perform any differently to the New Zealand market on average? And finally, does the choice of certifying authority (organisation that awards ISO registration) have an influence on the subsequent performance of the ISO registered firms' performance? This study is conducted from a financial perspective. The New Zealand market is found to have no reaction to ISO registration announcements; supporting the existence of semi-strong market efficiency. ISO registered firms are found to perform below average when compared to the New Zealand capital market and the choice of certifying authority does hold influence on subsequent firm performance.

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Introduction

Since the early 1990s many firms worldwide have invested considerably in the effort to gain and maintain ISO registration. The question this study addresses is whether these firms' shareholders benefit from the process of gaining ISO registration, in particular, New Zealand shareholders. Elmuti (1996) offers rationale for ISO 9000 registration by stating that it demonstrates management's commitment to quality; therefore, new customers, increased sales and reducing operating costs will follow. He also critiques the costliness of ISO 9000, along with stating that larger customers often impose it upon their smaller firms.

Unlike previous studies, this study considers both the 9000-series and 14000-series of ISO registrations within the New Zealand context, from a financial perspective.

Three possible investor reactions may result from a firm becoming ISO compliant. First, logic and some studies suggest a positive reaction. The rationale behind the argument of a positive reaction is that the benefits of ISO registration look large, firms look to be positioned in the market for the long term, and management demonstrates progressive thinking and commitment to business. Second, investors may desire an external signal of quality, but only at an acceptable cost; therefore, the reaction may be negative, with the benefits being hard to link to the registration process, short-term losses existing and long-term losses existing. Furthermore, investors may think there is a sole focus on gaining and retaining registration, rather than a focus on quality itself. Finally, there may be no reaction, with investors accepting ISO registration as a necessary part of doing business in a competitive environment. In fact, ISO's associated costs and benefits may not even reach the materiality threshold for larger firms. Or maybe investors do not understand what ISO registration involves and take a wait-and-see attitude.

This article poses three major questions with regard to ISO registration within the New Zealand business context. First, how do New Zealand public firms' stock prices react to the announcement of ISO registration? Second, do ISO registered firms perform any differently to the overall market? And finally, does the choice of certifying authority have any influence on the subsequent performance of the ISO registered firms' performance?

Public New Zealand firms have been awarded ISO registration by several major certifying authorities being: Telarc Ltd (Telarc); KPMG Quality Certification (International) Ltd (KPMG); Bureau Veritas Quality International (BVQI); SGS International Certification Services Pty Ltd (SGS-ICS); LRQA Ltd (LRQA); International Certifications Ltd (ICL); and Quality Assurance Services Ltd (QAS).

In turn, three hypotheses arise:

H1: Investors of New Zealand stocks express a reaction towards the announcement of a firm becoming ISO registered (through the respective stock price).

H2: New Zealand stocks that are ISO registered perform differently to those New Zealand stocks that are not ISO registered.

H3: The subsequent performance of registered firms' stock is dependent upon the choice of which certifying authority is used.

ISO 9000 registration

In 1946 the International Standards Organisation (ISO), founded ISO 9000 in Geneva, Switzerland. ISO comprises national standards institutes from 97 countries, including *Standards New Zealand*. ISO 9000 is a common set of standards for manufacturing, trade and communications industries. It provides a documented process control program intended to enhance quality, and offers a resource to those who need it (i.e. CEO). At its least the ISO 9000 registration process highlights deficiencies in quality control, resulting in improvement. ISO 9000 is made up of five subdivisions, which are:

- (1) 9000: Description of the standard series.
- (2) 9001: "Complete" companies that research, design, build, ship, install and service products.
- (3) 9002: Companies that produce and install products.
- (4) 9003: Warehousing and distribution companies.
- (5) 9004: Serves mainly as a guideline document.

All standards include a set of models and guidelines for quality assurance and quality management (Zuckerman, 1994, p. 13).

The registration process assesses the quality system, not the product lines, sites or divisions. Also, ISO 9000 does not assess how the business is run, or how the quality process is implemented. ISO registration can take several months to two years, depending on the organisation's goals and size.

Recently, ISO has introduced a new 14000-series. ISO 14001 is an addition to the 9000-series. Its nature is very similar to the 9000-series, although environmental issues are found to be predominant.

Literature review

Quality is a word that has evolved in meaning over the last century. Quality is a movement, which has been refined to total quality management (TQM), "a philosophy that makes quality values the driving force behind leadership, design, planning, and improvement initiatives. The belief is that for long term financial success, quality is essential" (Chase *et al.*, 1998, p. 20). Specifically, TQM embodies three major principles (Bounds *et al.*, 1994):

- (1) *Customer value.* Identifying what customers want from products or services, and businesses striving to produce outputs that meet the identified wants.
- (2) *Continuous improvement.* Not restricting quality improvement to a set goal, but striving (even incrementally) for continuous improvement.
- (3) *Systems management.* Reducing variation in the system allows for continuous improvement to be possible, resulting in increased customer value.

Many investigations have been made into the ISO 9000 quality standards and in a number of areas (all based in the US context). More specifically, research has been concentrated in these areas:

- *Benefits and costs of the implementation of ISO.* Debate exists over the use of implementing ISO due to the costs involved with implementation. Studies show differences between anticipated and actual benefits of implementing ISO 9000, with actual benefits being improvements in documentation, standards and quality awareness. Anticipated benefits are: improvements in documentation, standards, quality

awareness, market share, customer satisfaction and competitive advantage. The major cost areas in implementing ISO 9000 are training and surveillance (Skrabec *et al.*, 1997). However, these authors also found that using ISO 9000 as a way of system improvement need not be too costly. There is also debate over whether ISO 9000 registration results in increased customer awareness: "... the key question that is emerging in the literature is whether continuous improvement and market/customer advantage are indeed achieved as a result of ISO 9000 certification" (McFadyen and Walsh, 1992, p. 20).

- *Auditing and ISO 9000.* Auditing is an important tool in the preparation for ISO registration (Supe, 1994). The advent of ISO 9000 has seen a rise in the importance and types of auditors (De Meulder, 1993).
- *Customer satisfaction:* Customer satisfaction is also very important in quality. Organisations should recognise that their customers govern their business: "The driving force in ISO 9000 is the customer" (Merrill, 1995, p. 21). Hence, an important area of valuation in the organisation is the impact of customer satisfaction on an organisation's finances. "Few companies in any industry realize the awesome financial leverage of a loyal customer base ... the most important factor affecting performance is the quality of products and services relative to those of the competition ... there is a direct relationship between customer satisfaction and profitability" (Helmi, 1998, p. 9). "All articles surveyed propose a positive relationship between improved customer satisfaction and (long-term) financial results" (Eklof *et al.*, 1999, p. S518).

Any finance academic will explain that the underpinning goal of all financial managers is to *maximise shareholder wealth*. This goal offers the rationale as to how a corporation's performance is measured in this article. Literature pertaining to ISO is mainly concerned with stakeholder utility, rather than stockholder wealth.

The literature of modern corporate finance is broken into five distinct components. According to Smith (1990) these components are: the fundamental building blocks; capital budgeting decisions; capital structure policy;

dividend policy; evidence from announcements of corporate transactions.

This article is interested in two of the fundamental building blocks highlighted by Smith: the efficient market hypothesis and agency theory. A new paradigm is emerging called the new finance, where the efficient market hypothesis is at the forefront of debate. "The efficient markets paradigm is at the extreme end of a spectrum of possible states. As such the burden of proof falls on its advocates" (Haugen, 1999). Moreover, Barlow (1992) suggested the market does not respond properly to corporate earnings announcements and found some delays in stock price responses. Nevertheless, those who support the efficient market hypothesis believe that in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value (Fama, 1965).

Fama first offered a clear review of the efficient market hypothesis in his 1970 article titled "Efficient capital markets" (Fama, 1970). Here price was defined as being a function of all relevant information; therefore, an investor is unable to make abnormal returns on an asset when decisions are based on information. Three forms of efficiency exist:

- (1) *Weak form:* past information is fully reflected in price.
- (2) *Semi-strong form:* public information is fully reflected in price;
- (3) *Strong form:* internal (insider) information is fully reflected in price.

Consequently all information is useful in an inefficient market. Public, private and historical information is useful when weak form efficiency exists. Public and private information is useful when semi-strong form efficiency exists. Private information is useful when strong form efficiency exists. And, no information is useful in a perfectly efficient market. Fama (1991) offered three new categories to replace his earlier three forms in his article titled "Efficient capital markets II". The categories are: tests for return predictability; event studies; and tests for private information, respectively. Although the three categories are in essence identical to the original forms in meaning, the categories offer practical questions for researchers to address. Tests for return predictability ask: what historical information can we look at to predict what is going to happen? Event studies ask: how good are the markets at anticipating

information? And tests for private information ask: do corporate insiders win? Ross *et al.* (1996) extensively reviewed empirical research regarding market efficiency. They stated:

- *Weak form.* "It is claimed that people who see patterns in stock-price data are seeing optical illusions". Therefore, past information offers no assistance in investing and the market is weak form efficient. Furthermore, Magee and Edwards (1985) have a publication referred to as "the technical analysis bible", which attempts to predict the future from patterns in past price movement.
- *Semi-strong form.* Event studies (graphing cumulative abnormal returns (CAR) in relation to an announcement (i.e. public information)) regarding actions such as stock splits, dividend payments, etc. "strongly support semi-strong efficiency". However, several anomalies have been found (yet academics have fought to reason these) such as the Monday effect, January effect, Friday the 13th effect and so on. One famous event study was conducted by Fama *et al.* (1969, pp. 1-30), where 940 stock splits were examined. Fama *et al.* (1969) found positive returns before the split (due to splits being conducted at good financial times), with abnormal returns around the day the split was announced, and no increase in CAR after the split.
- *Strong form.* "Does not seem to be sustained by evidence" (Ross *et al.*, 1996). In turn, insider information can be used to make abnormal returns; hence, the reasoning behind insider trading illegality.

"The results are consistent with both the weak and semi-strong forms of the efficient market hypothesis" (Groenewold, 1997).

However, with the New Finance emerging and market inefficiency being supported by empirical studies investors may be faced with, or are faced with, a "golden opportunity (GO)" (Haugen, 1999). "Either the hypothesis has an inherent flaw, or Wall Street and its customer base are in truth totally irrational" (Bernstein, 1999, p. 1).

The second fundamental building block, agency theory, is concerned with those decisions made by management (the agent), which are not in the best interests of their

shareholders (principals), where shareholder wealth is not maximised.

In turn, this article wishes to provide empirical evidence that supports the efficient market hypothesis and determines that agency costs are evident when managers pursue ISO registration. Docking and Downen (1999) found that ISO 9000 registration by small firms in the USA results in positive abnormal returns for investors at announcement. Yet their results were of little strength, with their overall sample being unable to reject their null hypothesis. No studies have ever considered the ISO 14000-series to date and all studies have been set in the US context. Therefore, this article considers ISO (including 9000 and 14000-series registrations) within the New Zealand context.

The purpose of this article is to refute the existing hypothesis that ISO registration is beneficial to firms' performance, to confirm the market efficiency hypothesis and to develop a new theoretical idea surrounding ISO in the New Zealand business context. This article takes a financial perspective; therefore, firm performance is determined by the maximisation of the relative stock value.

Data

The initial sample consisted of all New Zealand ISO registered firms recorded on the April 2000 JAS-ANZ Register. Here 2,466 9000-series registrations and 58 14000-series registrations provided a total initial sample of 2,524 ISO registrations. However, for the purpose of this study firms need to be both ISO registered and public. Therefore, the initial sample was reduced to 131 registrations from 47 firms currently trading on the New Zealand Stock Exchange (NZSE); stock price data was obtained through Datastream. Each registration was matched to the stock price data of its *parent* firm, since ISO registration can be allocated to single divisions within larger organisations. Two forms of screening were required to ensure an adequate sample. First, stock price data was required from 180 days prior to ISO registration to 14 days after ISO registration for event studies and possible parameter estimations, and data from 11 May 1999 to 13 June 2000 for the examination of subsequent performance; resulting in 125 registrations from 46 firms. Second, the

Datex database was used to determine whether concurrent announcements occurred five days before or after a firm's ISO registration announcement (for this may impact on the stock reactions of those firms who announce registration). From this screening the final sample consisted of 122 ISO registrations by 43 public New Zealand firms (see Table I).

A total of 34 firms (94 registrations) were trading at announcement of their ISO registration, whilst nine firms (28 registrations) were not trading; including The New Zealand Refining Company Ltd who offered no initial registration date. From the 34 firms who were trading, six (eight registrations) were 14000-series registered. In turn, only the firms trading at announcement are included in the event study analysis, whereas all firms and registrations are included in following analysis (see Table II).

All financial securities (i.e. mutual funds) were omitted from the sample, as well as stocks such as Energy Equity Corporation Ltd (EEC) who had non-specific business sectors. It was assumed that any registrations pertaining to Fletcher Challenge were considered in regard to FLC not FCI (Fletcher Challenge Industries Ltd. Also, the parent stock prices for Air New Zealand Ltd are assumed to be the "A" class stocks.

Methodology

Three methodologies are used to examine the three different questions posed by this

research. This paper examines ISO registration from a financial standpoint; in turn firm performance is determined by the appreciation of respective stock value. Empirical evidence is used to improve validity.

First an event study methodology is used to determine a stock's price reaction to the announcement of ISO registration. Second, an ISO Index is constructed to illustrate the subsequent performance of ISO registered firms in relation to the NZSE. Finally, indexes for each certifying authority are developed and compared to the NZSE Index to determine whether the choice of certifying authority results in differential firm performance.

Event study

An event study methodology, much the same as Brown and Warner (1985), is used. This is "one of the most useful approaches to understanding financial behaviour" (Fama, 1991). An event study measures the reaction of stocks' prices about an announcement of some sort. The semi-strong form of market efficiency argues that public information is already, or very quickly, embedded in the stock price. Typically prices seem to adjust within a day to event announcements, yet Philip Brown (1968-1969) offered supportive evidence that suggested a stock price adjusts in as short a period as two minutes. Event studies are the most rigorous and mathematically sound forms of market efficiency test, because they do not require a "correct" asset-pricing model; hence the dual hypothesis debate that surrounds the market efficiency debate is eliminated.

The event window consists of 14 days on both sides of the initial ISO registration announcement date (i.e. a 39 day event window). An event study requires the calculation of an excess return for each given day. An excess return is calculated by subtracting a "risk-factor" from the daily return of the respective stock. In the past researchers have calculated the return of the stock and subtracted the return of the market (i.e. by using an index of some sort as a proxy for the market) multiplied by the relative beta of the market and the underlying stock. However, since Fama and French's (1992) article beta was disproved as a "good" measure of risk, yet size and book-to-market equity were found to hold stronger relative significance to the illusive "risk-factor". In addition, Fama (1991) states that an event study methodology *works* regardless of the

Table I Initial sample

Public firms	ISO 9000 regs	ISO 12000 regs	Total regs
47	123	8	131
<i>Screening No. 1: sufficient data</i>			
46	117	8	125
<i>Screening No. 2: concurrent information</i>			
43	114	8	122

Table II Final sample

	Public firms	ISO 9000 regs	Public firms	ISO 14000 regs
Trading at announcement	28	86	6	8
Not trading at announcement	9	28	0	0
Total	37	114	6	8
Public firms total:	43			
ISO regs total:	122			

measurement of the excess return, in fact using the basic return calculation offers almost exactly the same results. Therefore, the event study used here breaks the ISO 9000 registration announcements into four size quartiles, with quartile 1 containing the smallest firms' stock price reactions and quartile containing the largest firms' stock price reactions:

$$S_i = P_{iA} * NSO_{iA} \quad (1)$$

Size was calculated by multiplying the price of share i (P_{iA}), as at the date of ISO registration "announcement", by the number of shares outstanding (NSO_{iA}) at that date. The number of shares outstanding was obtained from DataStream and Datex, such as the stock price data. If a component of the size calculation was unavailable the respective parent company's annual turnover was used, and if this was unavailable number of employees was considered. The annual turnover and employee numbers were obtained from KOPASS. Quartile 1 was considered to contain the most risky stocks whilst quartile 4 was considered to contain the least risky stocks. Quartiles 1, 2, 3 and 4 contained 22, 21, 21 and 22 observations, respectively.

$$R_i = (P_{i2} - P_{i1})/P_{i1} \quad (2)$$

The daily return for each stock was calculated using equation (2). Where R_i equals the daily return for stock i , and P_i is the price of stock i :

$$AR = (\sum R_i)/N \quad (3)$$

Next the average daily return was calculated by using equation (3). Where AR is the average daily return for the respective quartile, $\sum R_i$ represents the sum of the daily returns for each registration and N equals the number of observations in the quartile:

$$CAR = \sum AR \quad (4)$$

Finally the cumulative average return for the quartile was calculated using equation (4). CAR represents the cumulative average return as at any given date over the event period, and $\sum AR$ is the sum of the relative average daily returns.

A fifth and separate event study was also conducted, which considers the New Zealand stock market's reaction to the registration of a firm under the 14000-series. This event study was conducted separately to the 9000-series, due to the 14000-series being newer and encompassing more hype. This hype is

expected to result in a stronger stock price reaction since the market perceives ISO 14001 registration as a more entrepreneurial and innovative action by the underlying firms' management.

ISO comparative index

Independent of the stock price reactions towards ISO registration announcements subsequent stock performance must be considered. To analyse the performance of ISO registered stocks a comparison of their performance was needed against a benchmark. The benchmark used is the total NZSE capital index, obtained from DataStream. This index used an equal weighted (price adjusted) capital index. Therefore, market value was not considered along with dividend payments, and other forms of stockholder remuneration apart from capital gains from stock price appreciation (market determined gains). This required the development of an equally weighted ISO capital index. Here all parent firms' stock prices were observed over a period from 11 May 1999 to 13 June 2000. This period was chosen since the last ISO registration announcement was made on 11 May 1999.

The daily return for each stock was calculated using equation (1), and the average daily return was calculated using equation (2).

$$INDEX_{ISO1} = INDEX_{ISO0} [1 + (AR_1 - AR_0)/AR_1] \quad (5)$$

The ISO Index was calculated using equation (5). Where $INDEX_{ISO1}$ equals the index at any given date and $INDEX_{ISO0}$ is the index on the previous date. The base-value of the ISO index was 1000, on 11 May 1999.

Note that the index for the NZSE was already available, yet the base-value as at 11 May 1999 was set at 1000, to make it comparable with the ISO index.

Certifying authority comparative index

From the sample one can observe that several certifying authorities have awarded ISO certification. Here it is examined whether the choice of certifying authority results in differential subsequent performance than the NZSE.

The same methodology is used to develop certifying authority indexes as is used to develop the ISO Index. Where the daily return for each stock was calculated using equation (1), the average daily return was calculated using equation (2) and the index at

any given date was calculated using equation (5). Furthermore, the same principles applied to the NZSE Index as for the ISO comparative index methodology.

Results

Event study

Graphical representations of the ISO 9000 event studies for quartiles 1 to 4 are offered in Figures 1 to 4, respectively. The day between the two broken lines represents the day of ISO registration announcement. In addition, Tables III to VI provide the statistical composition of the quartiles.

From Figure 1 it can be seen that the stock price of the smallest firms simply takes a random walk, the *t*-statistic of 0.87 (Table III) indicates that the returns before registration and after registration are not

Figure 4 ISO 9000 CAR (quartile 4)

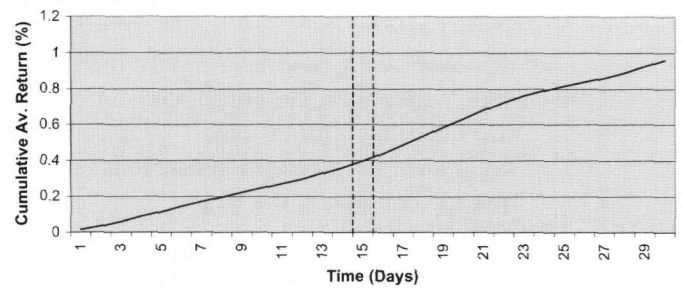


Table III ISO 9000 (quartile 1)

	Before	After
Mean	0.000457	-0.001667
Variance	3.6E-05	4.88E-05
Observations	15.00	15.00
Pearson correlation	-0.05	
Hypothesized mean difference	0.00	
Degrees of freedom	14.00	
<i>t</i> stat	0.87	
<i>P</i> (<i>T</i> ≤ <i>t</i>) two-tail	0.40	
<i>t</i> Critical two-tail (95 percent)	2.14	

Table IV ISO 9000 (quartile 2)

	Before	After
Mean	-0.00136	6.49E-05
Variance	2.32E-05	4.09E-05
Observations	15.00	15.00
Pearson correlation	-0.20	
Hypothesized mean difference	0.00	
Degrees of freedom	14.00	
<i>t</i> stat	-0.63	
<i>P</i> (<i>T</i> ≤ <i>t</i>) two-tail	0.54	
<i>t</i> Critical two-tail (95 percent)	2.14	

Table V ISO 9000 (quartile 3)

	Before	After
Mean	-0.00044	-0.001065
Variance	1.92E-05	5.93E-05
Observations	15.00	15.00
Pearson correlation	0.19	
Hypothesized mean difference	0.00	
Degrees of freedom	14.00	
<i>t</i> stat	0.30	
<i>P</i> (<i>T</i> ≤ <i>t</i>) two-tail	0.77	
<i>t</i> Critical two-tail (95 percent)	2.14	

significantly different from one another. From Figures 2 and 3 it can be seen that the cumulative returns are negative, yet the *t*-statistics of -0.63 (Table IV) and 0.3 (Table V) prove that the returns before and after registration are statistically indifferent.

Figure 1 ISO 9000 CAR (quartile 1)

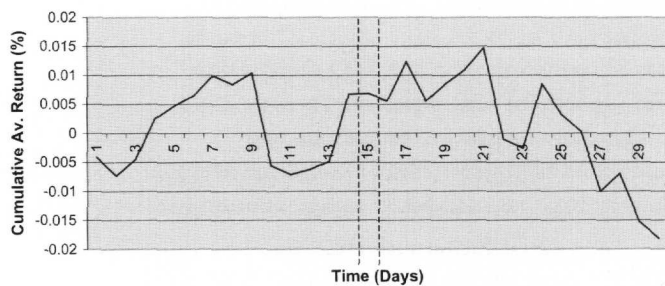


Figure 2 ISO 9000 CAR (quartile 2)

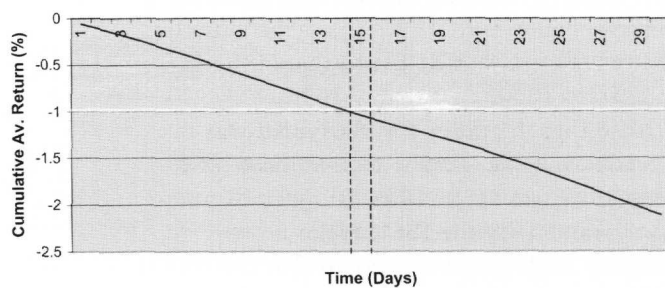


Figure 3 ISO 9000 CAR (quartile 3)

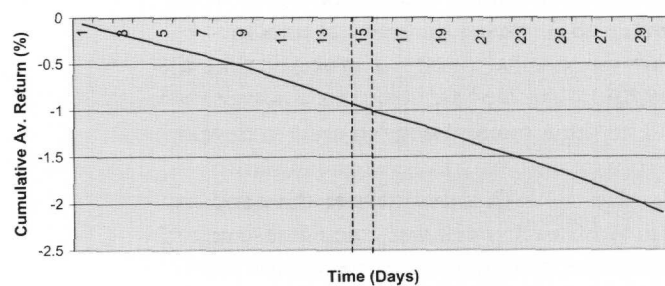


Table VI ISO 9000 (quartile 4)

	Before	After
Mean	0.001559	-0.000352
Variance	1.25E-05	2.79E-05
Observations	15.00	15.00
Pearson correlation	0.22	
Hypothesized mean difference	0.00	
Degrees of freedom	14.00	
t stat	1.31	
P (T ≤ t) two-tail	0.21	
t Critical two-tail (95 percent)	2.14	

Figure 4 illustrates that the largest firms have overall positive returns, but the returns before and after registration are statistically indistinguishable (*t*-statistic of 1.31).

From these results the null hypothesis cannot be rejected. In turn, the returns before and after ISO 9000 registration are not affected by the public announcement. This lack of reaction by no means suggests that the New Zealand capital market is inefficient. Due to the ISO registration process taking anywhere from two months to two years to complete, the lack of reaction simply suggests that the market has already embedded the information relative to the companies' ISO compliance efforts into the price. Therefore, one cannot use these results to either support or hinder the semi-strong form of market efficiency within the New Zealand capital market context.

Graphical representations of the ISO 14001 event study is offered in Figure 5. In addition, Table VII provides the statistical composition of the event study.

From Figure 5 it can be seen that the cumulative average returns of ISO 14001 registered firms is negative. However, the *t*-statistic (Table VII) of -1.93 proves that the returns before registration are significantly different from those returns after registration at a 10 percent significance level.

Figure 5 ISO 14001 CAR

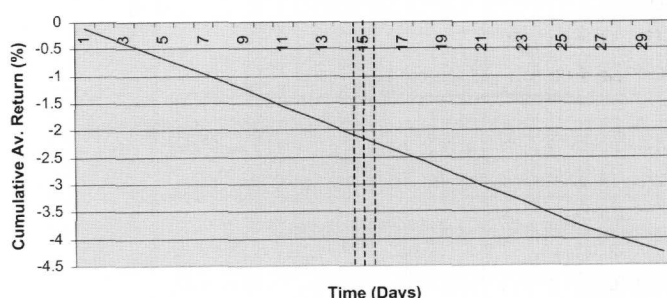


Table VII ISO 14001

	Before	After
Mean	-0.003819	0.003302
Variance	0.000126	9.38E-05
Observations	15.00	15.00
Pearson correlation	0.07	
Hypothesized mean difference	0.00	
Degrees of freedom	14.00	
t stat	-1.93*	
P (T ≤ t) two-tail	0.07	
t Critical two-tail (95 percent)	2.14	

Note: * Significant at 10 percent level

From these results the null hypothesis can be rejected at 90 percent confidence that the return before ISO 14001 registration is significantly less than the return after registration, yet still negative. The costs associated with ISO 14001 registration seem to be higher than those of the ISO 9000 registration.

ISO comparative index

The results of the event study suggest that overall investors do not react to the announcement of ISO registration. This lack of reaction begs one to examine what the subsequent performance of New Zealand's ISO registered firms is compared to the relative performance of the NZSE, as a whole. Figure 6 offers a graphical illustration of the ISO Index's performance in relation to the NZSE's performance from 11 May 1999 to 13 June 2000. In addition, Table VIII depicts the statistical relationship between the ISO index and the NZSE index.

From Figure 5 it can be seen that both indices move relatively similarly up until approximately the 225th day. After this point the ISO Index does considerably worse than the New Zealand capital market. The *t*-statistic of -9.45 is statistically significant at the 1 percent level (note that the *p*-values are rounded to 2dp), which means that the ISO index does considerably worse than the market overall in 99 of 100 cases (over the study period). Hence, investing in ISO firms is suboptimal, and financial managers who pursue ISO registration are not maximising shareholder wealth. New Zealand firms who are ISO registered perform more poorly than those who are not registered.

Certifying authority comparative indexes

It is illustrated in Figures 7 and 8 that several authorities have the power to register New Zealand firms under the ISO standards.

Figure 6 ISO v. NZSE equal weighted capital indexes

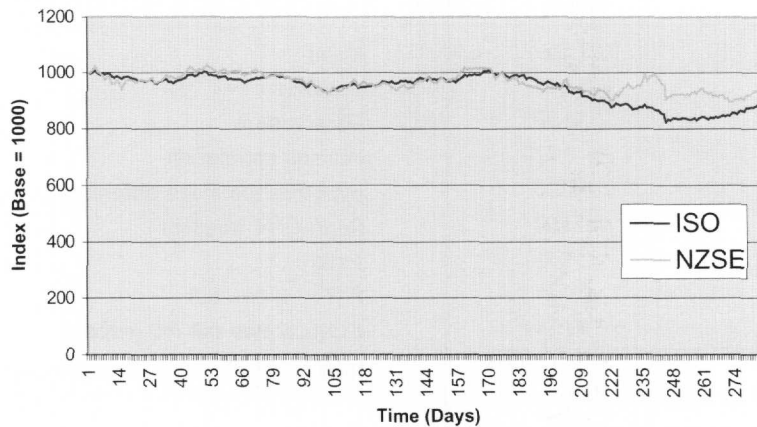


Table VIII Index comparison

	ISO	NZSE
Mean	944.69	964.21
Variance	2679.11	953.67
Observations	286.00	286.00
Pearson correlation	0.75	
Hypothesized mean difference	0.00	
Degrees of freedom	285.00	
t stat	-9.45*	
P (T ≤ t) two-tail	0.00	
t Critical two-tail (95 percent)	1.97	

Note: * Significant at 1 percent level

The most powerful feature of Figures 6 and 7 is that Telarc is the dominating certifying authority in regard to New Zealand ISO registration for public firms. Telarc registers approximately 63 percent of all public firms under the ISO standards, with the next closest authority registering a mere 13 percent. Also, Telarc was the choice of approximately 48 percent of the registered parent firms, with the next closest authority holding

approximately 15 percent of the market share. In turn, one would expect the firms who choose Telarc to have better performance than those who choose the inferior certifying firms. Why else would Telarc dominate unless this decision was in the best interests of the shareholders?

Table IX offers the statistical composition of each certifying authority's equal weighted capital index against the NZSE index.

From the results of the statistical analysis it can be seen that firms who became ISO registered through six of the seven certifying authorities performed significantly worse than the NZSE (at the 1 percent significance level). LRQA certified firms performed the worst (*t*-statistic -44.75), followed by KPMG (*t*-statistic -19.48), QAS (*t*-statistic -17.78), BVQI (*t*-statistic -17.56), Telarc (*t*-statistic -6.87) and SGS-ICS (*t*-statistic -5.64). However, ICL was unable to reject the null hypothesis, where ICL certified firms performance are statistically indifferent from the NZSE.

Figure 7 Certifying authority v. number of registrations

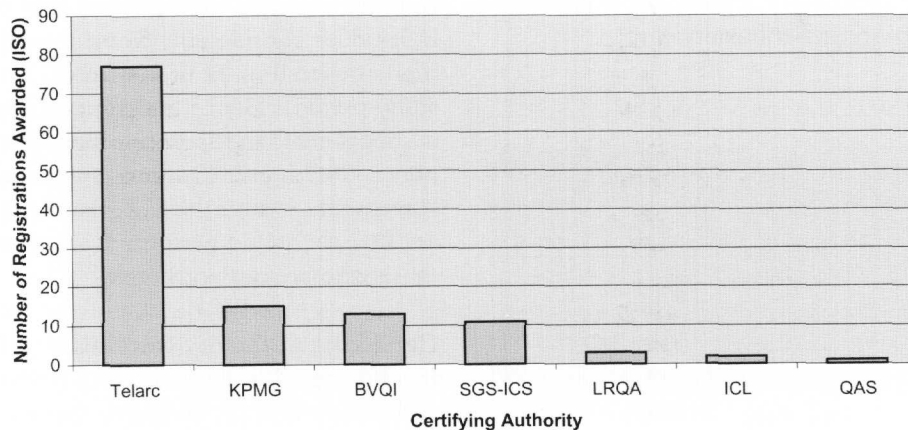


Figure 8 Certifying authority v. number of firms

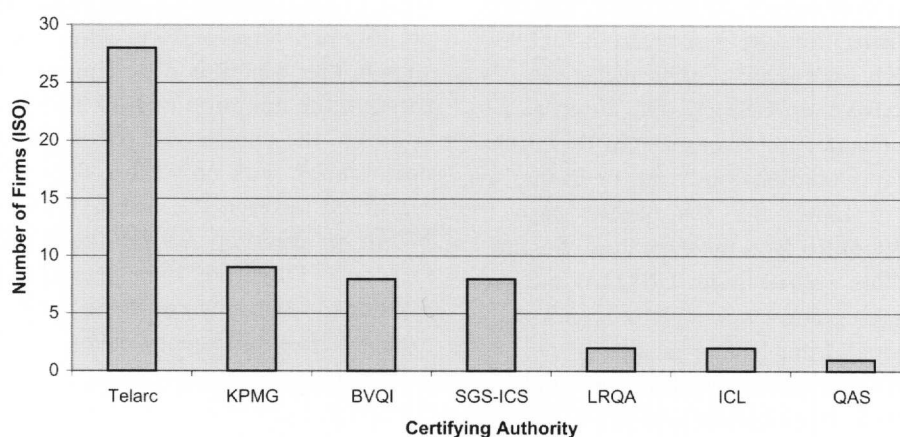


Table IX Certifying authority v. NZSE

	Telarc	KPMG	BVQI	SGS-ICS	LRQA	ICL	QAS	NZSE
Mean	948.48	895.02	921.91	955.44	822.29	950.72	824.15	964.21
Variance	2875.03	6251.65	3518.79	1370.02	4560.16	28714.16	22988.09	953.67
Observations	286.00	286.00	286.00	286.00	286.00	286.00	286.00	286.00
Pearson correlation	0.70	0.74	0.77	0.71	0.63	0.58	0.66	
Hypothesized mean difference	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Degrees of freedom	285.00	285.00	285.00	285.00	285.00	285.00	285.00	
t stat	-6.87*	-19.48*	-17.56*	-5.64*	-44.75*	-1.49	-17.78*	
P (T ≤ t) two-tail	0.00	0.00	0.00	0.00	0.00	0.14	0.00	
t Critical two-tail (95 percent)	1.97	1.97	1.97	1.97	1.97	1.97	1.97	

Note: * Significant at 1 percent level

Discussion and implications

From the results above New Zealand firms' performance can be considered in relation to ISO registration. Three issues are highlighted: the initial stock price reaction, the subsequent stock performance, and the value of management's decision making with regard to the choice of certifying authority used.

Regardless of the firms' size and/or nature of their returns, stockholders/investors have no reaction towards the announcement of ISO 9000 registration. This non-reaction does not imply market inefficiency; it simply suggests that the efforts and actions made by the firms to become ISO 9000 registered have already been embedded into the respective stock prices prior to ISO registration announcement. However, the problem with the non-reaction is that one cannot determine whether the "already embedded" information was good or bad.

At the announcement of ISO 14001 registration a statistically significant positive stock price reaction is evident (at the 10 percent significance level). Simply the returns

in the two-week period prior to the registration announcement were significantly less than the returns over the two-week period following the announcement. One would assume that ISO 14001 registration is good, and would be unsure of ISO 9000 registration's value. Or is the hype associated with ISO 14001 simply reflected in the stock price reaction, where investors are unsure of what the future outcomes of firms' registration will be. Maybe investors do not embed the information from a firm pursuing 14001 registration before announcement because they do not know what they are watching.

These results imply that investors are unable to make any returns at the announcement of a firm's ISO 9000 registration, because the information is already embedded in the price. The market is semi-strong form efficient. However, investors interpret ISO 14001 registration as good information and returns after the registration announcement are significantly better than the returns before the announcement.

Although ISO registration seems to be beneficial logically, financial academia prides

itself on its consideration of definite cashflows. The *ISO 9000 Survey* (1996) found that the average firms' domestic savings from ISO 9000 registration were US\$117,000, whilst the average costs were US\$187,000. From a financial perspective investment in ISO 9000 registration would obviously not be in the best interests of shareholders (i.e. negative firm performance). In fact, the cash flows for the average firms valued under US\$11m and over US\$1b even paint a worse picture, with the average small firms having savings of US\$23,000 and costs of US\$71,000, and the average large firms having savings of US\$291,000 and costs of US\$409,000. Look at the proportions! Furthermore, costs are incurred before the savings are made, so when considering the time-value-of-money the picture now becomes disastrous.

Since the results from New Zealand firms' reactions to ISO registration are blurred, and the US evidence suggests negative cashflows, what is the subsequent performance of ISO firms in relation to the NZSE? By comparing an ISO Index to the NZSE index it is found that, at the 1 percent significance level, ISO registered firms perform worse than the NZSE on average. Therefore, by investing in ISO registered firms an investor will perform significantly worse than average. This implies that managers' decisions to pursue ISO registration are not in the best interests of their shareholders/owners/bosses. The goal of shareholder wealth maximisation is forgotten; therefore, the personal goals of managers must front as incentives towards ISO registration. Agency costs are associated with the pursuit of ISO certification.

Several certifying authorities have the power to register public New Zealand firms under the ISO standards. Yet, Telarc is by far the most dominant authority, easily having the largest proportion of registrations and firms. However, when comparing the subsequent performance of those parent firms who registered through Telarc, they are not doing any better than any other certifying authority's clientele. Overall, firms who register through six out of the seven certifying authorities perform statistically significantly worse than the average. Only by registering through ICL can a firm's performance remain at par with the NZSE as a whole. Therefore, the predominant choice of Telarc as the certifying authority is not in the best interest of shareholders (i.e. firm performance is poor).

Overall, New Zealand shareholders do not react to ISO registration and those firms who are ISO registered perform poorly. Therefore, shareholder wealth is not being maximised through the adoption of ISO certification. In addition, the choice of certifying authority does matter, with only those firms who registered through ICL keeping up with the NZSE on average, and the others performing far worse. Therefore, managers who decide to register through any certifying authorities except ICL entail agency costs.

Conclusions

This study has offered empirical evidence that refutes the existing hypothesis that ISO registration is beneficial to firms' performance. Also, this study has confirmed that the market efficiency hypothesis survives, and has developed a new theoretical framework surrounding ISO in the New Zealand business context. In turn, this article makes a real contribution to both the realms of academia and the New Zealand business world.

This article has presented a new view of quality through a financial "eye". First, investors in New Zealand stocks are unable to make returns about the announcement of ISO registration, because the market values the process rather than the outcome of gaining registration. In turn, support is offered from the semi-strong form of market efficiency within New Zealand. Second, those firms who are ISO certified demonstrate inferior performance when compared to the market on average. As a result, the pursuit of ISO certification holds agency costs. Finally, the choice of certifying authority holds importance; with firms registered through ICL performing at par with the market, whilst all other firms (registered through alternative authorities) performing significantly worse than the market.

The findings of this study create impetus for future study into the area of quality and finance. The performance of firms using alternative quality standards needs to be addressed, along with consideration of small (private) firms' performance. Also, this study provides support for the existence of agency costs, but has not attempted to identify what these costs may be. Maybe, managers pursue ISO certification to provide quality assurance to themselves and/or their peers (competitors) as a signal of status. In turn, the question of who is making the quality related decisions

needs to be addressed. It needs to be determined whether financial managers are simply being incompetent, or whether other managers are justifying their positions. Nevertheless, firms who pursue ISO registration are incurring agency costs. In addition, why Telarc? Studies should attempt to identify the incentives that individual certifying authorities offer in order to sell their services. Do the certifying authorities with most clientele do the best work, or are they simply the most lenient towards offering ISO certification?

The findings of this study may in fact provide impetus for future study into the area of *behavioural* finance. Questions should be asked whether different markets interpret and perceive international standards differently (i.e. do New Zealand investors view ISO certification differently to foreign investors?). Maybe quality standards and techniques used in foreign countries are not applicable within the New Zealand context.

Overall, this article seems to hold an argument parallel to that of the risk-return argument between financial academics. Is a risk-return relationship non-existent, or is a correct measure of risk yet to be identified? Is a quality-return relationship non-existent, or is a correct measure of quality yet to be identified? We believe that internal validity is at fault.

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Commentary

Some thoughts on ISO registration from New Zealand with some important views of the financial effects of registration.