Is Privatization Necessary to achieve Quality of Universities?

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Abstract

The purpose of this study is to analyze the relationship between privatization in higher education and the quality of universities. An interesting fact is that of the top 10 universities in the US, nine are private. Previous studies have claimed that there is a relationship between the privatization of universities and their quality, since countries with a high proportion of private resources have superior universities.

The purpose of this paper is to analyze if indeed this supposed relationship is due to empirical regularities between quality and ownership, or whether the two are unrelated. The analysis presented herein is based on data collected on 508 universities in 40 countries. I show that flexibility is the important element affecting quality, and not ownership per se.

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I. Introduction

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, though some of them became famous for specific subjects, such as law in Bologna and medicine in Montpellier. Most university students, whose numbers were in any case few, were preparing for a career in the Church, even after the Reformation.

From the medieval period and on, universities were mainly funded by the church or the city. During these centuries, the impact of higher education on the economy was inexistent. Even during the first industrial revolution, the effect of university education on innovations was still negligible (see Bairoch, 1999).

Then, in the late nineteenth and early twentieth centuries, the impact and role of 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, which 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 capital owners 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 nineteenth 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.

The second main revolution in the role of universities took place following World War II. Indeed, during the last half of the twentieth century, dramatic changes took place in higher education: First, the role of universities has changed: They became critical to economic growth. As a consequence of the importance of higher education for economic development, there was a rise in the scale and scope of universities; the number of universities and colleges in the West rose, and the number of students increased even more.

Concurrently with this democratization of higher education, universities became heterogeneous not only in their specialization, but also in their quality. This is the second main change that took place in the universities during the twentieth century: the quality of education became heterogeneous. From this point on, there is a distinction between on the one hand, the elite universities, and on the other hand, the rest. Today, not only does a degree affect the remuneration and career path of graduates, but so (largely, yet not exclusively) does the prestige of the university or

college from which they graduated.[1] Concomitantly with the emergence of this heterogeneity in the quality of universities, there is also a clear distinction in the funding and ownership of universities. Some universities are private while others are public.

Not all countries have the same distribution of private and public institutions, and the dissimilarity among countries in the emergence of the type of universities is large. In some countries, such as Japan, a strong sector of private universities emerged; in other countries, mostly in Europe, the majority of universities are 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 purpose of this paper is to examine whether these two typologies, i.e., quality and ownership are related. Psacharopoulos (2005) claimed that indeed there is a relationship between the distinction of private vs. public universities and the quality of university. He showed (see Table 1) that countries with a high proportion of private financing have overall higher quality universities.

Another empirical regularity regarding the relationship between ownership and quality is presented in Table 2, which shows that of the 10 top universities in the US, nine are private. Is this correlation, presented in both tables, due to some causality? In other words, does it mean that, *ceteris paribus*, in order to be of high quality, universities have to be private? In this paper, I check whether private ownership is a necessary condition for a university's achieving quality.

I show that the empirical regularities presented in these two tables actually blur the picture, i.e., the relationship between state ownership and quality is not monotonic. There is another element that is essential to quality: flexibility. Private ownership is not a necessary condition for attaining flexibility, yet in some cases, in an environment of strong government intervention, it becomes essential.

This paper is divided into four parts. In the next part, I define quality of institutions. In the third part, I develop the typology of ownership and define the role of government in higher education. I then analyze the relationship between privatization and quality of universities. I empirically test the elements that affect quality and relate them to the broader intervention of governments. Part four presents the conclusions.

II. The Quality of Universities

From their founding in Middle Ages until the 19th century, universities had no economic or social goals. The university was intended neither to train the workforce,

[1] See Brezis and Crouzet 2005; and Brewer et al. 1999.

nor toward R&D; it was mainly the seat of theological discourse.[2] Later on, especially after the 19th century, universities started producing research and affecting the economy.

Today, universities produce multiple goods and have three main goals. The first goal is R&D. The university is the place where ideas are developed, innovation processes are invented, and basic research takes place. The literature emphasizes that 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. Universities' third role is to increase social capital. People like to have cultivated people in their milieu; it increases well-being and decreases crime. Some even believe that the main goal of higher education should rather be to attain a culture patina (see Readings, 1996).

Therefore, the quality of a given university should be related to the excellence of these two elements: R&D and education.[4] In recent years, there have been many attempts to find indices to these elements, which enable ranking universities.

It is clear that the ideal index for quality of education is related to the increase in human capital, which can be proxied by an increase in wages. Indeed, from a theoretical point of view, higher quality in education means that *ceteris paribus*, the salary of the graduate will be higher. So, assuming the same ability, better education will be represented by higher wages. For R&D, the best proxy is to check its impact on other research.

For the past few years, two institutions have published quality indices of universities, attempting to find good proxies for these two elements: education and R&D. In 2004, The Times Higher Education supplements (THES) started producing a ranking of the top 500 universities, which is popular with firms hiring new graduates, while The Shanghai Jiao Tong University (SJTU), has become well known, and is mostly used for comparison of universities by the academia and policy makers.[5] Since the correlation between both indices is 0.78, and the correlation between SJTU and the proxy of citation is 0.8, we focus only on the SJTU index (Table 3 presents the correlations between the various indices).

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[2] 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" (see Bairoch, 1999).

[3] For instance, Aghion et al. (2005a) 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] The third element, culture, is not related to quality of universities, since all institutions provide culture.

[5] See Liu, 2004. There exist also indices that specialize in the ranking of specific departments. The differences between them are small, and all indices are highly correlated. For instance, see Coupe (2004) for rankings of Economic Departments.

It should be noted that of these 508 universities from among 40 countries, only 12% are private. In Table 4, I present a summary of the data per country. However, only 15 countries have at least one university in the top 100. In column (7), I present the percentage of enrollment of students in private institutions. In the next section, I analyze the effects of the typology of ownership on the quality of universities, i.e., is private ownership an important element for the quality of a university?

III. Private vs. public institutions and quality of universities

The terminology on private and public institutions has led to some confusion in the literature. In fact, there are three different levels of analysis of the typology of ownership, which have to be analyzed separately: ownership per se, budget and flexibility. This paper focuses on ownership and flexibility.

A. Ownership

(i) Overview

Regarding ownership, this typology is valid only from the end of the 19th century, or since government has had a say in matters of higher education. Before that, the distinction between public and private universities was irrelevant, since from the Middle Ages, universities were not directly funded by the state, but rather mainly by the Church or the city. 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.

When defining the structure of ownership of universities, it should be emphasized that there are not two, but three different types of institutions: public, private non-profit, and private for-profit. The first group includes all institutions for whose budgets the state is responsible. In most countries, the majority of institutions fall into this category.

The second group is the universities owned by a non-profit institution. In Europe, until the last two decades, the private-non-profit institutions (PNP) were overwhelmingly affiliated with religious groups, especially the Catholic Church, and were mainly established in the 19th century.

Lately in many countries in the world, and especially in developing countries, secular PNP institutions are burgeoning in great numbers. Indeed, due to massification, as well as the pressure of higher enrollment in existing universities, new PNPs have developed. In other words, the emergence of PNP institutions occurred in countries where massification was very important, yet the state budget could no longer cover the expenses (see Tilak, 2003). A good example of this fact is the case of Latin America in which the increase in the number of students in Latin

America has been very big. The rate of growth of the number of students between 1960 to 1970 was 260%, and it has been mainly compensated for by an increase in enrollment in private universities, since in 1950, only 7% of the enrollment was in private universities; while in 1990 it was already 40%.

The third type of institution is the private for-profit (PFP) universities, all of which are quite new. While they are not numerous, it could well be that they will take off in the future.

There are countries in which PNPs were almost nonexistent until recently, Germany, for instance; and other countries wherein they have always existed: the US and Japan. With a thick brush, we could relate the existence of PNPs 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 almost 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.

The development of universities in the US and Japan has taken a quite different path. In these two countries, PNP institutions were already quite evolved by the late 19th century (see Table 5). Moreover, in both countries, the development of PNP and public institutions occurred in parallel.

In the US, at the end of the 19th century, circa 1890, public institutions constituted only 22% of total enrollment. From then on, the number of public universities has increased, and they have permitted the massification of the 20th century. Enrollment in the public sector increased during the 20th century to reach 50% of total enrollment in 1935, 60% in 1940, and 70% today. As shown in Table 5, the reputable PNPs were all established before 1920. Despite the importance and high quality of PNP institutions, a rapid development of public institutions occurred in the 20th century, mostly in states wherein the number of private institutions was small.[6]

The development of public institutions thus had the aim of developing education in the respective states and enabling students from those states a financial advantage. In the US, there are also some PFP institutions (see Table 6), of which three of them are mentioned in Table 5.

In Japan, private institution enrollment accounts for nearly 75% of all university enrollment. However, with a few exceptions, the public universities are those ranked

[6] See Goldin and Katz, 1998.

high; the best students and scholars are recruited to these universities. Admission to these top universities is similar to the recruitment to the *grandes écoles* in France (see Brezis and Crouzet 2005).

In Europe, in contrast to the US and Japan, the PNP sector is not developed at all, and only recently have some been established. The case of Germany is typical, wherein from 1980, more than 60 PNPs have been created. In the UK, two universities are privately financed: the University of Buckingham, which is a PNP, and the BPP college, which is a PFP. In the developing world, budget is diverted mainly to primary education, so that higher education is left mainly to financing by the private sector.

(ii) Empirical Results

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, similar to his work, I find that, as shown in Table 7, in 2006, 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.

Moreover, there is a correlation of 0.34 between the number of institutions in top 100 and the GDP per capita, and there is a strong correlation of 0.66 between the number of institutions in top 100 and the number of students in the country (see Tables 4 and 7).

These correlations imply that the data presented by Psacharopoulos, 2005 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 at the micro-level, the effect of ownership on the ranking of the top 508 universities in the world.

Table 8 shows the empirical results on the effects of ownership on quality. In column 1, on the entire set of 508 universities, the dummy for private ownership is significant. We obtain the same relationship on the sample of the top 100 universities (col. 2), and the 166 US universities included in the top 508 (col. 3).[7] So over the entire sample, private ownership affects a university's ranking.

In Table 5, it appears that the top universities are also the oldest. I therefore performed a regression checking on whether seniority has an impact on quality. In Table 8, columns 6 and 7, I show that seniority is significant, and in column 8, all variables are significant: While seniority affects quality, private ownership still has an

[7] However, when we remove the top 20 universities from the total sample, and also from the US sample, the ownership index is no longer significant (see cols. 4 and 5).

effect on the ranking of universities in their respective countries.[8]

In conclusion, it appears that the results at the country level, as presented by Psacharopoulos, are also robust at the individual university level. In the next section, I attempt to isolate which element implied by ownership leads to the relationship between ownership and quality. I focus on flexibility.

B. Interventionism and flexibility

(i) Overview

One of the main differences between private and public institutions is the level of intervention by the state. States and governments are not solely responsible for the budgets of public universities; they do sometimes intervene in their administration. There are at least four levels on which governments intervene, and in consequence, the level of flexibility of private institutions differs from that of public institutions in the same country. The four levels of flexibility are: (1) flexibility and freedom in recruitment of scholars (2) freedom of admission of students (3) freedom of decisions on salaries (4) freedom regarding tuition fees.

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, neither in their admission of students and tuition fees, nor in their selection of scholars and their pay. In Table 9, I present an Index of Flexibility of public institutions in the various countries of the sample. This index was formulated mostly based on a questionnaire sent to scholars from the various countries (see appendix). At each level, the ranking goes from 1 (no flexibility) to 4 (total flexibility).[9]

In Table 9, we present the sum of these four levels and their product. Both of these series present a different index of public institutions' flexibility. The range for the sum is from 4 to 16, and the product from 1 to 256. The intuition underlying these two possible indices is that the first index, the sum, presents the level of flexibility if there is no inter-relationship and effect between the various levels. The second index, the product, represents an index based not only on flexibility *per se*, but also on cross-effect among flexibilities.

In Table 10, I present the various correlations between the variables. 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.

[8] In column 8, the sample comprises US and UK universities only, with a dummy for the UK, which is not significant. In cols. 9 and 10, are presented the regressions for the US only, with and without the top 20 universities.

[9] Note that in this paper, I use a unique index for all the different states of America. This assumption should probably be relaxed in further research.

(ii) Empirical Results

Does flexibility affect institutions' quality? Table 11 shows the results of the regressions, including the Index of Flexibility.[10] Column 1 presents the same regression as the one presented in Table 8. When we add in the Flexibility Index, we obtain that the "private ownership" variable is no longer significant, while the index for flexibility in its two forms, product or sum, is significant (see col. 4 and 5).[11] Moreover, comparing columns 6 and 7 to column 4 of table 8, it can be noted that the flexibility index, in its two forms, are significant, while private ownership is not, and they increase significantly the R square of the regression.

So, it is not ownership *per se* that has an influence on the quality of universities, but rather *flexibility of administration*. 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.

IV. Conclusion

Privatization is one of those subjects that lead to fierce debate on the grounds of political and philosophical arguments. On one side are the neo-liberals, who believe that privatization is the panacea to bad management; 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 delicate. Public universities were established in the late 19th century on the grounds that they are the locomotives of development. Universities are perceived as the last 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 the meeting ground wherein students develop and fulminate their ideas on changing society, and discuss them with scholars. Today, 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 *per se* of the university. Today, quality is reflected in measurable elements; we have rankings, with all their flaws.

This paper has analyzed whether privatization is an important element in the

[10] Aghion, 2007 uses an index for autonomy based on questionnaire somehow different than ours, sent to European universities.

[11] In col. 2 and 3, we present regression with only the flexibility index as variable, and which is significant in both regressions.

quality of universities. I have shown herein that the main factor in universities' success is flexibility, which permits 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 the 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 ownership explains nothing, while the typology of flexibility is what tells the story of quality in higher education. Governments should give universities flexibility, the *sine qua non* of quality and success. The Index of Flexibility developed herein enables emphasizing its importance to the quality of universities.

Budgets are also an important element of a university's success. However, 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 intervention of the state is unwelcome.

This decade has seen higher education reforms in nearly all countries in the West. The sense is that the system is not prepared for the huge increase in the number of students and the fierce international competition. Therefore, France and Israel, among others, stand on the eve of far-reaching reforms in their educational systems.

This paper has shown that in order to maintain the quality of the public universities, countries will have to permit universities more 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 wherein unions are so strong as to prevent such changes, privatization will nevertheless pop up and save the system. Unless unions understand that the best policy is to permit at least some flexibility, privatization will become the panacea. While it 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

We have asked 350 scholars from 40 countries in Europe, North America, Asia and Oceania to answer to this questionnaire:

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 is it 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?

We have also compared the answers we got to the data presented by the European Union (see Eurydice European Unit, 2007). Approximatively 21% of the scholars have answered to these questions. The results are presented in table 9. We have used a scale of 1-4 freedom points to describe the degree of freedom in each category; 4 describing complete freedom to the public universities while 1 was given in the case of no flexibility. Private universities get 4 in each category.

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. *Correlation between the different proxies of quality*

	THES Overall (2006)	THES Citation (2006)	SJTU Overall (2006)	SJTU Citation (2006)
THES Overall (2006)	1.00			
THES Citation (2006)	.59	1.00		
SJTU Overall (2006)	.78		1.00	
SJTU Citation (2006)		.47	.80	1.00

Table 4. *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)
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
South Africa	4	0	0	13,300	44.0	758		1.7

Table 5. *Ranking and Ownership of Universities*

United States			
World Rank	Institution	Classification	Year of establishment
1	Harvard Univ	PNP	1636
2	Stanford Univ	PNP	1891
3	Univ California - Berkeley	Pub	1868
5	Massachusetts Inst Tech (MIT)	PNP	1861
6	California Inst Tech	PNP	1891
7	Columbia Univ	PNP	1754
8	Princeton Univ	PNP	1746
9	Univ Chicago	PNP	1890
11	Yale Univ	PNP	1701
12	Cornell Univ	PNP	1865
13	Univ California - Los Angeles	Pub	1919
14	Univ California - San Diego	Pub	1960
15	Univ Pennsylvania	PNP	1740
16	Univ Washington - Seattle	Pub	1861
17	Univ Wisconsin - Madison	Pub	1848
18	Univ California - San Francisco	Pub	1873
19	Johns Hopkins Univ	PNP	1876
21	Univ Michigan - Ann Arbor	Pub	1817
26	Univ Illinois - Urbana Champaign	Pub	1867
28	Washington Univ - St. Louis	PNP	1853
29	Northwestern Univ	PNP	1851
30	New York Univ	PNP	1831
31	Rockefeller Univ	PNP	1901
32	Duke Univ	PNP	1838
33	Univ Minnesota - Twin Cities	Pub	1851
34	Univ Colorado - Boulder	Pub	1876
35	Univ California - Santa Barbara	Pub	1905
37	Univ Maryland - Coll Park	Pub	1856
38	Univ Texas - Austin	Pub	1883
39	Univ Texas Southwestern Med Center	Pub	1943
41	Vanderbilt Univ	PNP	1873
43	Pennsylvania State Univ - Univ Park	Pub	1855
44	Univ California - Davis	Pub	1905
45	Univ California - Irvine	Pub	1965
47	Rutgers State Univ - New Brunswick	Pub	1766
49	Univ Pittsburgh - Pittsburgh	Pub	1787
50	Univ Southern California	PNP	1880
51	Univ Florida	Pub	1853
58	Univ North Carolina - Chapel Hill	Pub	1879
60	Carnegie Mellon Univ	PNP	1900
61	Ohio State Univ - Columbus	Pub	1870
68	Purdue Univ - West Lafayette	Pub	1869
70	Brown Univ	PNP	1764
74	Univ Arizona	Pub	1885
75	Univ Rochester	PNP	1850

78	Case Western Reserve Univ	PNP	1967
80	Michigan State Univ	Pub	1855
83	Boston Univ	PNP	1839
87	Rice Univ	PNP	1891
90	Indiana Univ - Bloomington	Pub	1820
91	Texas A&M Univ - Coll Station	Pub	1871
93	Univ Utah	Pub	1850
96	Arizona State Univ - Tempe	Pub	1885
97	Univ Iowa	Pub	1847
102	Univ Massachusetts - Amherst	Pub	1863
103	Georgia Inst Tech	Pub	1885
105	Oregon State Univ	Pub	1868
107	Univ California - Riverside	Pub	1954
108	Tufts Univ	PNP	1852
110	Univ Virginia	Pub	1819
116	Emory Univ	PNP	1836
125	Baylor Coll Med	PNP	1900
126	Mayo Clinic Coll Med	PNP	1972
131	Univ Hawaii - Manoa	Pub	1907
135	Dartmouth Coll	PNP	1769
138	Univ California - Santa Cruz	Pub	1965
139	Univ Georgia	Pub	1785
140	Univ Illinois - Chicago	Pub	1890
141	North Carolina State Univ - Raleigh	Pub	1887
147	Univ Massachusetts Med Sch	Pub	1962
152	Univ Tennessee - Knoxville	Pub	1794
153	Colorado State Univ	Pub	1870
155	Univ Miami	PNP	1925
156	State Univ New York - Stony Brook	Pub	1957
158	Virginia Tech	Pub	1872
159	Florida State Univ	Pub	1851
166	Univ Texas Health Sci Center - Houston	Pub	1972
169	Univ Cincinnati - Cincinnati	Pub	1819
171	Iowa State Univ	Pub	1856
173	Virginia Commonwealth Univ	Pub	1838
177	Univ Alabama - Birmingham	Pub	1900
178	Univ Texas M.D. Anderson Cancer Center	Pub	1941
182	Univ Connecticut - Storrs	Pub	1881
185	Univ Nebraska - Lincoln	Pub	1869
187	Oregon Health & Sci Univ	Pub	1974
191	Univ Delaware	Pub	1743
193	Univ Maryland - Baltimore	Pub	1807
200	Mt Sinai Sch Med	Pub	1963
203	Univ Med & Dentistry New Jersey	Pub	1970
204	George Mason Univ	Pub	1957
205	Univ Colorado Health Sci Center	Pub	1912
208	Rensselaer Polytechnic Inst	PNP	1824
210	Yeshiva Univ	PNP	1886
215	Univ Kentucky	Pub	1865
221	Univ Kansas - Lawrence	Pub	1865
222	Univ Missouri - Columbia	Pub	1839

231	Univ Notre Dame	PNP	1842
232	Washington State Univ - Pullman	Pub	1890
233	Univ New Mexico - Albuquerque	Pub	1889
234	Brandeis Univ	PNP	1948
235	Louisiana State Univ - Baton Rouge	Pub	1859
238	Univ South Carolina - Columbia	Pub	1801
239	Univ Houston	Pub	1927
240	Univ Vermont	Pub	1791
243	Univ Oregon	Pub	1876
248	George Washington Univ	PNP	1821
249	State Univ New York - Buffalo	Pub	1846
260	Univ Texas Health Sci Center - San Antonio	Pub	1959
266	Univ South Florida	Pub	1956
273	Wake Forest Univ	PNP	1834
278	Wayne State Univ	Pub	1868
279	State Univ New York - Albany	Pub	1844
283	Syracuse Univ	PNP	1870
284	Univ Texas Med Branch - Galveston	Pub	1891
296	City Univ New York - City Coll	Pub	1847
298	Univ Alaska - Fairbanks	Pub	1917
302	Georgetown Univ	PNP	1789
306	Kansas State Univ	Pub	1863
309	Thomas Jefferson Univ	PNP	1824
320	Univ New Hampshire - Durham	Pub	1866
323	Univ Rhode Island	Pub	1892
326	Med Univ South Carolina	Pub	1824
333	Univ Central Florida	Pub	1963
336	Tulane Univ	PNP	1834
347	Texas Tech Univ	Pub	1923
348	Clemson Univ	Pub	1889
351	Univ Montana - Missoula	Pub	1893
352	St.Louis Univ	PNP	1818
353	State Univ New York Health Sci Center - Brooklyn	Pub	1860
356	Univ Nevada - Reno	Pub	1874
359	Univ Oklahoma - Norman	Pub	1890
362	San Diego State Univ	Pub	1897
363	Univ Texas - Dallas	Pub	1956
372	Temple Univ	Pub	1884
373	Indiana Univ - Purdue Univ - Indianapolis	Pub	1969
380	Univ Arkansas - Fayetteville	Pub	1871
386	Brigham Young Univ - Provo	PNP	1875
388	Utah State Univ	Pub	1888
399	Auburn Univ	Pub	1856
400	Med Coll Wisconsin	PNP	1893
402	Univ Nebraska - Med Center	Pub	1880
414	Univ Wyoming	Pub	1886
417	Univ Maryland - Baltimore County	Pub	1966
420	Michigan Tech Univ	Pub	1885
436	Drexel Univ	PNP	1891
438	Univ Connecticut Health Center	Pub	1961
443	Florida International Univ	Pub	1965

450	Northeastern Univ	PNP	1898
451	Mississippi State Univ	Pub	1878
452	Southern Methodist Univ	PNP	1911
458	Univ Akron	Pub	1870
463	Boston Coll	PNP	1827
464	Univ Maine - Orono	Pub	1862
472	Univ Idaho	Pub	1889
474	Univ Kansas Med Center	Pub	1905
476	Med Coll Georgia	Pub	1828
478	Lehigh Univ	PNP	1865
480	West Virginia Univ	Pub	1867
481	Univ Louisville	Pub	1798
485	Univ Wisconsin - Milwaukee	Pub	1956
487	Coll William & Mary	Pub	1693
491	New Mexico State Univ - Las Cruces	Pub	1888
497	Howard Univ	PNP	1867
504	Old Dominion Univ	Pub	1930
507	Montana State Univ - Bozeman	Pub	1893
508	Univ Memphis	Pub	1912
	University of Phoenix	PFP	1976
	Walden University	PFP	1971
	Capella University	PFP	1993

United Kingdom

World Rank	Institution	Classification	Year of establishment
4	Univ Cambridge	Pub	1209
10	Univ Oxford	Pub	1096
23	Imperial Coll London	Pub	1907
25	Univ Coll London	Pub	1826
48	Univ Manchester	Pub	1824
53	Univ Edinburgh	Pub	1582
62	Univ Bristol	Pub	1876
72	Univ Sheffield	Pub	1897
81	Univ Nottingham	Pub	1798
84	King's Coll London	Pub	1829
92	Univ Birmingham	Pub	1900
111	Univ Liverpool	Pub	1881
130	Univ Sussex	Pub	1961
136	Univ Leeds	Pub	1831
142	Univ Glasgow	Pub	1451
170	Univ Southampton	Pub	1862
176	Univ East Anglia	Pub	1963
180	Univ Durham	Pub	1832
186	Univ Leicester	Pub	1921
188	Cardiff Univ	Pub	1883
189	Univ St Andrews	Pub	1413
199	Queen Mary, Univ London	Pub	1785
216	Univ Reading	Pub	1892
226	Univ Aberdeen	Pub	1495

229	Univ York	Pub	1963
230	Univ Newcastle-upon-Tyne	Pub	1963
246	Univ Warwick	Pub	1965
250	Univ Bath	Pub	1966
255	Univ Dundee	Pub	1881
262	Univ Lancaster	Pub	1964
281	Queen's Univ Belfast	Pub	1845
282	London Sch Economics	Pub	1895
292	London Sch Hygiene & Tropical Med	Pub	1899
308	Open Univ	Pub	1969
357	Univ Essex	Pub	1964
361	Univ Exeter	Pub	1855
392	Royal Holloway, Univ London	Pub	1849
421	Univ Wales - Swansea	Pub	1920
425	Univ Surrey	Pub	1891
439	Brunel Univ	Pub	1966
489	Birkbeck, Univ London	Pub	1823
505	Univ Strathclyde	Pub	1796
	University of buckingham	PNP	1974
	BPP college	PFP	2007

Japan

World Rank	Institution	Classification	Year of establishment
20	Tokyo Univ	Pub	1877
22	Kyoto Univ	Pub	1897
67	Osaka Univ	Pub	1869
77	Tohoku Univ	Pub	1907
94	Nagoya Univ	Pub	1871
99	Tokyo Inst Tech	Pub	1881
149	Hokkaido Univ	Pub	1876
150	Tsukuba Univ	Pub	1872
154	Kyushu Univ	Pub	1903
267	Kobe Univ	Pub	1902
285	Keio Univ	PNP	1858
293	Hiroshima Univ	Pub	1929
312	Okayama Univ	Pub	1870
334	Niigata Univ	Pub	1921
339	Waseda Univ	PNP	1882
369	Kanazawa Univ	Pub	1949
370	Tokyo Med & Dental Univ	Pub	1946
382	Yamaguchi Univ	Pub	1949
405	Nagasaki Univ	Pub	1949
407	Univ Tokushima	Pub	1874
412	Gunma Univ	Pub	1949
413	Chiba Univ	Pub	1901
415	Nihon Univ	Private	1889
422	Tokyo Univ Agr & Tech	Pub	1877
427	Kagoshima Univ	Pub	1949
428	Osaka Prefecture Univ	Pub	1888

431	Gifu Univ	Pub	1949
433	Osaka City Univ	Pub	1880
442	Ehime Univ	Pub	1949
444	Tokyo Metropolitan Univ	Pub	1949
483	Kumamoto Univ	Pub	1874
498	Juntendo Univ	Private	1838

Table 6. *Higher Education Institutions and Enrollments in the US*

Table 1. U.S. Postsecondary Institutions and Enrollments: Fall 2001

	Public	Private Not-for-Profit	Private For-Profit	Total
Institutions	2,099	1,941	2,418	6,458
Four-Year	629	1,567	324	2,520
Two-Year	1,165	269	779	2,213
Less than Two-Year	305	105	1,315	1,725
Enrollment	12,370,079	3,198,354	765,701	16,334,134
Four-Year	6,236,486	3,120,472	321,468	9,678,426
Two-Year	6,047,445	63,207	241,617	6,352,269
Less than Two-Year	86,148	14,675	202,616	303,439

Source: American Council on education, 2002. Page 2.

Table 7. *Correlations*

	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 8. *Regression results*

Regression results: The effect of private ownership on quality of institutions ***Dependent variable: quality of the institution***										
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	247.6225 (35.83)	452.9342 (144.17)	282.3761 (19.92)	242.4908 (35.90)	266.9174 (19.02)	237.6648 (7.82)	251.0822 (9.29)	247.3975 (13.35)	236.1385 (7.83)	241.8687 (7.41)
Private Ownership	55.45689 (2.83)	23.19079 (3.62)	61.27699 (2.35)	18.85533 (0.91)	26.43392 (0.95)	----------	----------	52.60046 (2.08)	49.80764 (1.86)	22.8271 (0.81)
Seniority	----------	----------	----------	----------	----------	.4657602 (2.25)	.2505058 (2.55)	.2784201 (2.78)	.3680387 (1.73)	.1999353 (0.85)
Country	----------	----------	----------	----------	----------	----------	----------	-1.636305 (-0.06)	----------	----------
R^2	0.0155	0.1177	0.0325	0.0017	0.0062	0.0299	0.1398	0.0630	0.0501	0.0112
Obs	508	100	166	488	146	166	42	208	166	146

Notes: *t value are in parenthesis*
Col.1 – top 508 universities.
Col.2 – top 100 universities.
Col.3,6, 9 - U.S universities in the top 508 universities.
Col.4, 10 – excluding world top 20 universities.
Col.5 – Top 20 U.S universities are excluded.
Col.7 – UK universities in the top 508 universities
Col.8 – Top US and UK universities in the top 508. Variable country is a dummy with value 1 for the UK.

Table 9. *The Flexibility Index*

Country	Flexibility index[12]					
	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[13]	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

[12] Flexibility of public institutions.
[13] Provincial universities are less flexible in recruitment of scholars and students.

Table 10. *Correlations between ownership and flexibility*

	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 11. *Regression results*

Regression results: The effect of flexibility on quality of institutions
Dependent variable: quality of the institution

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	247.6225 (35.83)	152.5385 (6.01)	221.3902 (22.57)	163.0013 (6.13)	222.4676 (22.49)	177.7336 (6.82)	224.8281 (23.30)
Private Ownership	55.45689 (2.83)	----------	----------	27.83837 (1.32)	18.90544 (0.86)	-7.956716 (-0.35)	-13.9125 (-0.60)
Flexibility[1]	----------	8.12366 (4.15)	----------	7.014978 (3.30)	----------	5.453894 (2.60)	----------
Flexibility[2]	----------	----------	.268824 (4.45)	----------	.2410403 (3.52)	----------	.1801704 (2.64)
R^2	0.0155	0.0330	0.0377	0.0363	0.0391	0.0146	0.0151
Obs	508	508	508	508	508	488	488

Notes: t value are in parenthesis
1. Flexibility by index of sum.
2. Flexibility by index of product.