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Regulation of University Admission Quotas in Metropolitan Areas and the Competition between Universities

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"The excessive demand for universities in metropolitan areas as a result of location premiums and regulated admission quotas diminishes the competition between universities and the incentive to enhance educational performance to attract more students. Case in point are the lower graduate employment rates (measure of educational performance) of universities in metropolitan areas compared to those in non-metropolitan areas despite higher quality students. Additionally, the graduate employment rate of non-metropolitan universities are influenced by educational input factors such as an increase in the percentage of courses taught by full-time faculty while that of metropolitan universities are contingent merely on enrollees' entrance scores. Ergo, a structure that revitalizes the competition between universities and encourages them to improve their education services must be established in order to enhance the quality of higher education."

I. Introduction

Despite boasting the highest university enrollment rate in the world, Korea's university education is plagued with low graduate employment rates and poor educational performance, precipitating the need to address the root causes and establish effective countermeasures. In the case of universities in advanced countries, the answer lies in

heightening autonomy and competition.

Private universities in the US have long since enjoyed freedom from government regulations and the excellence achieved through their competition has been the driving force behind the competitiveness of public universities (Aghion *et al.* 2009). The success in the US prompted Europe, where universities were suffering from weakened competition under strict government regulations and control, to also adopt market competition-based reforms in the mid-1980s. Since the reforms, university education has flourished as a result of heightened competition, reduced government regulations, fusion among discipline, increased autonomy and a higher consideration for stakeholders' opinions (Schimank, 2007).

Increasing autonomy and promoting competition has been fundamental in reforming universities in advanced countries.

This paper examines the effects and issues arising from regulated university admission quotas, the main form of government control over university operations. Currently, the government only regulates the admission quota of universities in metropolitan areas to control population density. As such, this presents the ideal environment to conduct a social experiment on the effects of quota regulations. First, the consequences of universities' equilibrium behavior under quota regulations will be analyzed. Then, the implications of and improvements needed for the current university restructuring policy will be discussed.

II . Hypotheses on the Effects of Regulated Admission Quotas

Generally, universities encourage enrollments and in order to be selected by prospective students, they enter into heated competitions with each other. However, government regulated admission quotas may change these common practices.

From a purely theoretical perspective, regulated admission quotas eliminate the pressure of competition among universities to attract more students. This would in turn, limit their incentive to offer a higher level of education services (from the students' perspective when considering the cost of attending university) than the base-level as it would not result in increasing the number of enrollments. In such a case, the competition between universities would not entail enhancing the level of education to attract more students but based on the standard of the prospective students. As such, the educational performance of universities would be contingent on the competency level of the enrollees for the respective year.

On the contrary, if universities were to have autonomy with regards to their admissions quota, this would encourage them to become more competitive and make further efforts to upgrade their education services in order to increase the number of enrollees. This would consequently motivate neighboring universities to boost their own efforts for fear of becoming obsolete. In this case, universities' educational performance would become dependent on the level of effort that is made.

<Table 1> Effects of regulated and autonomous admission quotas

	Regulated admission quota	Autonomous admission quota
Efforts to improve education service	Low	High
Education service	Base-level education service (A) ¹⁾	Higher than (A)
Education performance	Dependent on competency level of students	Dependent on university's efforts

Base-level education service refers to a level of university education service that, after taking into account of the time and cost of completing university, nullifies the merit of going onto university from high school.

Under the premise above, Table 1 shows the trends in education services and educational performance within both regulated admission quotas and autonomous admission quotas.

The above discussion on the differing effects of regulated and autonomous admission quotas can be applied to Korea's case where universities in metropolitan areas have regulated admissions quotas and those in non-metropolitan areas do not. Generally, Korean students prefer universities in metropolitan areas (which have location premium). Ergo, the competition to enter metropolitan universities is markedly higher than that for universities in non-metropolitan areas. Furthermore, the university ranking, which is based on entrance exam scores, for the former is also higher. In this respect, universities in metropolitan areas are able to select a higher level of students.

Regulating admission quotas in metropolitan areas was originally a part of efforts to suppress excessive population inflow into metropolitan areas. However, despite the increasing population, fixed quotas have resulted in exacerbating the excessive demand for placements in universities in metropolitan areas while also ramping up the competition for private education (tutoring and supplementary education). At the same time, the excessive demand is weakening the competition between universities.

Based on the theoretical analysis of regulated and autonomous admission quotas, there is a high probability that the excessive demand resulting from regulated admission quotas in metropolitan areas is lowering universities' efforts to enhance their education services. Specifically, if universities had to compete with each other to attract more students, this would serve as an incentive for them to enhance the quality of their education services. In turn, these efforts will also have an impact on the respective universities' educational performance.

As such, the following theoretical hypotheses can be established on the behavior of universities with regards to educational input and performance in both metropolitan and non-metropolitan areas. Of course, this is under the premise that the universities in metropolitan areas have location premium.

Hypothesis 1: [Efforts to improve education service] Compared to universities in metropolitan areas that have location premium and are in excessive

Universities in nonmetropolitan areas that do not have regulated admission quotas have a larger incentive to improve their educational performance compared to universities in metropolitan areas that have excessive demand and location premium.

demand due to regulated admission quotas, those in non-metropolitan areas that have to compete in order to attract more admissions would be more committed to enhancing their education services.

Hypothesis 2: [Education performance] Universities in non-metropolitan areas would have higher levels of educational performance compared to the quality of enrollees. Additionally, their educational performance would be affected by the input variables that reflect the universities' efforts to improve their education services. However, universities in metropolitan areas that have less incentive would have lower levels of educational performance compared to the standard of enrollees and educational performance would be dependent on input variables that are relevant to the efforts made.

Although it would be difficult to closely examine the validity of the above hypotheses, this paper will attempt to find circumstantial evidence through a series of analyses that are based on variables for which data was available.

Firstly, educational performance and the graduate employment rate are measured. Although the quality of employment cannot be reflected, with the government focusing on the gradate employment rate in university evaluations and funding, it is a vital performance indicator. There are many input factors that affect education performance. However, the main factors can be broadly divided into two categories i.e. preliminary input factors such as the quality of enrollees, and process input factors which are related to the quality of universities' education services.

For the preliminary input factor, this paper uses enrollees' CSAT results and for the process input factor, the percentage of courses taught by full-time faculty was used as the key variable as well as the educational environment i.e. the number of full-time faculty per student, amount of government funding per student, amount of university investment per student, etc. as the control variable.

III. Substantiation via Case Analysis of Universities in Metropolitan and Nonmetropolitan Areas

The subjects for the empirical analysis presented in this paper have been limited to private four-year universities that are eligible for government funding.¹⁾ Data on

¹⁾ Samples from teacher colleges, Korea National University of Education, remote colleges, broadcasting universities, technical colleges, cyber universities, various school and graduate schools amongst others were excluded. Universities that were established solely for the purpose of training religious leaders and in arts & physical education and hence not subject to government support were also excluded.

the variables necessary for the analysis were extracted from the government's Higher Education in Korea (http://www.academyinfo.go.kr).²⁾ A total of 391 observations of 132 universities from 2011 to 2013 were used.

The most appropriate criterion for educational performance is the disparity between students' competence level at the point of enrollment and graduation. Variables that reflect this may vary but this paper uses the graduate employment rate³⁾ as the dependent variable. The employment rate is the market's evaluation of the graduates' abilities and when entrance scores, which show students' competence level at enrollment, are considered here, educational performance can be confirmed.

For the explanatory variables, the percentage of courses taught by full-time faculty and the number of full-faculty per student, government funding and grant transfers from industry-academic cooperation departments, etc. were used.⁴⁾ Entrance scores have the largest impact on the graduate employment rate and as such are the most suitable variable, however, due to difficulties obtaining the data, placement scores from private university entrance exam organizations were used (CSAT score percentile: CSAT score out of 400 points (sum of points for the four sections) converted into a percentile). Also, variables that reflect whether the respective universities were established after the implementation of the normative system for university establishment (implemented in 1997: policy to ensure that universities can be established when the requirements are met)⁵⁾ and the admission quota were added as control variables. Finally, in order to control

²⁾ Given that the analysis data of this study is based on a three-year panel data (2011-2013), a fixed-effect model might be most suitable. But, there are limitations in the application as the variables used cannot change radically in the short-term, and hence a pooled ordinary least square model was used.

³⁾ Employment rate (as of 2012) = {(those with workplace-based health insurance + graduates employed on campus + overseas employment + employed persons in farming businesses)/employable persons} X 100. The employed (as of 2012) include those with workplace-based health insurance, graduates employed on campus, overseas employment and persons employed in farming businesses. Graduates employed on campus (as of 2012) refer to those with workplace-based health insurance, as of the date of survey, who signed a longer-than-one-year contract with university foundations or relevant institutions (industry-academic cooperation departments, university or enterprises) and are paid more than the minimum wage; the salary of a person employed at the per-hour minimum wage of 4,580 won (as of 2012) is 957,220 won. Overseas employment refers to those who work for more than 15 hours per week and maintain an employment contract for longer than 91 days. Persons employed in farming businesses refer to those without workplace-based health insurance working in farming businesses as of the date of survey. Employable persons (according to the 2012 guideline): Graduates - (those who are advancing into higher education, undertaking their mandatory military service, those unable to work, the officially excluded and foreign students). Persons who are unable to work refer to those who are inmates, dead, those who have immigrated overseas and hospital patients for more than six months. Persons who are deemed officially excluded refer to those who are medical aid recipients, graduates with a degree from religious leader training course, female military officers attending a training course before being officially commissioned and persons eligible for education courses provided by professional education institutes for aviation workers.

⁴⁾ There are diverse ways to enhance educational performance e.g. adjusting the percentage of courses taught by full-time faculty, increasing number of full-time faculty, efforts to secure government funding and efforts to promote industry-academic cooperation. Which one is chosen is dependent on the marginal costs. Specifically, government funding will depend on official measures, and industry-academic cooperation departments and university enterprises entail huge costs. In particular, increasing full-time faculty from the universities' perspective will be a considerable burden in both the short- and long-term. As such, the easiest method for universities is to adjust the percentage of courses taught by full-time faculty.

⁵⁾ Before the adoption of the normative system, procedures to obtain permission to establish universities were highly complicated and difficult. The system simplified the process, and therefore universities can be established if the requirements are met. The government sought a change in Korea's higher education policy paradigm in 1995, often called the May?31 Education Reform, and its core policy was the normative system. After the system was initiated in full swing, Korea's higher education system has become corpulent, according to certain critics.

<Table 2> Difference in the percentage of courses taught by full-time faculty

Variable	Total	
Average CSAT score (A) (0 ~ 400)	-0.003 (0.011)	
Non-metropolitan university (B)	10.843*** (3.769)	
(A) * (B) Interaction	-0.022 (0.016)	
Year dummy and relevant variables controlled	0	
Constant	75.299*** (5.517)	
Obs.	384	
Adjusted coefficient of determination	0.2968	

Note: Figures in () are standard errors. * p<0.1; *** p<0.05; *** p<0.01. Relevant control variables include whether the university was established after the adoption of the normative system, log value of admission quota and proportion of humanities & social sciences and arts & physical education majors.

**Source: Reproduction of data provided by Higher Education in Korea (http://www.academyinfo.go.kr).

the disparity in the employment possibilities of different majors, this paper used the percentage of students majoring in humanities and social sciences, and arts and physical education.

1. Percentage of Courses Taught by Full-time Faculty

Under the assumption that the percentage of classes taught by full-time faculty correlates to universities' efforts to enhance their education service, this paper deducts (as shown in Hypothesis 1) that universities in non-metropolitan areas have a higher percentage of courses taught by full-time faculty than those in metropolitan areas. In order to confirm this, Table 2 uses the combined data of the observed values from universities in metropolitan and non-metropolitan areas to verify the difference in the percentages of courses taught by full-time faculty.

Even when the average CSAT score of each university was controlled to take into account the discrepancy in the average competency level of students at metropolitan and non-metropolitan universities (comparison between universities with similar scores), it still revealed that the percentage of course taught by full-time faculty at non-metropolitan universities was higher than that of metropolitan universities by almost 11%

As the coefficients of interaction terms show in Table 4, the percentage of courses taught by full-time faculty was not influenced by enrollees' entrance scores. This implies that non-metropolitan universities are more committed to enhancing their education services than those in metropolitan areas regardless of the competency level of the students. (6) Meanwhile, although full-time faculty members conduct research in addition to teaching, the percentage of courses taught by full-time faculty cannot be used to measure

Even if the difference in students' competence levels in metropolitan and nonmetropolitan universities is taken into consideration, the percentage of courses taught by full-time faculty remains higher for the latter.

the level of their research accomplishments.⁷⁾ However, even when these differences are considered, the results show that the higher commitment of universities in non-metropolitan areas to increase the percentage of courses taught by full-time faculty remains unchanged.

2. Graduate Employment Rate

Location premiums enable universities in metropolitan areas to attract more competent students, and in turn, the students' high competence levels serve to increase the respective universities' educational performance (graduate employment rate). Under the assumption that the efforts of universities in all areas are at the same level, the graduate employment rate of metropolitan universities should be higher or at least similar to that of non-metropolitan universities. However, this paper reveals that the graduate employment rate of metropolitan universities marked an average 56.2%, 3.1%p lower than that of non-metropolitan universities (59.3%); indicating that the former has inefficiencies that hinder efforts to enhance educational performance and make improvements.

Furthermore, despite the reservation wage, which is the subjective minimum wage level that determines employment, being higher on average for students from metropolitan universities, the number of delayed employment is also higher. Accordingly, the graduate employment rate for metropolitan universities may be lower in the short-term. It should be noted, that the quality of employment has not been reflected. Ergo, the analysis on the graduate employment rate should be supplemented with an analysis using variables that can reflect the quality of employment e.g. average wage, rate of permanent positions, etc. However, as the relevant data was unavailable, this requires research in the future.

The following section will analyze the different impact of input factors on the graduate employment rate. The focus will be placed on comparing the relative influence that preliminary input factors (enrollee scores) and process input factors (efforts to improve education service) have on educational performance(employment). Even under the assumption that there is a systematic difference in the quality of lectures and entrance scores, as the analysis in this paper divides metropolitan and non-metropolitan universities and examines the factors influencing the graduate employment rate in each league,

The fact that the average graduate employment rate is lower for universities in metropolitan areas implies that there is a problem with regulating admission quotas.

⁶⁾ Apart from adjusting the rate of courses taught by full-time faculty, universities' efforts to improve educational performance can be measured by the number of lectures per full-time faculty. For undergraduate courses, the number of courses per full-time faculty per semester marked 2.53 for universities in metropolitan areas while those in non-metropolitan areas registered 2.91 revealing that those in non-metropolitan areas have a heavier burden. On the other hand, in the case of graduate schools, the circumstances are reversed with metropolitan areas posting 0.77 and non-metropolitan areas posting 0.56. Overall, full-time faculty per course was similar, with that of metropolitan areas registering 3.30 and non-metropolitan at 3.47.

⁷⁾ From a quantitative perspective, there are not statistical differences, in the number of per full-time faculty members' research papers published in research journals listed in the NRFK. However, for internationally published papers or SCI papers per faculty member, there is a difference of 0.1 between metropolitan (0.2) and non-metropolitan (0.1) universities, meaning that for every 2 papers published by 10 faculty members of metropolitan universities, 1 will be published by those of non-metropolitan universities.

<a>Table 3> Analysis of factors that influence metropolitan universities' graduate employment rate

Variable	(1)	(2)	(3)	(4)
Percentage of courses taught by full-time faculty (%)	-0.051 (0.054)	-0.049 (0.054)	-0.036 (0.056)	-0.054 (0.054)
Average CSAT score (0 ~ 400)	0.050*** (0.010)	0.048*** (0.011)	0.044*** (0.012)	0.022* (0.013)
Log value of admission capacity	-4.719*** (0.968)	-4.567*** (1.042)	-4.632*** (1.046)	-4.141*** (1.002)
University established after the adoption of the normative system	2.335 (1.980)	2.036 (2.121)	2.279 (2.141)	1.720 (2.042)
Proportion of humanities & social sciences and arts & physical education majors	-0.187*** (0.035)	-0.184*** (0.036)	-0.169*** (0.040)	-0.172*** (0.038)
Number of full-time faculty per student		4.921 (12.280)	2.451 (12.615)	1.828 (12.001)
Log value for the amount of government funding per student			0.350 (0.403)	0.260 (0.384)
Log value for per-student grants transferred from industry- academic cooperation departments and school-based enterprises				0.008*** (0.002)
Year dummy controlled	0	0	0	0
Constant value	89.486*** (7.848)	88.368*** (8.351)	86.551*** (8.615)	89.438*** (8.227)
Obs.	155	155	155	155
Adjusted coefficient of determination	0.3331	0.3293	0.3281	0.3920

Note: Figures in () are standard errors. * p<0.1; *** p<0.05; *** p<0.01.

Source: Reproduction of data provided by Higher Education in Korea (http://www.academyinfo.go.kr).

it presents the opportunity to investigate the differences between the behavior of universities based on whether they have regulated admission quotas or not.

Table 3 shows that the educational performance (graduate employment rate) of metropolitan universities is contingent on individual students' competence level and not on the efforts of the respective universities. A rise of 100 points in the average CSAT score accounts for a 2.2~5%p increase in the graduate employment rate, but the percentage of courses taught by full-time faculty is found to have contributed little to the employment rate.

The above findings prove that universities in metropolitan areas have little incentive to improve their education services. Indeed, the reason behind the insignificant contribution of the percentage of courses taught by full-time faculty to the improvement of educational performance may be due to the fact that there is an ample supply of competent part-time lecturers in the region whose quality is similar to that of full-time lecturers. However, even if the quality of part-time lecturers is superior, the bond that the full-time faculty have with the students and their education must be taken into account. Furthermore, as expected, Table 3 confirms that graduate employment rates decrease with an increase in the number of enrollments and students majoring in humanities and social sciences, and arts and

metropolitan
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Non-

<Table 4> Analysis of factors that influence non-metropolitan universities' graduate employment rate

Variable	(1)	(2)	(3)	(4)
Percentage of courses taught by full-time faculty (%)	0.107** (0.048)	0.115** (0.049)	0.118** (0.049)	0.119** (0.049)
Average CSAT score (0 ~ 400)	-0.011 (0.009)	-0.009 (0.009)	-0.012 (0.010)	-0.013 (0.010)
Log value of admission capacity	-1.176** (0.511)	-1.292** (0.535)	-1.323** (0.536)	-1.333** (0.540)
University established after the adoption of the normative system	3.515*** (1.264)	3.532*** (1.266)	3.619*** (1.269)	3.624*** (1.272)
Proportion of humanities & social sciences and arts & physical education majors	-0.234*** (0.028)	-0.238*** (0.029)	-0.232*** (0.030)	-0.232*** (0.030)
Number of full-time faculty per student		-10.622 (14.503)	-11.287 (14.517)	-11.327 (14.552)
Log value for the amount of government funding per student			0.335 (0.332)	0.330 (0.333)
Log value for per-student grants transferred from industry- academic cooperation departments and school-based enterprises				0.001 (0.006)
Year dummy controlled	0	0	0	0
Constant value	74.679*** (6.222)	75.415*** (6.309)	73.715*** (6.530)	73.843*** (6.583)
Obs.	222	222	222	222
Adjusted coefficient of determination	0.4248	0.4236	0.4236	0.4210

Note: Figures in () are standard errors. * p<0.1; ** p<0.05; *** p<0.01.

Source: Reproduction of data provided by Higher Education in Korea (http://www.academyinfo.go.kr).

physical education majors.⁸⁾ The same phenomenon can be seen in Table 4 for universities in non-metropolitan areas.

Table 4 shows that in the case of universities in non-metropolitan areas, educational performance (graduate employment rate) is contingent on universities' efforts and not the competence level of the students. And although CSAT scores are unrelated to the graduate employment rate, a 10%p rise in the percentage of courses taught by full-time faculty is the equivalent to a 1.07~1.19%p increase in the graduate employment rate. This may also imply that unlike metropolitan universities, there is a wide quality gap between part-time lecturers and full-time faculty at non-metropolitan universities. Nevertheless, the results are still significant since increasing the pecentage of courses taught by full-time faculty is a major part of universities' efforts to enhance education quality. What is confirmed here is that the educational performance of non-metropolitan universities that do not have location premium and regulated admission quotas can be changed through the efforts

⁸⁾ If investments do not correlate with the increase in students, this could negatively impact students' educational performance and may lead to difficulties in the management of students, lectures and employment and start-ups. As such, small universities are more preferable as opposed to large universities with regards to student and degree management, which is the basis for the argument that even with autonomy, admission quotas cannot be limitless.

of the respective universities. Furthermore, contrary to general beliefs, the graduate employment rate of non-metropolitan universities established after the adoption of the normative system is higher than that of others.⁹⁾

As seen above, despite metropolitan universities having higher quality students, the graduate employment rates are lower. Furthermore, the graduate employment rate of metropolitan universities is determined by preliminary input factors such as the student's entrance scores while that of non-metropolitan universities are affected by process input factors such as the efforts made to improve education service. But, due to the limitations in the available data, it would be exaggeration to claim that the efforts made by universities in metropolitan areas to enhance educational performance are weak purely based on the analysis results.

Nonetheless, based on the theoretical argument that excessive demand reduces the incentive for universities that have regulated admission quotas to improve the quality of their education services, this paper has deduced implications for the behavior of universities in metropolitan areas. Specifically, although the regulated admission quota was implemented to alleviate the excessive concentration in metropolitan areas, the current structure (quotas can be filled without effort and the number of enrollments cannot be increased even with more effort) will fail to encourage universities to boost efforts to strengthen educational performance.

IV. Conclusion and Policy Recommendations

In order to enhance the competitiveness and educational performance of higher education, universities must be given autonomy and an incentive system must be established to generate competition to provide better quality education. In particular, to achieve this based on the pursuit of 'consumer-oriented' education and university restructuring through voting with feet, universities must be selected by more prospective students through the improvent of education services. However, under current policies that strictly control the admission quota of metropolitan universities, excessive demand will continue and this will result in weakening the incentive to enhance the quality of education service.

From this perspective, it is at least theoretically valid to provide universities with autonomy over their admission quotas rather than controlling them with government policies. And although the original aim of regulated admission quotas was to control the overflow in metropolitan universities, the question of how long a policy that serves to overheat the competition for private education while weakening the competition between

⁹⁾ Since the lecturers at universities that were established after the adoption of university establishment regulations are relatively younger, fixed costs such as wages are low. Therefore, such universities are able to invest in enhancing educational performance.

universities to improve education services can continue needs to be addressed.

The government's current university restructuring policy includes ranking universities based on evaluation indices and adjusting or maintaining the admission quotas accordingly. Additionally, government funding is increased based on universities' voluntary efforts to reduce their quotas. However, despite the fact that the aim of providing the incentives is to correlate the provision of higher education with the declining student population, they can result in the following problems.

Korean private universities are highly dependent on tuition-based revenue as such private universities in metropolitan areas who have regulated admission quotas as well as regulated tuition have little financial leeway. On the other hand, universities that are in less demand and able to reduce their admission quotas remain unaffected by the reductions and also profit from the funding provided by the government for meeting the reduced quota. However, this results in the failure to weed out uncompetitive universities (based on weak demand). The effect of quota reductions on universities in high demand can be divided into two forms, both of which also result in inefficiency. Firstly, it serves to reduce the opportunity for students to enroll in universities of their choice. And secondly, the reduction in admissions will deteriorate the universities' finances which will in turn cut education investments eventually diminishing the quality of education.

The most appropriate method to restructure universities is one that is founded on the market function which is centered on consumer choice. However, considering the constraints of the location premiums of metropolitan areas, this will be an impossible feat. In this respect, rather than focusing on the quality of education service, a level playing ground which minimizes the rent of location premiums should be established.

An example of this would be to maintain or reduce the current level of the total admission quota for the metropolitan area or consider giving the universities autonomy to decide their own quota within the total admission quota. More pointedly, universities would be allowed to compete with other universities in their respective regions. There will be little opposition from universities in non-metropolitan areas as this does not entail any significant changes, and as such, the political implications will be minimal. Of course in this case, there would be the burden of regularly adjusting the metropolitan universities' admission quotas to maintain fairness to those in non-metropolitan areas.

Additionally, there are numerous other measures including integrating and fostering non-metropolitan universities or to relocate metropolitan universities to non-metropolitan areas. In any case, a societal consensus must be reached. Whichever measure is selected, consideration must be given to whether the measures revitalize competition to enhance the quality of education services at universities. Furthermore, prospective students must be allowed to make their choice based on detailed and transparent information about the universities' educational environment and performance, and universities with weak competitiveness must be weeded out.

Prospective students must be able to base their choice on detailed and transparent information and universities that are in low demand must be weeded out.

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