How Do The Scores of World University Rankings Distribute?

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Abstract—World University Rankings are the most significant interest among universities all over the world. But unfortunately their detail methodology are behind closed doors. In order to speculate on the secret, author reports how the scores in rankings distribute.

Keywords—*world university ranking, institutional research, bibliometrics, descriptive statistics.*

I. INTRODUCTION

Since about 2004, the world university rankings (WUR) have become popular among institutes of higher education around the world. The Governments of some advanced countries are so concerned with WUR that they adopt university rankings as indicators for assessment of universities. One might consider that competitive environment for universities would contribute greatly to the qualitative progress of higher education. On the other hand, one might have doubts whether the rankings are conducted fairly as well, because the technical definitions of indicators with which the overall scores of WUR are calculated are behind closed doors.

What is the goal and the purpose of WUR? For instance, the publishing company, *Times Higher Education* (THE, for short) [1], the pioneer of WUR, aims to

> "provide the **definitive list** of the world's best universities, evaluated across teaching, research, international outlook, reputation and more".

Another well-known university ranking publishing company, *Quacquarelli Symonds* (QS, for short) [2], states that

> "That is who we are for. **The students**. And more specifically, prospective international students".

In fact, the market of higher education, especially in East Asia, has grown gradually in this decade with rapid socio–economic changes in East Asian countries and China. Since the publishing company are profit-making organizations, universities should recognize that WUR also are profit-making enterprises on the social-economical background.

However, at the beginning, there was the only one ranking, that was THE ranking, but recently QS ranking since 2013 attracts interests not only by students and their parents, but by people in universities. Now there are two different major WURs that we are interested in, however, we are in confusion. Because there are some reasons: firstly, both THE and QS state that their WUR are total and comprehensive one. But the methodologies are technically different so that the results of those WUR differs.

Secondly, as they don't disclose the technical definition of indicators, one cannot verify the properties of those WURs. Though they release the rankings with scores for criteria (missions of institutions, etc.,), the scores are relative values, i.e., the top university in terms of some criteria would obtain 100 full-points, other universities would be allocated to relative values as the score, corresponding to the gap from the top university. These relative values are calculated with the hidden methodology and specific metrics. All we can know is the weights for criteria scores, which are used to tally the overall scores.

Critical studies to WUR, like [3], [4] and [5], analyze and verify WURs, and evaluate their effect. But there has not been found the study about statistical distributions about WUR scores. In this paper, graphs of distributions of WUR relative scores is reported. The purpose of our study is to pursuit the distribution of specific metrics, that the relative scores base on.

II. METHODOLOGY AND ANALYSIS

The criteria and their weights of THE and QS WUR are shown in Table. I. Each score of criterion is given by a relative value composed of some indicators associated with the criterion. Top universities are assigned 100 points. Scores of other universities are assigned relative value between 100 and 0 compared with top university. As overall scores are given by weighted mean of those scores, overall scores also are relative values. All of the scores can be obtained from the web pages of THE[1] and QS[2].

Author collected relative scores of 800 universities in THE WUR and 400 universities of QS WUR, and presented histograms of all criteria and overall scores. Bins range from 0 to 100 for each score, and the bin value is chosen 5 points, i.e., 20 bins in each histogram. The frequency distributions of WUR in 2016 relative scores are shown in Fig.**??** and Fig.**??**. Note that some data of the criteria in THE, industry income, are missing because THE don't release part of the data given low-ranked universities. Since both overall scores given to low ranked universities are not disclosed, author estimates them (titles are 'overall_estimate').

In THE WUR, the criteria, *teaching* and *research* remind us of the log-normal distribution. To base on subjective surveys is in common. The *citation* criterion have the remarkable feature

WUR	Criteria	Weight	Method of data collection
THE	Teaching	30%	Reputation survey and statistics about the learning environment.
	Research	30%	Reputation survey to researchers and faculties, and statistics about research income and paper-productivity.
	Citation	30%	Paper citations published from 2010 to 2015 in journals, conference proceedings and reviews.
	International Outlook	7.5%	Statistics on ratio of international staff and student, in addition, international collaboration on journal publications.
	Industry Income	2.5%	Knowledge transfer activity by looking at research income and institution earns from industry (does not include government funds).
QS	Academic Reputation	40%	Reputation survey for researchers to choose the best institution in their own research field.
	Employer Reputation	10%	Reputation survey for employers to identify the universities producing the best graduates.
	Faculty Student	20%	The metric of the number of academic staff relative to the number of students.
	Citations per Faculty	20%	The metric of the average number of citations for each researchers.
	International Faculty	5%	The metric of the number of international faculty relative to the number of the whole faculty.
	International Students	5%	The metric of the number of international students relative to the number of the whole students.

TABLE I.   DESCRIPTION OF CRITERIA OF THE AND QS UNIVERSITY RANKINGS

that 4 bins from 75 to 95 have the same points as around 25 universities.

In QS WUR, the all maximal bin range from 95 to 100, i.e., top-scored universities are crowded. It is hard to find unimodality in all criteria, meanwhile the overall score distributes with a single mode.

III.   CONCLUSION

World University Rankings become the most significant interest among universities all over the world. We expect a fair competition under transparent methodology in any university rankings. Facing to the report of WUR, one would try to analyze the result using statistical intelligence. Unfortunately some well-known WUR closed detail information of the methodology, and it is hard to find out even essence of ranking data as shown in this paper.

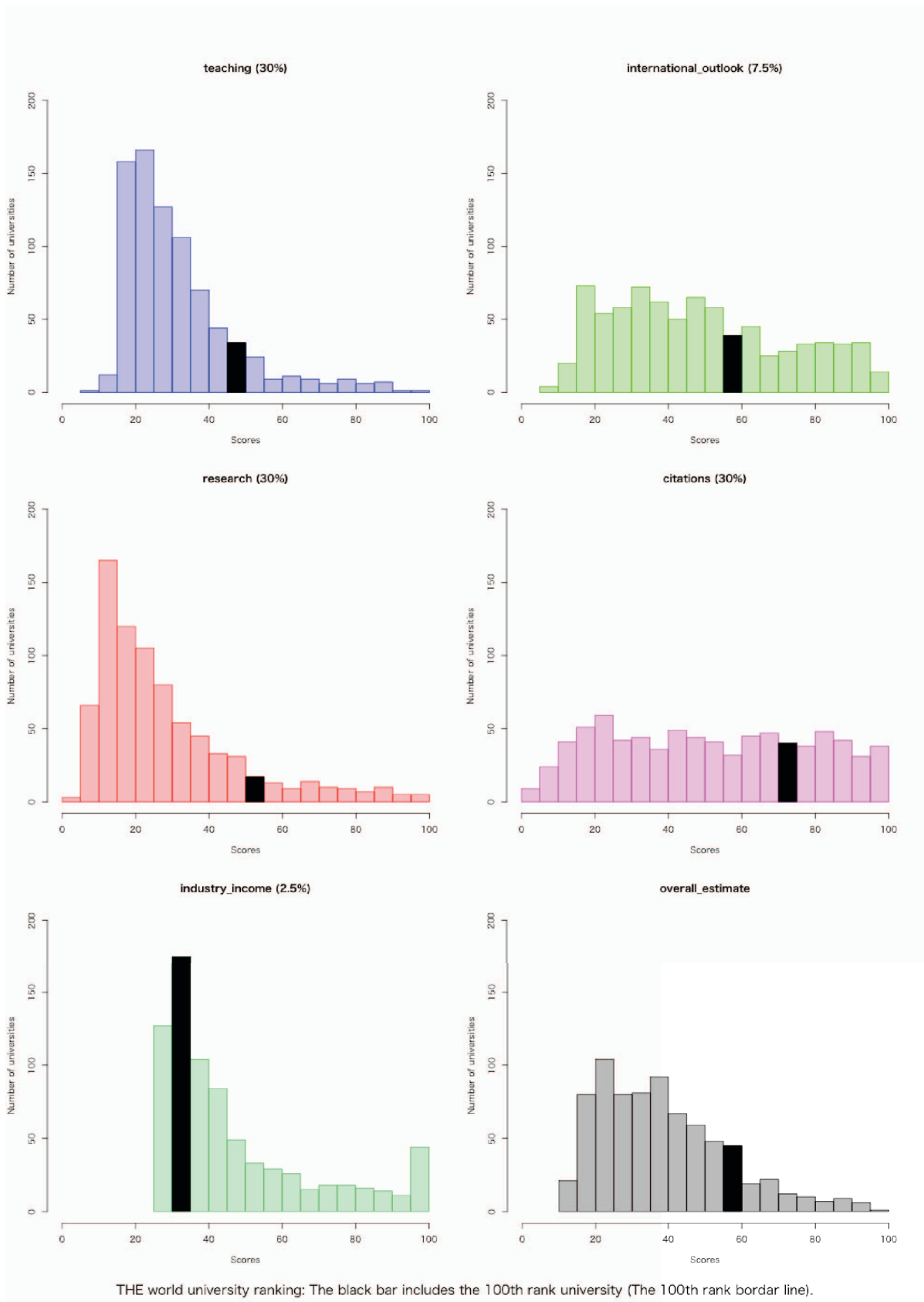REFERENCES

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Fig. 1. Distributions of scores in Times Higher Education: World University Rankings.
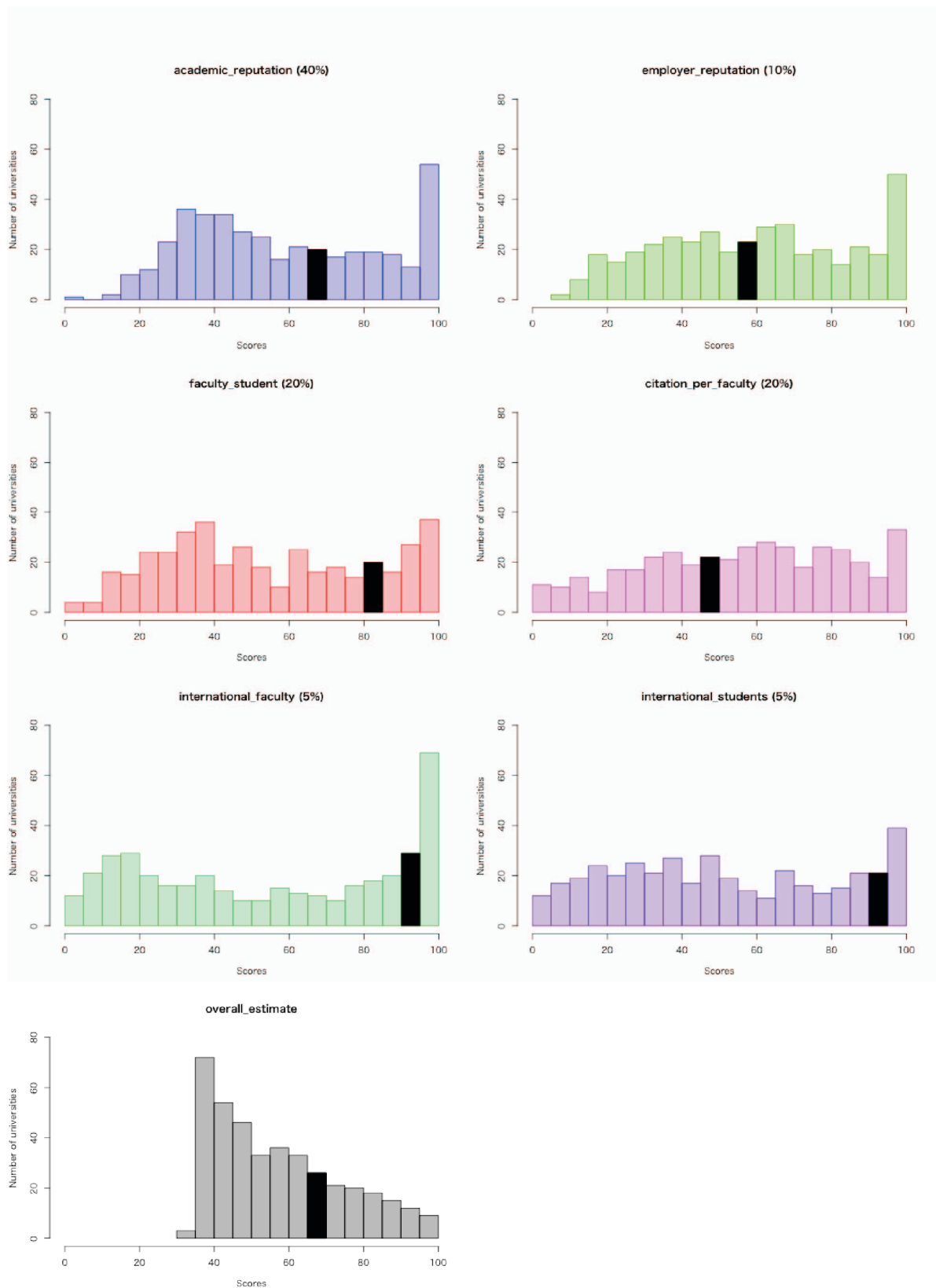
Fig. 2. Distributions of scores in Quacquarelli Symonds (QS): World University Rankings.