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Comparing university tuition fees with PBRF performance

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COMPARING UNIVERSITY TUITION FEES WITH PBRF PERFORMANCE

KEY FINDINGS

This study examined the historical association between the level of tuition fees at the bachelors level and the relative quality of research as assessed in the Performance-Based Research Fund (PBRF) Quality Evaluation. The analysis showed that:

- There was a positive association between the relative domestic tuition fees of a bachelors-level course and the relative quality of research at that university, but it was very weak. Therefore, if students inferred quality from the relative price of a course they may have incorrectly assumed higher price means higher quality.
- The weak association was likely a result of different price strategies at the universities during the 1990s, with some universities setting fees with the objective of maintaining affordability for students.
- If price is a poor indicator of institutional quality, the public availability of a wider set of performance measures may help the decision-making-process of students.

Introduction

As recently as 2004, there was little or no official information available on the quality of individual tertiary education organisations (TEOs).[1] The situation has improved slightly in recent times, with the publication of the results of the PBRF Quality Evaluations, but these measure just one dimension of university performance – research quality. Therefore, in deciding which courses to do and/or which institution to attend, potential participants in tertiary education are reliant to some degree on information provided by family, schools or peers to make their choices.

In the vacuum created by this lack of detailed information on university performance, there is some evidence that students also use the price of a course as a proxy measure for its quality. Holdsworth and Nind (2006) surveyed over 500 senior secondary school students from around New Zealand about the main factors influencing their decision to attend a particular university. Their research showed that the quality and flexibility of the qualifications/courses were the most important factor in student choice. This was followed by the likelihood that employers would recruit from the institution. However, the authors also found that the students in the survey preferred the course they chose to be either the same cost or more expensive than a similar course at another institution. This implies that students may be inferring the quality of the course from its price.

This paper explores the issue of inferring quality from price by analysing the association between the price of bachelors-level tuition at New Zealand universities with the results of the Performance-Based Research Fund (PBRF) Quality Evaluation. The objective of the analysis is to see how closely the price of tuition for students is associated with the quality of research produced by universities. The results will indicate how well price works as a proxy for the quality of a university, at least in terms of quality of research.

[1] The results of the 2003 PBRF Quality Evaluation were published in May 2004.

Obviously, quality of research captures just one dimension of university performance. Other important measures of quality would include the quality of teaching and the way employers perceive the graduates from a particular university. However, official data at the subject level for these measures is not publicly available at the present time.[2] Therefore, the focus of this study is, by necessity, on comparing price with research quality.

Note that in the absence of other comparable measures of performance, the universities have used the PBRF Quality Evaluation results to market themselves to potential students. For example, the University of Auckland use their PBRF results as a measure of their national reputation.[3]

Given that domestic tuition fees have been subject to some form of government regulation since 2001, the time frame used in this analysis requires careful selection. For the purposes of this study, the tuition fees charged in 2003 are compared with the results of the 2003 PBRF Quality Evaluation. Effectively, these tuition fees represent the fees charged in 2000, the last year before fees were frozen under the government's fee stabilisation policy. Therefore, the fees reflect the strategic price setting decisions of the universities in 1999, which happens to be in the period of the work assessed in the 2003 PBRF Quality Evaluation. So there is an alignment of sorts between the quality of research as assessed in the first PBRF Quality Evaluation and the price charged at the time the first results were published.

After 2003, fees were regulated under the government's Fee and Course Costs Maxima (FCCM) policy. Undergraduate domestic tuition fees above the maxima were required to reduce,[4] while fees below the maxima could increase by a maximum of 5 percent. As a result, the relative difference between the fees of universities is being reduced by government regulation and not necessarily by the decisions of the universities. Therefore, using current levels of fees would not allow for a clear undiluted analysis of the pricing strategies of the universities.

The structure of this paper is as follows. First, trends in domestic fees at universities between 1991 and 2000 are examined. Then, the data used in the paper is presented. This is followed by the presentation of the results of the analysis which is followed by some final conclusions.

Trends in tuition fees

The premise of this study assumes that price is a proxy for the quality of a course at a TEO, measured in this study by the quality of research. However, other factors, such as the cost of delivery, levels of government funding and a desire to maintain access for students are likely to have influenced the relative fees set by the universities. To get a sense of fee movements at universities in the eight years of unregulated fees between 1992 and 2000, Figure 1 presents the indicative tuition fee for a student studying full-time in a bachelor of arts at six of the universities.[5]

In 1991, the standard tuition fee set by the government was $1,300 for undergraduate study. In 1992, fees were deregulated and universities were free to charge tuition fees at a level which they determined. As can be seen in Figure 1, from the common starting point of $1,300 in 1991, a significant variation in the Bachelor of Arts fee developed over time. In 2000, the gap between the highest and lowest fee was $550.

Although it may be that students infer quality from the price of tertiary education, the pricing strategies of the universities may not necessarily have been applied with this in mind. For

[2] Although the New Zealand government is moving to make a variety of measures available. The United Kingdom government has also signalled that universities in future will need to produce a suite of performance indicators (Department for Business Innovation & Skills 2009).
[3] See http://www.auckland.ac.nz/uoa/key-statistics.
[4] This was later changed so that fees above the maxima were not allowed to increase.
[5] The increase in tuition fees at these universities is partially a refection of reduced per-student funding by the government between 1992 and 1999.

example, Victoria University of Wellington moderated fee increases during the late 1990s as it was concerned about the affordability of courses for students (Victoria University of Wellington 1999). As a result, its fees went from being the most expensive in 1997 to one of the lowest in 2000. Also, the University of Otago maintained the lowest fee during the period 1992 to 2000. How these strategies impacted on the association between price of tuition and the quality of research at these universities is explored in the results section.

Figure 1

Bachelor of Arts indicative full-time fees by university 1991-2000

Source: New Zealand Vice Chancellors' Committee

Data

The data used in this analysis comes from two sources. The quality of research is measured by the average quality score by subject area and university from the 2003 PBRF Quality Evaluation[6] and tuition fees data for 2003 is sourced from the Single Data Return (SDR). The average quality score is a weighted measure of the quality of research produced by staff at participating TEOs. Each staff member was allocated a quality score from 0 to 10, with 10 representing the highest level of peer-assessed quality.

In total, there are 41 subject areas where information is available on university performance. However, not all universities are represented in all subject panels, due to the nature of specialisation at each institution. Also, where there is only one provider in a subject area (such as Veterinary science and Dentistry) this subject is omitted from the analysis.

In total, there were 223 pairs of observations available for this analysis.

Method

Because fees in different subject areas are likely to vary based on different cost structures, there is a need to normalise the tuition fee data to be able to compares fees between different subject

[6] This is sourced from Tertiary Education Commission (2004).

areas. This is done by dividing the median tuition fee charged by a university within a specific subject area by the average of the median tuition fees of all universities in that subject area. This means that a value of 1 indicates that the tuition fees charged by a university are at the average in that subject area, a value above 1 indicates the fees are greater than the average in that subject area and a value less than 1 indicates the fees are below the average for that subject area. In other words, the fees are normalised to the average of all universities in that particular subject area.

A similar approach was taken with the average quality score. It represents the relative performance of a university in each PBRF subject area. A value greater than 1 indicates that the average quality score of a university was above the university average in that subject area, while a value of less than 1 indicates that the average quality score was below the university average in that specific PBRF subject area.

The framework for analysing the results is presented in Figure 2. The relative price of a subject area at a university is compared to the relative quality of research in that subject area. Figure 2 is divided up into four quadrants: Lower price/Higher quality, Higher price/Higher quality, Lower price/Lower quality and Higher price/Lower quality.

Figure 2
Framework for displaying relative quality and price

If students are reliant on price as a proxy for quality, then for the assumption to hold true the observations should fall in the bottom left and top right quadrants, where the levels of price and quality are in alignment.

Results

The distribution of relative tuition fees (price) at the universities and relative quality are presented in Figure 3 and Figure 4 in the form of boxplots.[7] In terms of relative price, it is clear that the relative tuition fees charged by the Universities of Auckland, Canterbury and Waikato along with Lincoln University were generally higher than the university average in the various subject areas. The relative quality of the universities shows that Auckland had the best relative performance while Auckland University of Technology (AUT) had the lowest.

[7] The white line in the middle box represents the median. The length of the box represents the interquartile range. Outliers are represented by dots.

Figure 3
Distribution of relative PBRF subject price by university 2003

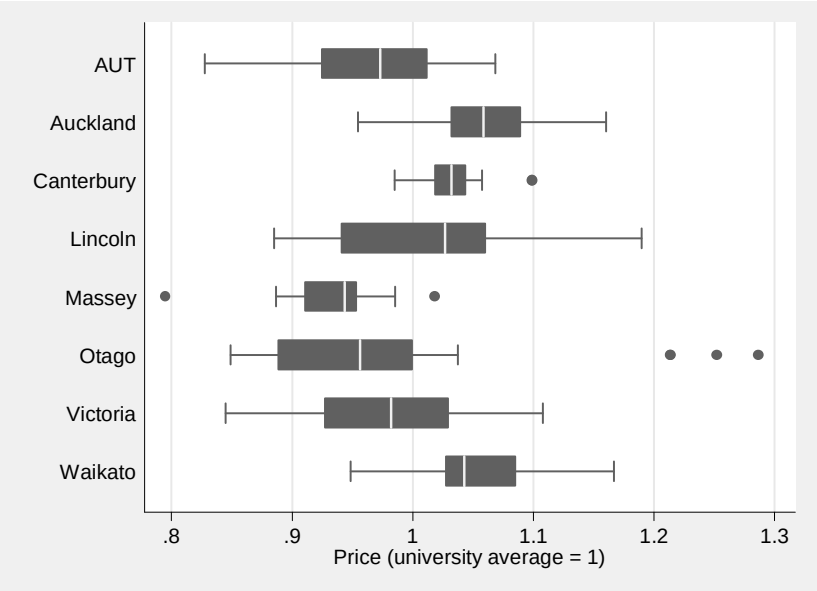
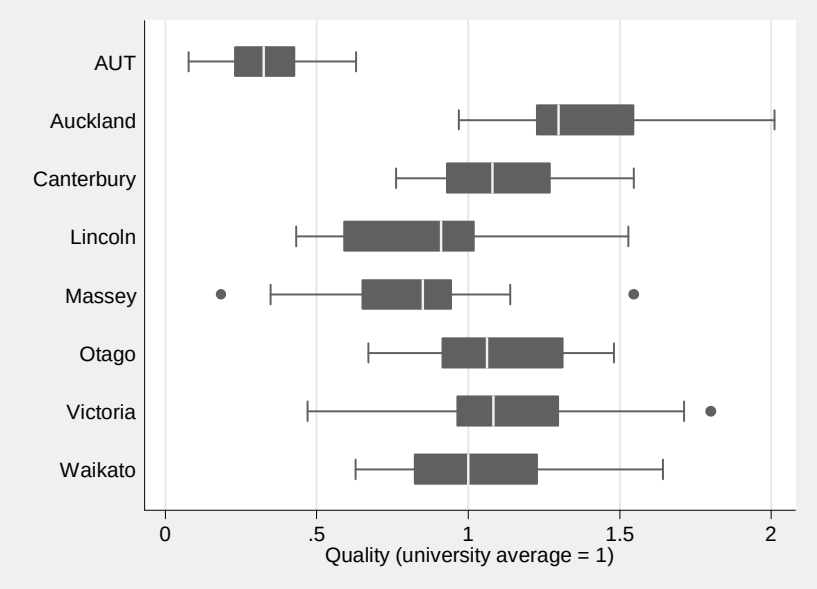


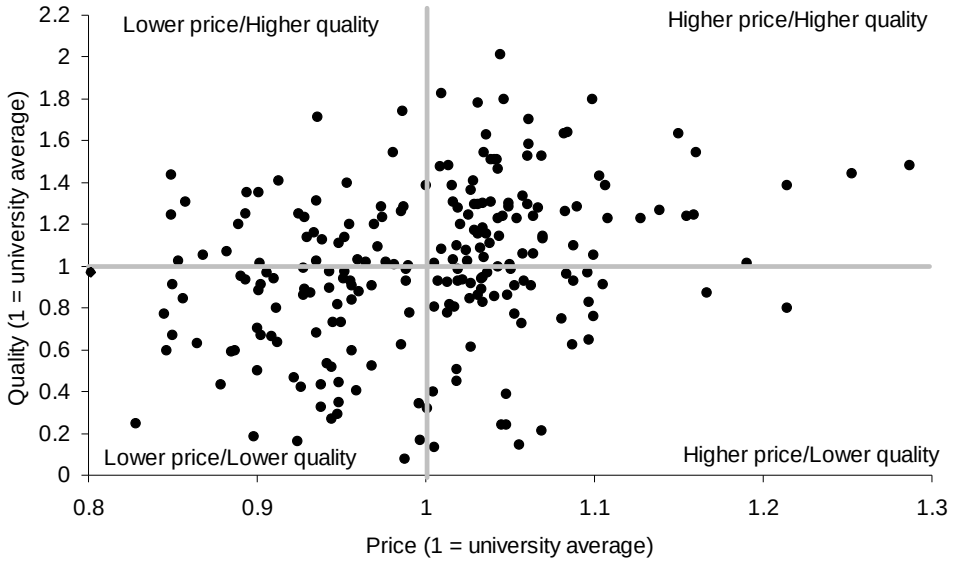
Figure 4
Distribution of relative PBRF subject quality by university 2003



The 223 paired observations of relative price and quality for each of the PBRF subject areas at the universities are presented in Figure 5. This shows that 34.5 percent of observations were in the Higher price/Higher quality quadrant, 21.1 percent in the Higher price/Lower quality quadrant, 16.6 percent in the Lower price/Higher quality' quadrant and 27.8 percent in the Lower price/Lower quality quadrant.[8] The distribution of observations for each university is also presented in Table 1 in the Appendix at the end of this paper.

[8] Note that the 2006 Quality Evaluation results were also compared to the 2003 tuition fees. This exhibited an even weaker correlation between price and quality of research.

Figure 5
Relative quality and relative price for all universities



If students were reliant on tuition fees as a guide to quality, then the fees would have provided an accurate indication in the 'Higher price/Higher quality' and 'Lower price/Lower quality' quadrants. Just over 62 percent of subject areas were in these quadrants.

Regression analysis was used to generate a line of best fit – this is presented below:

$$\textit{Quality} = -0.42 + 1.42 \times \textit{Price} \qquad R^2 = 0.09$$

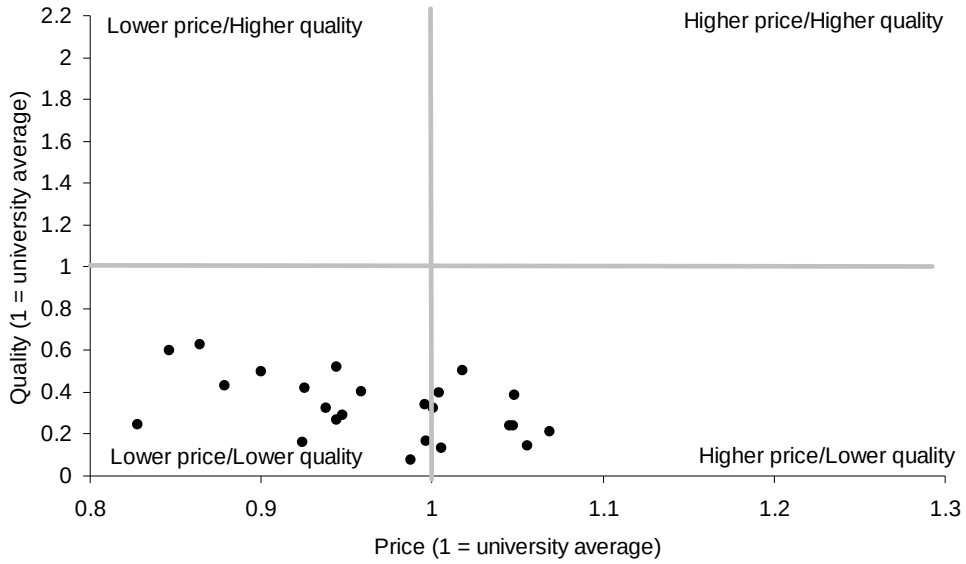
This indicates there was a positive linear association between relative price and quality of the PBRF subject areas at New Zealand universities, but the relationship is relatively weak. This can be assessed from the wide distribution of points in Figure 5 and the R^2 of 0.09. This means that just nine percent of the variation in relative quality was explained by the variation in relative price.

This suggests that factors other than research quality are reflected in the price of a university course. These other influences may include the cost of delivery or may reflect a pricing strategy at particular universities, such as keeping fees affordable for students.

It is likely that an analysis using current tuition fee levels and the more recent 2006 Quality Evaluation results could show an even weaker relationship between research quality and the cost of tertiary education for students because of the mixture of historical pricing strategies of universities with the impact of government fee regulation.

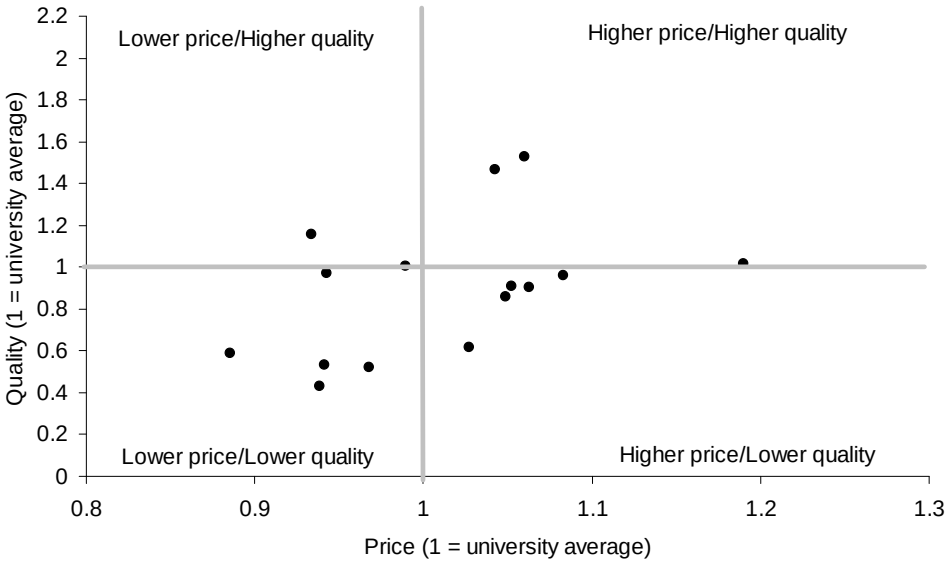
The results for each individual university are now presented. This can provide a clearer picture of how the relative price and quality of research at each university compare. The data for Auckland University of Technology (AUT) is presented in Figure 6. The majority of subjects at AUT are in the Lower price/Lower quality quadrant (62.5 percent), followed by the Higher price/Lower quality quadrant (37.5 percent). The lower relative research performance of AUT is not surprising considering its newly acquired university status (in 2000).

Figure 6
Comparing relative price and quality of PBRF subject areas for the Auckland University of Technology 2003



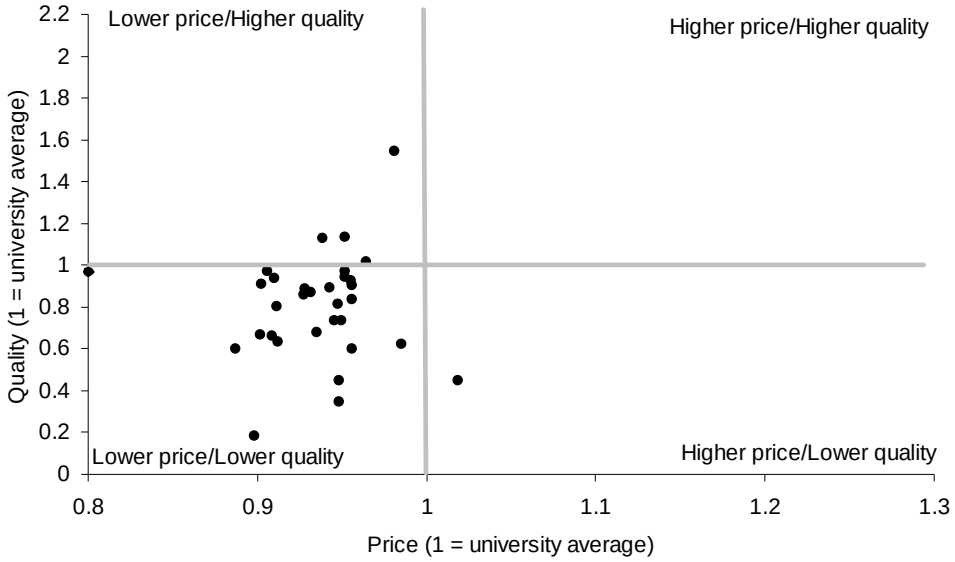
The results for Lincoln University are presented in Figure 7. The most populated quadrants are Lower price/Lower quality (33.3) percent and Higher Price/Lower quality (33.3 percent).

Figure 7
Comparing relative price and quality of PBRF subject areas for Lincoln University 2003



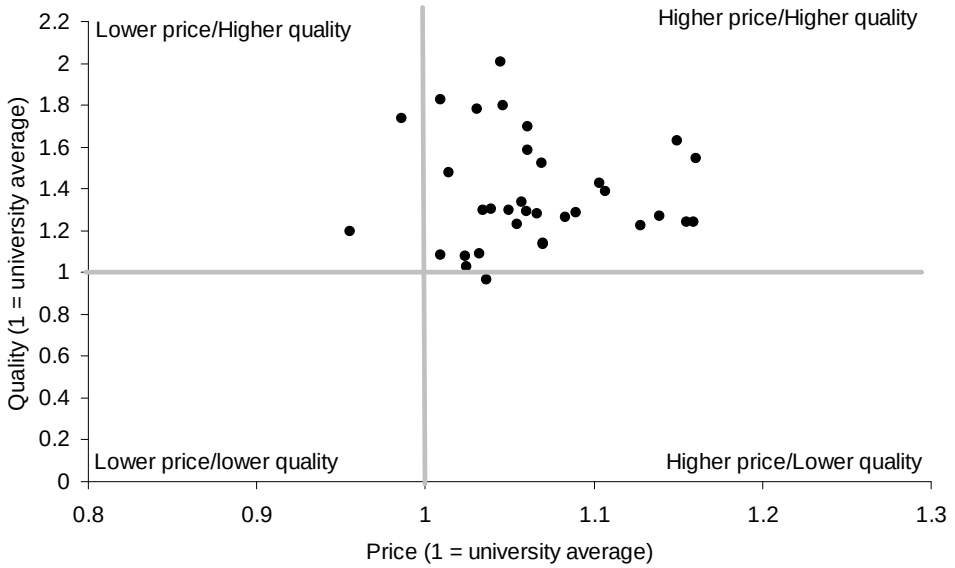
The results for Massey University are presented in Figure 8. The lower relative cost of tuition at Massey is clear, with just one of the observations in the Higher price quadrants. The vast majority of observations are in the Lower price/Lower quality quadrant (84.4 percent), followed by the Lower price/Higher quality quadrant (12.5 percent).

Figure 8
Comparing relative price and quality of PBRF subject areas for Massey University 2003



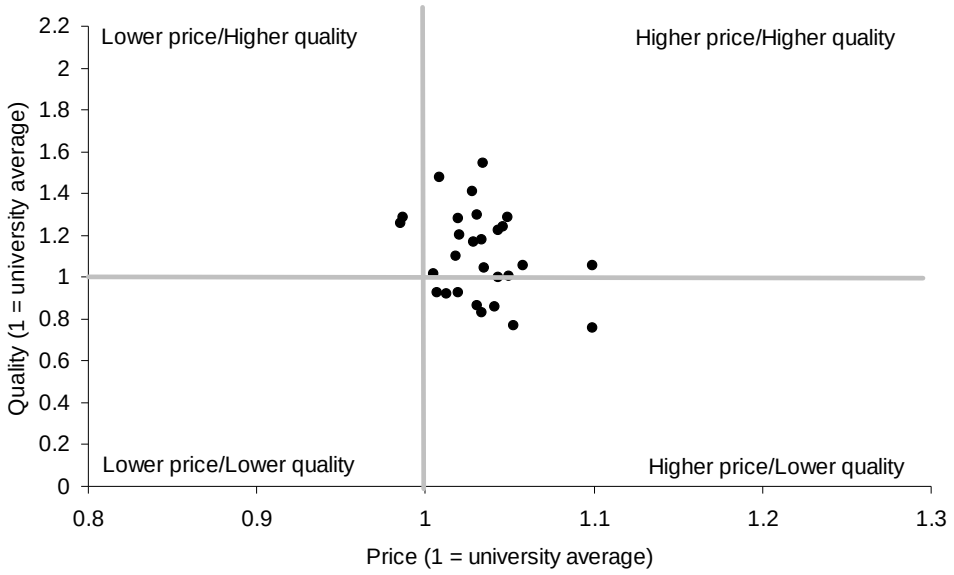
The data for the University of Auckland is presented in Figure 9. The strong relative performance of Auckland in the 2003 Quality Evaluation is clearly shown. What is also evident, is that the relative fees for Auckland are generally more expensive that the university average. The vast majority of observations for this university were in the Higher price/Higher quality quadrant (91.2 percent).

Figure 9
Comparing relative price and quality of PBRF subject areas for the University of Auckland 2003



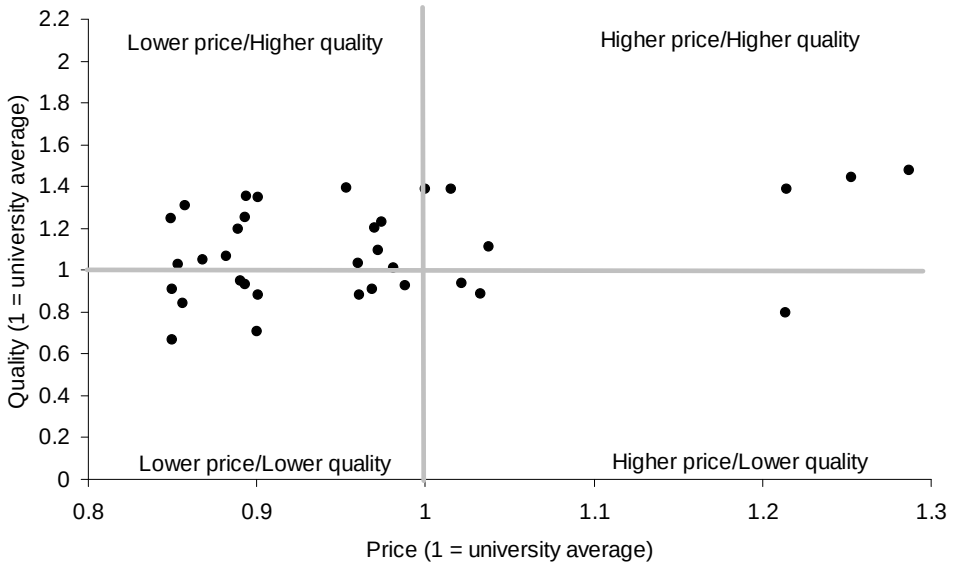
The results for the University of Canterbury are presented in Figure 10. This shows that the majority of observations are populated in the Higher price/Higher quality quadrant (64.3 percent. There are also a number of observations in the Higher price/Lower quality quadrant (28.6 percent)

Figure 10
Comparing relative price and quality of PBRF subject areas for the University of Canterbury 2003



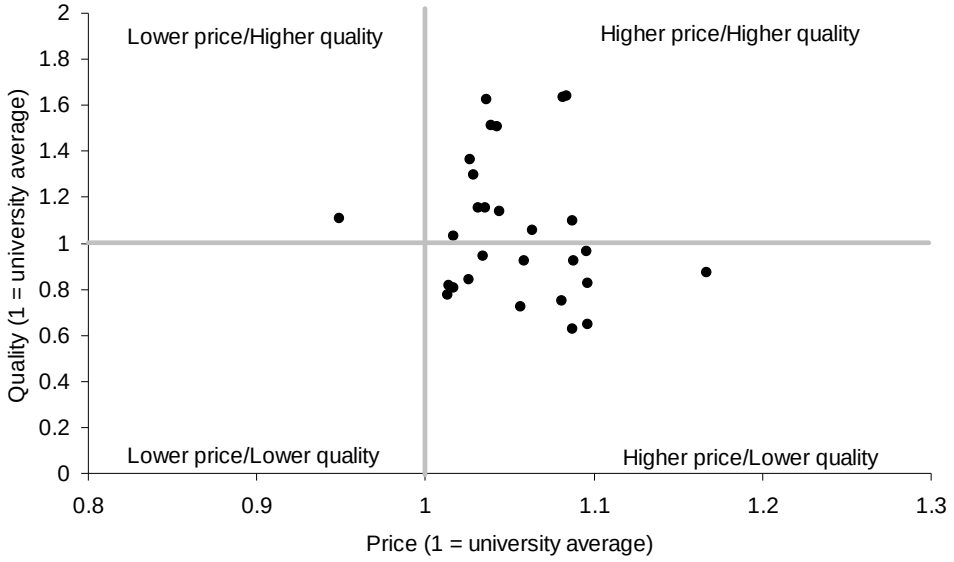
The data for the University of Otago is presented in Figure 11. As was seen in Figure 1, the University of Otago charged lower tuition fees than other universities. The effect of this is that a significant proportion of subject areas are in the Lower price/Higher quality quadrant (44.1 percent). The next highest proportion of observations was in the Lower price/Lower quality quadrant (29.4 percent).

Figure 11
Comparing relative price and quality of PBRF subject areas for the University of Otago 2003



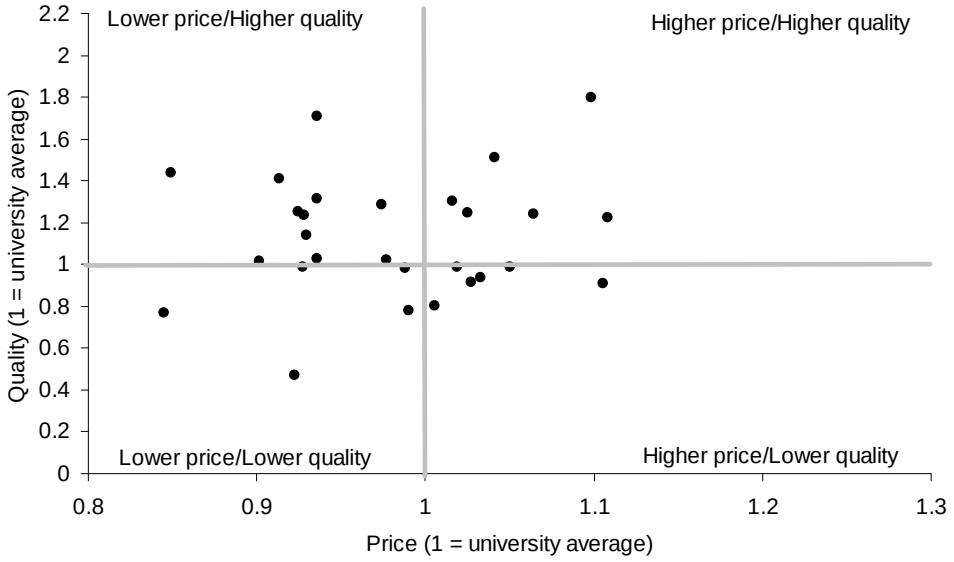
The data for the University of Waikato is presented in Figure 12. This shows that fees at Waikato are relatively more expensive than the university average. Figure 12 shows that the most populated quadrant is the Higher price/Lower quality quadrant (50 percent), followed by the Higher price/Higher quality quadrant (46.4 percent).

Figure 12
Comparing relative price and quality of PBRF subject areas for the University of Waikato 2003



The results for Victoria University of Wellington are presented in Figure 13. This shows that the most populated quadrant (like Otago's) was the Lower price/Higher quality category (39.3 percent). The shift to lower fees in the late 1990s to improve affordability is obviously a key factor in this result. The next most populated quadrants are Higher price/Higher quality (21.4 percent) and Higher price/Lower quality (21.4 percent).

Figure 13
Comparing relative price and quality of PBRF subject areas for Victoria University of Wellington 2003



Conclusion

In terms of the quality of research, the analysis in this paper suggests that historically there was a positive but relatively weak association with the price of tuition at the bachelors level. In a significant proportion of cases, the relative price and quality of research did not align, inferring there was potential for incorrect information to be introduced into the decision-making process for students.

It must be stressed that the quality of research is just one dimension of university performance. The quality of teaching at a university and how the labour market views their graduates are equally as important to assess and a quite different picture may emerge if the price of tuition was compared to these measures. However, without publicly available information on these measures, it is impossible to know.

In any event, if future fee regulation continues in a similar form to the current FCCM policy, then eventually all university undergraduate fees are likely to be at their respective maxima, and hence the same in the various subject areas. Therefore, there would be no differentiation by price and students will be unable to attempt to infer quality from the cost of a course.

Recently, the Government has signalled an intention to publish a wider suite of performance measures at the provider level (Tolley 2009), potentially including measures such as completion rates. If done appropriately, these measures could help remove the necessity for students to infer quality from price and also present a more balanced picture of university performance. This in turn would aid the student decision-making process.

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Appendix

Table 1
Distribution of relative price and quality of PBRF subject areas 2003

	Higher price/Higher quality %	Higher price/Lower quality %	Lower price/Higher quality %	Lower price/Lower quality %
Auckland University of Technology	0.0	37.5	0.0	62.5
Lincoln University	20.0	33.3	13.3	33.3
Massey University	0.0	3.1	12.5	84.4
University of Auckland	91.2	2.9	5.9	0.0
University of Canterbury	64.3	28.6	7.1	0.0
University of Otago	17.6	8.8	44.1	29.4
University of Waikato	46.4	50.0	3.6	0.0
Victoria University of Wellington	21.4	21.4	39.3	17.9
Total	34.5	21.1	16.6	27.8