

Why are American universities at the top of the international rankings?

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I. Introduction

During this past decade, academic life in universities has undergone substantial changes, not only in the increase in the consumption of all types of media by students, but also in the attention paid by the media to universities. Formerly, academic life and especially the competition for prestige among universities were the interest of a small sphere of people in academia. This is no longer the case. Today the publication of university rankings is widely covered by the media. The media coverage of universities' rankings and qualities has become so vigorous that some governments have increased higher education budgets with the direct aim of improving their countries' universities rankings.¹

For many years now, a striking fact related to these rankings is that US universities consistently maintain their position at the top of the rankings. Indeed, upon publication of the new format of the *Times Higher Education* (THE) ranking, THE editor Ann Mroz pointed out that the most outstanding fact is the continuing leadership of American universities, and that among the 10 top-ranked universities, only two are non-American. In the so-called Shanghai rankings (SJTU), among the 50 top-ranked universities, we find that 75 percent are from the US.

Another empirical regularity that has been emphasized is the number of private institutions among top-ranked universities. Psacharopoulos (2005) analyzed the relationship between university ownership and educational quality and showed (see Table 1) that countries with a high proportion of privately owned universities have overall better universities. Therefore he stressed the importance of private ownership for obtaining quality education. Another empirical correlation between ownership and quality is presented in Table 2, which shows that, of the 10 top-ranked US universities, nine are private.

The purpose of this paper is to determine whether universities have to be private in order to be of high quality. This paper will examine whether private ownership is an essential element affecting the quality of universities. I will show that the empirical correlations presented in Tables 1 and 2 actually blur the picture, and that the relationship between university ownership and quality is not significant.

This research shows that state ownership is actually a variable idiosyncratic to the country, due to path dependence in the establishment of higher education institutions. Indeed,

¹ Indeed, French President Nicolas Sarkozy increased the higher education budget in hopes of increasing the number of French universities among the 100 top-ranked universities.

the dissimilarity between countries regarding universities' ownership types is large, and not all countries have the same distribution of private and public institutions. In some countries, such as Japan, a strong private university sector has emerged over time; in other countries, mostly European ones, the majority of universities is owned and funded by the state. Moreover, in some countries there is strong government intervention in universities' decision-making processes, while in others the state has little or no role in universities' decisions. The third part of the paper focused on these differences among countries.

Since this paper argues that ownership is not an essential element for quality, it will pinpoint another element essential to higher education quality: flexibility. Flexibility in governance permits universities autonomy in decision-making. In this paper, we will present four different definitions of universities' flexibility. The first one is flexibility in deciding which scholars get recruited to the institution and freedom in deciding on their promotions. The second one is freedom in the student admissions process; the third is freedom of decision-making on salaries; and the fourth is freedom regarding tuition-setting.

This paper stresses that while private ownership is not a necessary condition for attaining flexibility, yet, in some cases, such as an environment of strong government intervention, it might become essential.

This paper is divided into five parts. In the next part, I define institutional quality and present a short history of the evolution of higher education. In the third part, I present a short historical perspective on ownership and define the role of government in higher education. I then analyze the relationship between universities' privatization and their quality. In part four, I empirically test the elements that affect quality and relate them to the broader intervention of governments. Part five concludes.

2. A Historical perspective on the role and quality of universities

Higher education institutions have undergone many changes over the past few centuries. For long, universities were part of the religious establishment, and their main role was to teach the liberal arts, philosophy, and theology. They were all quite prestigious, though some of them became famous for specific subjects, such as law in Bologna and medicine in Montpellier.

From their founding in the Middle Ages until the 19th century, universities had no economic or social goals. The university was intended neither to train the workforce nor to promote research and development; it was mainly the seat of theological discourse. Most university students, whose numbers were in any case quite small, were preparing for a career in the Church even after the Reformation.

During these centuries, the impact of higher education on the economy was nonexistent. Even during the first Industrial Revolution, the effect of university education on innovations was still negligible. It must be stressed that the Industrial Revolution in the 18th century was not based on theoretical knowledge developed at universities, but rather on the basis of training "on the shop-floor".²

² Economic Historians have stressed that the Industrial Revolution was not due to human capital. Mokyr wrote that: "If England led the rest of the world in the Industrial Revolution, it was despite, not because of her formal education system" (Mokyr, 1990, p.240). See also Bairoch, (1999).

Then, in the late 19th and early 20th centuries, the impact and role of the university changed, mainly due to two economic events. The first was the “second Industrial Revolution”, i.e., the rise of new industries, like chemicals and electricity, that were science based (see Landes, 1969 and Mokyr, 1993). The second was the rise of the corporate economy, and of the Chandlerian managerial enterprise that led to the process by which salaried senior managers largely took over from owners of capital and heirs of the founding families. Both engineers and managers needed specialized formal training, while the pioneers of industrialization and their heirs only had had on-the-job training (see Brezis and Crouzet, 2004).

In consequence, the medieval universities were reformed and expanded in the late 19th century. They generally became secular, and they started to teach new subjects, particularly sciences and technology and also economics. Furthermore, many new universities, funded by the state, were established in Europe, especially in England and Germany. However, the universities’ role in the economy was still a minor one.

After World War II, the role of universities continues to change. The main change was that they became critical to economic growth. From then on, universities produced multiple goods and had two main goals. The first goal is producing research and development. The university is the place where ideas are developed, innovation processes are invented, and basic research takes place. Indeed, pure and basic research cannot be supported by the private sector; therefore it must be conducted in universities.³ Second, universities educate the next generation of the labor force. Higher education leads to an increase in human capital, which is one of the main factors of production today.

Therefore, a given university’s quality becomes related to the excellence of these two elements: R&D and education.⁴ In recent years, while there have been many attempts to construct indices for these two elements, there is no agreement on what the best proxies are. Today, two main institutions publish university rankings: the *Times* Higher Education (THE), and Shanghai Jiao Tong University (SJTU). Their rankings are based on proxies for these two elements: education and R&D.

The *Times Higher Education Survey* began publishing a ranking of the 500 top-ranked universities in 2004, but, in 2010, it began developing new proxies for quality. The SJTU ranking has become well known, and it is mostly used by academia and policy-makers. There are two other rankings with a slightly lower profile: the Jiao Tong University ranking of top universities (SJTU), and the rankings compiled by the Higher Education Evaluation and Accreditation Council of Taiwan. It should be noted that while the correlation between the various rankings is quite high, it has slightly decreased over the years. Still, in 2007, the correlation between the *Times* and the Jaitong rankings was 0.78.

The empirical research in this paper is based on the SJTU 2007 ranking. We chose 2007 and not later, because, over time, universities have begun to tilt their rankings by engaging in “gaming”. This type of strategy will become more frequent, and, in consequence, rankings

³ For instance, Aghion et al. (2008) stated that basic research should be conducted in universities, while advanced research should be conducted at private institutions. The intuition underlying this statement is that scholars want “creative control”, and in exchange accept lower wages than those paid in the private sector.

⁴ A byproduct of attending university is acquiring culture, which in the past was the main goal (some outliers would claim that obtaining cultural patina is still the main goal! see for instance, Readings, 1996). In any case, indices do not test the products of university study, but only its impact on technology and education, so that culture is not included in the proxy for universities’ quality.

will become less efficient as a proxy for quality. Therefore, we should not be surprised if, over time, new methodologies and proxies will have to be developed. However, for the year 2007, the SJTU ranking is a good proxy for quality, especially given the difficulties of finding an ideal proxy.

What should be included in an ideal index of universities' quality? An ideal index for education quality should measure higher education's effects on the increase in human capital. This is not an easy matter. From a theoretical point of view, an increase in human capital can be proxied by an increase in wages, since higher quality in education means that, *ceteris paribus*, the salary of the graduate will be higher. So *a priori*, Mincer wage equations could provide a proxy for education quality because the remuneration and career path of graduates would be influenced by the prestige and quality of the university from which they graduated; and better education will be represented by higher wages.⁵ Unfortunately, it is not easy to adjust for students' abilities at the international level, and thus a proxy using Mincerian wage equations is not yet feasible. In consequence, other proxies for education have been chosen, which are usually quantitative and not really qualitative.

Regarding R&D, the best proxy for research quality of a research article or book would be to test its impact on other research. A first proxy for this impact is captured by the citation index. Another proxy is the prestige of the journal in which the article was published. Both proxies have problems. Lately, there are more concerns over whether peer review is objective: some accuse peer reviewers of nepotism, others of lack of audacity and courage.⁶ Consequently, it is not clear whether the impact of the research is influenced by the prestige of the journal. Since it is not easy to publish new indices, and in order to walk between the raindrops, most rankings are based on citation indices as well as impact factors. Despite all the caveats we have underlined in these proxies for quality, our analysis will still be based on the SJTU ranking.

3. A Historical Perspective on the ownership of universities

From the Middle Ages until the 19th century, universities were not directly funded by the state, but rather mainly by the Church or the city. In consequence, during this period the notions of ownership, and the distinction between public and private universities were irrelevant, since governments did not have a say in matters of higher education. Note, for example, that when Harvard was founded in 1636, it was a small state-church college chartered by the Massachusetts Colonial Assembly.

The structure of ownership changed at the end of the 19th century, a period wherein changes in the structure and aims of higher education occurred along with the creation of many new universities in Europe as well as in the US.

Today there are three different types of university ownership. Universities are either: (i) public, (ii) private non-profit, and (iii) private for-profit. The first group includes all institutions for whose budgets the state is responsible. The second group consists of private not-for-profit institutions, and the third group, which is still very small, contains institutions that earn a profit from providing higher education.

In most countries, the majority of institutions fall into the first category, i.e., public

⁵ See Brezis and Crouzet 2005; and Brewer et al. 1999.

⁶ Brezis (2007) and Thurner and Hanel (2010) present some of the problems with peer review.

universities. In table 3, column (7), I present, the percentage of enrollment of students in private institutions for 20 countries. It shows that the enrollment in public institutions ranges from 25% for Japan to 100% for New Zealand. It should be noted that of the 508 top universities from among 40 countries, 88% are public.

The second group includes the universities owned by a non-profit institution. These universities are the ones we coined as private, and there are 12% of the 508 top universities. The development of private universities has taken a very different path in the US and Japan compared to Europe and the developing countries. In Europe, private institutions were almost nonexistent until recently, while in US and Japan, they have always existed.

In the US and Japan, private institutions were already quite significant by the late 19th century. Moreover, in both countries, the development of private and public institutions occurred in parallel. In the US, at the end of the 19th century, private institutions constituted 78% of total enrollment in universities while public institutions constituted only 22% of total enrollment. From then on, the number of public universities as well as enrollment in the public sector has increased. It reached 50% of total enrollment in 1935, 60% in 1940, and 70% today. This increase has permitted the massification of higher education in the 20th century. It is interesting to note that the top-quality private institutions were all established before 1920, before the huge increase in public universities.

In conclusion, private institutions play a major role in the US. Private universities and colleges not only represent some 30% of total enrollment, but they are the majority of high quality institutions. However, a rapid development of public institutions occurred in the 20th century, mostly in states where the number of private institutions was small.⁷ The development of public institutions thus had the aim of developing education in the respective states and enabling students from those states to get a financial advantage.

In Japan, private institution enrollment accounts for nearly 75% of all university enrollments. However, with a few exceptions, the public universities are those ranked high; the best students and scholars are recruited to these universities, in contrast to the US.

In Europe, in contrast to the US and Japan, the private sector is not developed at all, and only recently have some private universities been established. With a broad brush, we could relate the nonexistence of private institutions in the past to the tendency of a given country toward government intervention. In countries with strong interventionism, *à la* Colbert, as in France, the government is expected to develop universities in the same way that it is responsible for primary and secondary education. Therefore, institutions in Europe were nearly all public.

Another reason given for the intense development of public institutions in Europe is that the establishment of research universities has also been related to the development of the nation-state. The creation of universities arose from the needs of modern states to adopt and develop new technologies, since states increasingly needed trained specialists and engineers, for waging war in particular and for economic development in general. Since universities became the necessary link in the chain of the success of industrialization, public universities in Europe flourished.

In conclusion, private institutions in Europe were rare; there are countries in Europe in which the private non-profit institutions (PNPs) were almost nonexistent until recently, and the private-non-profit institutions, mainly established in the 19th century, were

⁷ See Goldin and Katz, 1998.

overwhelmingly affiliated with religious groups, especially the Catholic Church.

Lately, in many countries in the world, and especially in developing countries, secular private (non-profit) institutions are burgeoning in great numbers. The case of Germany is typical. There, from 1980 on, more than 60 PNPs have been created. Indeed, due to massification as well as to the pressure of higher enrollment in existing universities, new private institutions have developed. In other words, the emergence of private (non-profit) institutions occurred in countries where massification was important but the state budget could no longer cover the expenses (see Tilak, 2003).

A good example of this is the case of Latin America, where the number of students has increased by 260% between 1960 and 1970. This increase in the number of students has been matched by an increase in enrollment in private universities from 7% of the total in 1950 to 40% in 1990.

The third type of institution is the private for-profit (PFP) university, which is quite new. While they are not numerous, it could well be that they will take off in the near future. In the UK, there are two universities that are privately financed: the University of Buckingham is a private-non-profit institution, while the BPP College is a private for-profit college, although neither is among the top 508 universities.

In conclusion, the evolution of the ownership of universities has been very different in different parts of the world. For some countries, like Japan and the US, higher education mainly started with private institutions while in Europe and developing countries the path is just the opposite. Most universities were public at the beginning of the take-off of higher education. It is not clear if there is an optimal proportion of private institutions to which most countries will converge. It could very well be that ownership is path dependent. The question we intend to elucidate in this paper is the impact of private ownership on the quality of the university.

4. Empirical Analysis

The basic relationship we test is whether the flexibility of universities and their ownership affect the quality of universities. In all countries, the universities at the top of the ranking are also the oldest universities. Therefore, we also include in the empirical test the seniority of universities. The basic equation we test is:

$$q_j = \alpha + \beta_1 Flex. + \beta_2 ownership + \beta_3 seniority + \varepsilon_j \quad (1)$$

where *Flex* is the flexibility of the university, *ownership* is the type of ownership of the university, and, in some of the regressions, we also add the *seniority* of the university.

This regression is checked at the level of the university. We have gathered data on the 508 universities that are included in the SJTU rankings. I am aware that this is a sub-sample, and it could be that, at the lower tail of the ranking of the universities, this relationship is different. The results could then be interpreted as the difference between very good quality and mild quality when we have truncated the universities that are with low quality. Before presenting the results, I will present the data.

4.1. The data

A. Quality

The dependent variable is the quality of universities, q_j . The proxy we use for this variable is the position in the ranking of a given university. Since in the ranking the best university is given as one, we have inverted the ranking, so that Harvard has a q_j of 508 and University of Memphis, ranked at ranked 508, gets a value of 1. This is an ordinal ranking, and in the future, it would be better to find a cardinal ranking for these universities.⁸ In section III above, I have raised additional problems related to the way the ranking is produced. However, this is the best proxy in existence.

In Table 3, I present a selection of data on higher education at the level of countries. This work is micro in its essence, but it is interesting to also show the data at the country level. In the first three columns, I present the number of institutions in top 100, 200 and 500. As shown in Table 4, the correlation between these three columns is very high. The correlation with GDP per capita is around 36% and the highest correlation is with the total number of students in the country.

B. Ownership

Ownership is defined as a dummy variable taking the value 1 for universities being private. As emphasized above, countries in Western Europe have almost no private institutions, and none among the top 500, while Japan, America and Eastern Europe have a large part of private institutions. I should emphasize that in this sample of top 508 universities, all private institutions are non-profit ones. In Table 4, column (7), I present the percentage of enrollment of students in private institutions. As emphasized above, among the 508 universities of the ranking which are from among 40 countries, only 12% are private.

C. Seniority

Since there is some hysteresis in the quality of any university and large changes in quality are not easily achieved, we test whether the age and seniority of universities gives them a lead in quality.

The variable we use is the year of establishment of the institution. It ranges from 1096 and 1209 for Oxford and Cambridge, to 1636 for Harvard University, and among the youngest universities in the sample is the University of California-Irvine established in 1965. The data included in the regression is the age of the university, i.e. 2007 less the year of its establishment.

D. Flexibility

One of the main differences between private and public institutions is the level of intervention by the state. There are four levels on which governments may intervene in public institutions: (1) freedom regarding tuition fees, (2) flexibility in deciding which scholars get recruited to the institution, and freedom in deciding on their promotions (3) freedom of admission of students, and (4) freedom of decisions on salaries.

⁸ Although it should be noted that the incremental difference between universities' quality is staying more or less constant, so that the problem of an ordinal ranking is not too acute.

The variance is wide among countries: on the one hand, are some of the US states, where private and public universities have total freedom in choice of students and scholars. On the other hand, in France, no flexibility is given to the heads of universities, either in their admission of students and tuition fees, or in their selection of scholars and their pay. In Table 5, I present an Index of Flexibility of public institutions in the various countries of the sample. This index was produced based on websites and a questionnaire sent to scholars from the various countries (see the appendix). For each of the categories of freedom described above, the index goes from 1 (no flexibility) to 4 (total flexibility).⁹

In Table 5, I present the different indices, as well as the sum and product of these four elements. The range for the first four indices is from 1 to 4; the range for the sum is from 4 to 16, and for the product from 1 to 256. The intuition underlying these indices is that the sum reflects the level of flexibility if there is no interrelationship between the various levels. The product represents an index based not only on flexibility *per se*, but also on cross-effect among flexibilities.

Finally, in Table 6, I present the various correlations between the different variables included in the regressions. It should be noted that the two indices for flexibility have a correlation of 0.92, and that ownership and flexibility have a correlation of 0.4 for the sum, and of 0.47 for the product.

4.2. Empirical Results

The results are presented in tables 7-8. The variable on the left hand side of the regression is the quality of universities. In Table 7, the variables on the right-hand side of the regression are private ownership and seniority (seniority is included only for US universities). Columns (1) to (3) seem to corroborate the facts emphasized by Psacharopoulos, i.e., that private ownership is linked to quality. Although the R^2 are low, the variable "private ownership" is positive and significant. Column (1) presents the data for all 508 universities. Column (2) focuses only on the top 100 universities, and in this regression the effect of ownership appears more significant. When focusing on the 166 American universities included in the ranking, in column (3), we get the same effect as for all universities in the world.

We also check the effect of seniority on the quality of US universities, since, as explained above, there could be a time effect whereby the first universities to be founded will have more time to develop a good reputation. Indeed, in column (4), we see that, by adding seniority, we find that private ownership becomes almost insignificant. This result is interesting especially because the correlation between seniority and ownership is small as shown in table 6.

In conclusion, it appears that the results at the country level, as presented by Psacharopoulos, are also robust at the individual university level. Let us now introduce the flexibility indices into the regressions,.

Table 8 shows the results of the regressions when we include the flexibility index.¹⁰ Column 1 presents the same regression as the one presented in Table 8. When we add in the

⁹ I use the same value of the index for all the different states of America. This might be problematic since, in some states, public universities have somewhat different degrees of freedom, especially in setting tuition. This assumption should be relaxed in further research.

¹⁰ Aghion, 2007 uses an index for autonomy based on questionnaire somewhat different from ours, sent to European universities only.

flexibility index, we find that the private ownership variable is no longer significant, while the index for flexibility in its two forms, product or sum, is significant (see columns 2 and 3).

In the next four columns, we add to the regression each of the elements of flexibility. We find that flexibility in tuition (*Flex-TF*) is significant. It seems *a priori* quite surprising that flexibility in setting tuition fees is so significant for quality, especially because politicians stress the importance of keeping tuition fees low. Brezis (2010) develops a signaling model that explains why tuition flexibility is in fact the element that permits a separating equilibrium. In countries with tuition fee flexibility, there will be, on the one hand, universities with superior scholars and students and high tuition; and, on the other hand, universities with less-good scholars and students and low tuition. In countries where the government decides on a flat tuition fee structure, we get a pooling equilibrium wherein there will not be high- and low-quality universities, but rather all will be on more or less the same level. Therefore, tuition flexibility is important for obtaining some high-quality universities and also some of low quality.

These tables permit us to come back to the question of ownership and flexibility. Does ownership affect quality of institutions? As mentioned above in Tables 1 and 2, it appears that it indeed does. Let us recall that Psacharopoulos (2005) found a correlation of 0.63 between the top 100 institutions and the share of private resources financing higher education. Checking simple correlations, I find that, as shown in Table 4, there is a correlation of only 0.11 between the number of institutions in the top 100 in a given country and the percentage of enrollment in private institutions.

These correlations imply that the data presented by Psacharopoulos are not sufficient to conclude an effect of ownership on quality (see also Psacharopoulos, 2003). The correct way to analyze this relationship is to check the effect of ownership on the ranking of the top 508 universities in the world at the micro-level, as we did in this paper.

The reason why ownership might influence the quality of the university is quite intuitive. In countries in which government does not give flexibility to public universities, private ones have the possibility of making their own decisions and climbing to the top.

So, it is not ownership *per se* that has an influence on the quality of universities, but rather *flexibility of governance*. Governments that leave their universities alone to make their own decisions actually give them the possibility of attaining high quality.

This result implies that public universities are not necessarily suffering from some bias in quality. Public universities suffer from the intervention of governments in their decision making.

5. Conclusion

Privatization is one of those subjects that generate fierce debate on the basis of political and philosophical arguments. On one side are the neo-liberals, who believe that privatization is the panacea to bad administration; on the other side are the neo-conservatives, who would like to keep sensitive sectors in the public sphere. Privatization of higher education is even more controversial. Public universities were established in the late 19th century on the grounds that they are the locomotives of progress. Universities are perceived as a bastion of intellectual life and national culture.

However, the university's role has changed considerably. Today, its main role is the

development of new technologies in a competitive environment. In consequence, the meaning of excellence and quality has evolved. It is no longer enough that universities are a meeting ground where students develop and express their ideas for changing society and discuss them with scholars. Today, concerns for results and efficiency have “invaded” the realm of research and higher education. A techno-bureaucratic notion of excellence is no longer perceived as contradictory to the values of the university *per se*. Today, quality is reflected in measurable terms; we have rankings, with all their flaws.

This paper has analyzed whether privatization is an important element in the quality of universities. I have shown that the main factor in universities’ success is flexibility, which enables good administration. When the public universities were created in the West, they were adapted to the economic and social environment of the times. However, today they have not adapted to globalization. The problem in public universities is too much state control and too little freedom to administer their own affairs. It is clear that if public universities want to maintain their rankings and not lose pace with the others, first and foremost they need flexibility. In the age of globalization, this effect becomes even more important, since competition among universities for good scholars and students increases.

This paper has shown that the typology of university ownership explains nothing, while the typology of flexibility is what tells the story of quality in higher education. Governments should allow universities flexibility, the *sine qua non* of quality and success. The flexibility index developed in this paper emphasizing the importance of flexibility and autonomy to the quality of universities. Although budgets are an important element of a university’s success, a university does not need to be public in order to obtain state funds. While research should be financed even more by public funds, all other state intervention should be discouraged.

This paper has shown that in order to maintain the quality of public universities, countries will have to permit universities greater flexibility. If flexibility fails to be integrated into education reforms, there are only two possible dynamic paths that countries can take: either their public universities will take a clear downhill slide and become irrelevant to quality research, or they will become privatized. In countries where unions are so strong as to prevent such changes, privatization can nevertheless emerge and save the system. Unless governments understand that the best policy is to permit at least some flexibility, privatization will become the panacea. While privatization of higher education is not a necessary phenomenon, the lack of serious reforms in countries without flexibility will bring about private universities to take the lead.

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Appendix

Questionnaire

The four questions which determine the flexibility of universities are the following:

1. Are decisions concerning recruitment of scholars taken by the university/department, or is there some intervention of the government in the recruitment of scholars?
2. Are decisions concerning acceptance of new students taken uniquely by the university, or is there some intervention of the government/state?
3. Are salaries of scholars flexible: are they open to negotiation between the university and the faculty member/candidate or are they determined by the government/state. Are there differences of wages among professors in different universities or departments?
4. Concerning tuition fees: do the universities have the freedom to set tuition fees or it is the state/government that takes this decision?

I have sent this questionnaire to some 200 scholars, and 130 scholars (from 40 countries) have responded, describing the type of system in their own country; I thank them for their help.

Table 1. Quality of Universities and Private Financing

Country	Private resources to higher education (%)	No. Universities in top 100
Austria	0	1
Denmark	0	1
France	9	4
Germany	10	7
Sweden	12	4
UK	30	11
Japan	55	5
Australia	44	2
US	67	51
Canada	39	4

Source: Psacharopoulos, 2005, Table 2.

Table 2 - List of 10 best universities in the US

Institution	Regional ranking	Private/Public
Harvard	1	Private
Stanford	2	Private
Berkeley	3	Public
MIT	4	Private
Cal Tech	5	Private
Columbia	6	Private
Princeton	7	Private
Chicago	8	Private
Yale	9	Private
Cornell U.	10	Private

Source: SJTU 2007.

Table 3- Selected Data on Higher Education

Country	No. of institutions in top 500 (1)	No. of institutions in top 200 (2)	No. of institutions in top 100 (3)	GDP per capita (in US \$) (4)	Population (in mil.) (5)	No. of students (in 000) (6)	Students in private HE institutions (in %) (7)	students per population (in %) (8)
South Africa				13,300	44.0	758		
Europe								
Austria	7	1	0	34,700	8.2	229		2.8
Belgium	7	4	0	33,000	10.4	316		3.0
Czech	1	0	0	22,000	10.2	317	6.4	3.1
Denmark	4	3	1	37,100	5.5	201		3.7
Finland	5	1	1	33,500	5.2	174		3.3
France	23	7	4	31,120	63.7	2,287	12	3.6
Germany	41	14	6	31,190	82.4	1,974	3	2.4
Greece	2	0	0	24,000	10.7	353		3.3
Hungary	2	0	0	17,500	10.0	422		4.2
Ireland	3	0	0	44,500	4.1	192	7.5	4.7
Italy	20	4	0	30,200	58.1	1,820	6.3	3.1
Netherlands	12	9	2	32,100	16.6	194		1.2
Norway	4	1	1	46,300	4.6	211		4.6
Poland	2	0	0	14,400	38.5	1,917	29.5	5.0
Portugal	2	0	0	19,800	10.6	381	25.7	3.6
Russia	2	1	1	12,200	141.4	6,884	14.9	4.9
Slovenia	1	0	0	23,400	2.0	112	2	5.6
Spain	9	1	0	27,400	40.4	1,444	12	3.6
Sweden	11	4	4	32,200	9.0	357		3.9
Switzerland	8	6	3	34,000	7.5	160	1.6	2.1
UK	42	22	11	31,800	60.8	2,336		3.8
Asia								
China	14	1	0	7,800	1321.9	9,236		0.7
China-HK	5	0	0	37,300	7.0	79		1.1
China-TW	6	1	0	29,600	22.9	1,270		5.6
India	2	0	0	3,800	1129.9	11,779		1.0
Israel	7	4	1	26,800	6.4	246	10.5	3.8
Japan	33	9	6	33,100	127.4	2,809	75.6	2.2
Singapore	2	1	0	31,400	4.6	110		2.4
South Korea	8	1	0	24,500	49.0	3,549		7.2
Turkey	1	0	0	9,100	69.7	2,454	5.2	3.5
America								
Argentina	1	1	0	15,200	40.3	1,273		3.2
Brazil	5	1	0	8,800	190.1	1,550	70.3	0.8
Canada	22	7	4	35,700	33.4	1,014		3.0
Chile	2	0	0	12,600	16.3	800	44.1	4.9
Mexico	1	1	0	10,700	108.7	2,538	33.7	2.3
United States	166	88	54	43,555	300.0	16,031	27.4	5.3
Oceania								
Australia	17	7	2	33,300	20.4	863	1.4	4.2
New Zealand	5	0	0	26,200	4.1	491	0.1	11.9
Africa								
Egypt	1	0	0	4,200	80.3	1,670		2.1

Table 4. *Correlations on various variables of Table 3.*

	Institution in Top 508	Institution in Top 200	Institution in Top 100	Gdp Per capita	Population	No. of Students	Students. in Private HE.	Students per population
Institution in Top 508	1.00							
Institution in Top 200	0.99	1.00						
Institution in Top 100	0.98	0.99	1.00					
Gdp Per capita	0.37	0.36	0.34	1.00				
Population	0.12	0.08	0.09	-0.42	1.00			
No. of Students	0.65	0.64	0.66	-0.21	0.72	1.00		
Students. in Private HE.	0.11	0.08	0.11	-0.29	0.50	0.17	1.00	
Students per population	0.08	0.09	0.11	0.19	-0.33	-0.06	-0.37	1.00

Table 5. *The Flexibility Index*

Country	Flexibility index					
	Scholars	Students	Salaries	Tuition Fees	Sum	Product
Austria	4	4	4	1	13	64
Belgium	4	4	1	1	10	16
Czech	4	4	1	3	12	48
Denmark	4	3	2	1	10	24
Finland	4	3	1	1	9	12
France	2	1	1	1	5	2
Germany	3	3	2	1	9	18
Greece	1	1	1	1	4	1
Hungary	3	4	1	2	10	24
Ireland	4	3	2	1	10	24
Italy	3	4	1	2	10	24
Netherlands	4	2	2	1	9	16
Norway	4	2	2	1	9	16
Poland	2	4	1	2	9	16
Portugal	3	2	1	1	7	6
Russia	2	3	2	3	10	36
Slovenia	4	4	2	2	12	64
Spain	3	2	1	1	7	6
Sweden	4	3	3	1	11	36
Switzerland	3	4	1	4	12	48
UK	4	4	3	3	14	144
China	4	4	3	1	12	48
China-HK	4	4	3	1	12	48
China-TW	4	3	2	1	10	24
India	4	4	2	1	11	32
Israel	4	4	1	1	10	16
Japan	4	4	4	2	14	128
Singapore	4	4	4	1	13	64
South Korea	4	4	1	3	12	48
Turkey	3	1	1	1	6	3
Argentina	4	4	1	1	10	16
Brazil	4	4	1	1	10	16
Canada	4	4	1	3	12	48
Chile	4	4	3	3	14	144
Mexico	4	4	1	1	10	16
United States	4	4	4	4	16	256
Australia	4	4	1	1	10	16
New Zealand	4	2	1	4	11	32
Egypt	3	1	1	1	6	3
South Africa	3	2	3	4	12	72

Table 6. *Correlations between the variables included in the regressions.*

	Private ownership	Sum	Product	Seniority
Private Ownership	1.00			
Sum	0.40	1.00		
Product	0.47	0.92	1.00	
Seniority	0.08	-0.09	-0.07	1.00

Table 7. Regression results: The effect of private ownership on quality of institutions

<i>Dependent variable: quality of the institution</i>				
<i>Variable</i>	(1)	(2)	(3)	(4)
Constant	247.6225 (35.83)	452.9342 (144.17)	282.3761 (19.92)	236.1385 (7.83)
<i>Private Ownership</i>	55.4568 (2.83)	23.19079 (3.62)	61.27699 (2.35)	49.80764 (1.86)
<i>Seniority</i>	-----	-----	-----	.3680387 (1.73)
R^2	0.0155	0.1177	0.0325	0.0501
<i>Obs</i>	508	100	166	166

Notes: *t* value are in parenthesis
Col.1 – top 508 universities.
Col.2 – top 100 universities.
Col.3 and 4- U.S universities in the top 508 universities.

Table 8. *Regression results: The effect of private ownership on quality of institutions*

Dependent variable: quality of the institution

<i>Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	247.62 (35.83)	163.0013 (6.13)	222.467 (22.49)	202.52 (14.32)	151.43 (3.58)	191.72 (6.72)	215.27 (13.84)
<i>Private Ownership</i>	55.45 (2.83)	27.8383 (1.32)	18.905 (0.86)	23.51 (1.10)	-----	47.57 (2.38)	36.93 (1.75)
<i>Flexibility</i> ¹		7.014 (3.30)	-----	-----	-----	-----	-----
<i>Flexibility</i> ²		-----	.241 (3.52)	-----	-----	-----	-----
<i>Flex-TF</i>		-----	-----	19.26 (3.64)	-----	-----	-----
<i>Flex-Scholr</i>		-----	-----	-----	27.76 (2.46)	-----	-----
<i>Flex-Studnt</i>		-----	-----	-----	-----	15.94 (2.02)	-----
<i>Flex-Salary</i>		-----	-----	-----	-----	-----	12.71 (2.32)
<i>R</i> ²	0.0155	0.0363	0.0391	0.04	0.01	0.02	0.02
<i>Obs</i>	508	508	508	508	508	508	508

Notes: *t* value are in parenthesis

1. Flexibility by index of sum. 2. Flexibility by index of product.