Strong State and Weak Universities: the Long-Term Roots of the Spanish University System Problems*

Estado fuerte y universidades débiles: el trasfondo de los problemas del sistema universitario español

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Abstract: State intervention in the academic world has been excessive and inadequate in Spain. It has crowded out industry rather than promoted a fruitful relationship among "academia, government and industry" as the support for a long-term knowledge-based advanced society. Enrollment rates from 1857 to 2000, as well as research indicators support this hypothesis. This has resulted in a university and research system too closely linked to public demands rather than to social and economic needs. Spain's ability to produce and apply new knowledge has thus been hampered, in spite of significant public investments in higher education and science.

Keywords: Spain, University, Research, Higher education, Long-term trends, Human capital.

Resumen: Intervención del Estado en el mundo académico ha sido excesiva e inadecuada, y ha desplazado a la industria en lugar de promover una relación fructífera entre "academia, gobierno e industria", como base de una sociedad avanzada sustentada en el conocimiento a largo plazo. Las tasas de matrícula 1857-2000, así como los indicadores de investigación apoyan esta hipótesis. Esto ha dado lugar a un sistema universitario y de investigación en exceso vinculado a las demandas públicas en lugar de a las necesidades sociales y económicas. La capacidad de España para producir y aplicar nuevos conocimientos se ha visto así obstaculizada, a pesar de las inversiones públicas importantes en la educación superior y la ciencia.

Palabras clave: España, Universidad, Investigación, Educación superior, tendencias a largo plazo, capital humano.

* This article is mostly based upon the author's recent book of 2013.

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Introduction

In 1899 Santiago Ramón y Cajal, the only Spanish scientist who has received the Nobel Prize for his research in Spain, wrote "[t]he long-lasting prosperity of nations is the work of Science and its applications to further life and material concerns".[1] One hundred years later, this is clearly the case: research-oriented countries, even regions such as Route 128 in Massachussets or Silicon Valley in California, are among the world's most prosperous.[2] Universities and research centers are at the heart of this long-term dynamism, fueled by a business-friendly atmosphere.

Not all countries, however, have been able to garner these positive externalities from their university systems. Jeffrey Sachs classifies world countries according to their technological profile among those that "provide nearly all of the world's technology innovations", those "able to adopt these technologies in production and consumption" and, finally, those "technologically disconnected, neither innovating at home nor adopting foreign technologies". He concludes that "[c]ountries that do not keep up with global technology often collapse, unable even to maintain their standard of living, much less increase it" and suggests that "[a] new strategy of technological promotion must be based on an interplay of academia, government and industry".[3] According to Sachs's ranking of world countries, Spain is not among those generating knowledge-led innovations and, we might add, it is thus at risk of falling behind. As a matter of fact, during the last two centuries Spain has not been able to catch up with innovation-led countries, as Graph 1 shows. In 2010 Spanish per capita income was only 55 and 81 per 100 relative to that of the USA and Germany, approximately the same levels it already had in 1850, the first date for which reliable data are available. In spite of long-term economic growth, the relative position of Spain has not changed much over

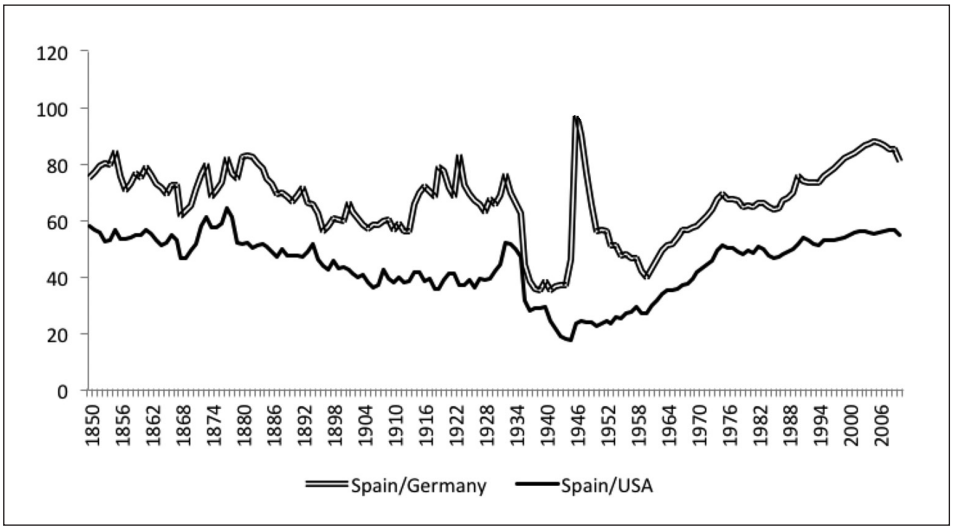
[1] Ramón y Cajal (2005, pp. 197).

[2] Silicon Valley wealth generation amounted to that of the 10th world economy in 2010. Eesley and Miller (2012).

[3] "[O]ld ideological divisions are over […b]ut a more intractable division is taking hold, this time based on technology. A small part of the globe, accounting for some 15% of the earth's population, provides nearly all of the world's technology innovations. A second part, involving perhaps half of the world's population, is able to adopt these technologies in production and consumption. The remaining part, covering around a third of the world's population, is technologically disconnected, neither innovating at home nor adopting foreign technologies" in "A new map of the world" *The Economist,* Jun 22nd 2000.

the last 150 years. Furthermore, since the outbreak of the last crisis in 2008, the country has lost ground.[4]

How well tuned to the country's needs is the Spanish university system? Who is responsible for its design? Who and how is running the system? Are there claims to change or improve it? These are some of the questions I shall address in this paper. My main thesis is that state intervention in the academic world has been excessive and inadequate, and has crowded out industry rather than promoting a fruitful relationship among "academia, government and industry" as the basis for a long-term knowledge-based advanced society. This has resulted in a university and research system too closely linked to public demands rather than to social and economic needs. Spain's ability to produce and apply new knowledge has thus been hampered, in spite of significant public investments in higher education and science.



Graph 1. Spain GDP per capita relative to USA and Germany, 1855-2010 (1990 International Geary-Khamis $). Source: Maddison Project Database (2014).

[4] The comparison is made with Germany and the USA since their university systems have been the best suited for economic growth linked to research and innovation in the 19th and 20th centuries.

The State and the Universities

Universities were born in the late Middle Ages as an "an association of masters and scholars leading the common life of learning", a trait that still defines them.[5] They survived attempts from within, by both students and teachers, and from without, by church and state, to control and suffocate their freedom of thought with myriad norms and controls. But as talented individuals deserted the universities, in the Early Modern period, many if not most succumbed to these pressures and ceased to be beacons of original thinking by the time of the Scientific Revolution of the 17th century and the Enlightenment of the 18th. At the turn of the 19th century, the stage was set for a profound renovation of the university as a center of advanced studies and a training ground for highly qualified individuals, especially civil servants. The new French university system, of which the *Grandes Ècoles* were the most research- and business-oriented part, and the Humboldt University in Berlin, became the models upon which most of continental Europe tried to renovate its institutions of higher learning. Spain was one of those countries which tried to improve their universities. However, Spanish universities surrendered academic independence to the state in exchange for financial stability. University professors became civil servants and the state regulated from the curriculum, to exams and degrees, from student admissions to the appointment of professors, or university governance.

The old British college tradition survived in Great Britain and in the USA, where they were joined by new *land-grant universities*. Vast endowments made the universities financially and, therefore, academically independent and helped create strong links between academia and the social and economic regional environment. In the 20th century a new wave of change took place across the Atlantic, as the USA government concentrated research funds on the universities during WWII, a trend consolidated during the following decades. Academic and economic independence, though increasingly sustained by state competitive funds to finance research, allowed American

[5] Other surviving characteristics are "the notion of curriculum of study, definitely laid down as regards time and subjects, tested by an examination and leading to a degree, as well as many of the degrees themselves --bachelor as a stage toward the mastership, master, doctor, in arts, law, medicine and theology. Then the faculties, four or more, with their deans, and the higher officers such as chancellors and rectors, not to mention the college, wherever the residential college still survives. The essentials of university organization are clear and unmistakable, and they have been handed down in unbroken continuity. They have lasted more than seven hundred years--what form of government has lasted so long?" Haskins (1923, p. 24).

universities to attract and retain talent from all over the world. The American university system, "bâtie en hommes" as the old medieval universities were, became the leader it is today.[6] As Clark Kerr stated, the American university "has few peers in the preservation, dissemination and examination of the eternal truths; no living peers in the search for new knowledge; and no peers in all history among institutions of higher learning in serving so many of the segments of an advancing civilization".[7] Recently, countries trying to make their universities the cornerstone of their future wellbeing, such as South Korea in the 1970s and China in the 1990s, have looked at the USA for a model. Stanford, one of the universities with stronger links to its socio-economic world has become the standard they aspire to replicate.[8]

A modern 21th century society requires a sophisticated university system, "internally inconsistent, as an institution" and yet "consistently productive" to satisfy its many needs, from professional training to highly specialized research. In order to answer to these needs, it has to be flexible and decentralized, it has to be able to cooperate and to compete, to innovate and to preserve; thus it has to be "torn by change" yet enjoy "the stability of freedom".[9] The University of California, of which Kerr himself was the President when the campuses of San Diego, Irvine and Santa Cruz were established, is a good example of the virtues of the American way. The institutional framework of the University of California allows for the coexistence of very different institutions within the same system. The University of California proper is a research and post-graduate studies institution, with ten so-called "universities", five of which figure among the fifty highest ranking universities in the world according to the *Academic Ranking of World Universities* [2012]; the State University of California has 23 campuses mainly oriented to undergraduate students; and, finally, the 110 California Community Colleges are more vocationally oriented. In addition to these, there are many private institutions, among others Stanford University, the second best and one of the world most respected, deeply embedded in the Silicon Valley economy. The

[6] According to Étienne Pasquier talking about the University of Paris, France, in the 16th century. Quoted by Haskins (1923, p. 2). Similar wording about the relevance of "talent" is found in many authors. Ramón y Cajal stated that "men, not means, are almost everything in science", (2005, Chapter VI).

[7] Kerr (1995, p. 33)

[8] In 1971 the Korean Advanced Institute of Science and Technology (KAIST) was modelled after Stanford University. Today it ranks 79 in the *Times Supplement of Higher Education*. Canosa (2011, pp. 38 ff.)

[9] Kerr (1995, p. 34). On "universities" and "university systems," see Clark (1983, p. 22).

California model is a microcosm of the larger USA university system in which leading international institutions such as Harvard, Stanford, MIT or Chicago, both public and private, coexist with colleges focused towards local demand for higher educational skills. In between these two extremes, research- and teaching-oriented, there are a host of "universities". All these institutions together form the "American university system", one of the most efficient in the world, capable of producing both good professionals and new knowledge. The necessary "internal inconsistency" is found in a complex system of different universities, both at the state and the country level which, as a whole, have proved to be "consistently productive".

How does the Spanish university system fit into the picture? Spanish universities go back to medieval times. They were beacons of learning up to the 16th century, attracting students and teachers alike from all over Europe, but they steadily declined over the following centuries.[10] In the 19th century they followed France into a path of reform aimed at reversing the previous downward trend. While French reforms succeeded, however, Spanish attempts mostly failed, except for a brief and isolated episode during the early 20th century. It was during that period that Spain followed the two-path approach France had implemented a century earlier by establishing both the universities and the *Grandes Écoles*. In 1907 the Spanish government, prompted by demands from highly respected academics in the aftermath of the 1898 crisis, chartered the *Junta para la Ampliación de Estudios (JAE – could be loosely translated as Council for Advanced Study)*, a research institution whose primary goal was to open the country to the international scientific world. Nobel-winner neuroscientist Santiago Ramón y Cajal became its first President. The JAE sent graduate students abroad and channeled them back to its new research institutes and to the universities in a comprehensive attempt to improve higher education and research. A few years later, in 1919, a couple of new university bills (*Reales Decretos*) granted each university more autonomy from the State than they had ever enjoyed. The following years are known as the *Silver Age* of Spanish science, a promising new age that came to an abrupt end with the outbreak of the Spanish Civil War in 1936. Both the universities and the JAE, renamed the *Consejo Superior de Investigaciones Científicas (CSIC, High Council for Scientific Research)*, lost their

[10] Pérez (2013) and Kagan (1981). The publication in 1514 of the Complutensian Polyglot Bible, considered one of the greatest ever research projects in philology accomplished in a Spanish university, inspired and financed by Cardenal Cisneros, is a good example of Spanish universities excellency.

independence in the new regime of General Franco. Many scientists, as happened in the rest of Europe during WWII, left the country never to return.

Spanish universities experienced a new wave of reform following the death of Franco in 1975. Discussion of the first project to transform the Universities, the stillborn *Ley the Autonomía Universitaria* (LAU), languished for several years at the *Cortes* (Congress), until it was withdrawn in 1982.[11] It paved the way for the speedy approval in 1983 of the Socialist Party (PSOE)-sponsored *Ley de Reforma Universitaria (LRU, University Reform Bill)*, which was supposed to bring the universities into the world mainstream. This was followed by a new bill, the *Ley de la Ciencia* (1986), allegedly to steer and coordinate scientific and technical research. After a number of decrees introduced further changes in the late 1980s and 1990s, two new university bills were approved in 2001 and 2007, and a fresh science bill was issued in 2011. There has been talk of an impending "new" university bill since then, and several decrees have been made official in the meantime.

Yet, these reforms have failed: expectations for a new university in Spain were high at the onset of the Transition to Democracy. They have not been fulfilled. Frequent legal changes since the first reform bill was approved in 1983 have been inadequate to provide Spanish universities with a stable and sound institutional framework that would promote excellence and diversity, "internal inconsistency" and "external consistency". Perhaps one of the universities' biggest failures has been their inability to establish a successful relationship between industry and academia; a related one is their failure to attract talent. As a result, the university system does not satisfy social needs. What went wrong with the initial 1983 design? Or was it a problem of implementation rather than design? Who is responsible for the failure, the politicians who devised the laws or the academics who applied them?

The University Reform Bill of 1983 is the backbone of the system; the bills of 2001 (LOU) and 2007 (Modified LOU) are mere revisions which do not question its main traits. All of them, including the Science Bills of 1986 and 2011, are equally interventionist and regulatory.[12] The LRU, and even more so both LOUs, regulate many issues which should have been left for each university to decide, from the definition, duration and even contents of

[11] Not surprisingly, many of the Cortes Deputies were themselves university professors. The discussions relative to their own promotions illustrate the way they came to control the university for their own benefit. *Diario de Sesiones de Cortes.*

[12] Recent university regulations follow, without knowing it, the framework of the Calomarde Decree of 1824, one of the failed attempts to turn the university of the Ancient Regime into a modern institution.

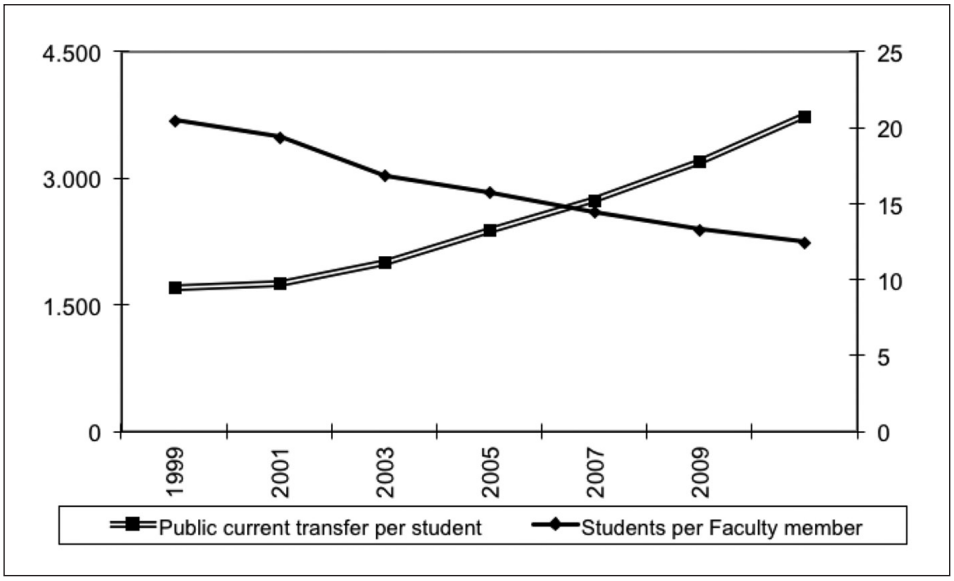
degrees, to student selection, fees, or exams; from faculty recruitment, promotion or retribution, to the organization of schools. State regulation and internal rules have stifled change within the universities, which have become self-centered, cumbersome bureaucratic machines.[13]

State intervention is particularly notorious, complex and inefficient as we shall see, in the case of university finances, from both the income and the expenditure point of view. Though autonomous in name, the universities have long been financially dependent of the state: since the early 1980s, public funds have contributed with around 75-80 per 100 of the university yearly budget. Students' fees have kept dwindling from almost 25 per 100 in 1980 to less than 15 per 100 of the budget until the early 2010s, and are fixed by the central government and the regional governments following a complex procedure which does not take into account real costs.[14] As a result, most of the Spanish public universities' income is either directly provided by the state (subsidies) or regulated by it (student fees). Activities related to services demanded by the private sector, mostly linked to research, are insignificant in university budgets, though they have increased relatively since the last crisis started in 2008. In addition to this, the state also determines a large chunk of the universities' current expenditures which are related to faculty and administrative personnel retributions, more than 80 per 100 of total expenditure. Until a recent decree in 2012 froze new recruitments, however, each university decided the size of its faculty; but, since most professors hold tenured positions and are thus considered civil servants, their retribution is fixed by the state. Thus, the government can take steps that significantly alter public universities' sources of income –i.e. annual transfers and students' fees— as well as their financial obligations–i.e. faculty salaries. The universities themselves can do the same by increasing the size of the professorial body, or the retributions of those not yet tenured and of other staff. This atypical situation has led the universities to complain about "insufficient public funding" for years, in spite of increasing public transfers prior to the 2008 crisis. Graph 2 shows how significant increases in public funds resulted in equally significant increases in the size of the faculty, even though the number of students was stable and even declining.

In spite of this stifling regulation, the LRU failed to establish the control mechanism of the decision-making prerogatives left to the newly-named

[13] When refering to "state regulation" I am considering all forms of intervention from both the central and the regional, or autonomous, governments.

[14] Uriel *et al.* (1997, p.135); and CRUE, several years.



Graph 2: Public expenditure per student and students per faculty member (Constant Euros of 1994). Source: CRUE (2008 and 2010).

"autonomous" universities: who was to set the university goals and who, and how, was to make sure that they were met. The 1983 bill gave control of each university to a governing body in which faculty had the upper hand. In one way or another, depending upon the particular university bill (1983, 2001 and 2007), the President of the University, the "Rector", as well as the school deans and department heads, are elected by the students, the staff and the faculty. Provisions for an effective control by newly created boards of trustees (*Consejos Sociales*), in which different social agents have a seat, have proved insufficient since the bill did not provide the Board of Trustees with the required control instruments: underfinanced and almost with no regular staff, they depend upon the universities' governing bodies to get regular and reliable information. Furthermore, the boards lack decision- making capacity; this belongs to the academic body, the *Claustro*.

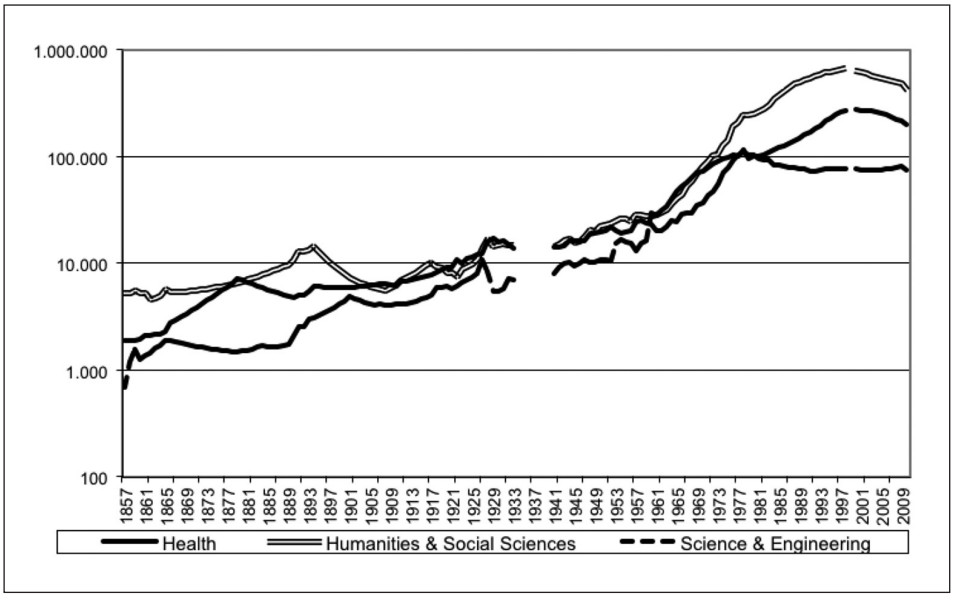
Poor and badly defined accountability processes have been recently acknowledged to be an obstacle to the successful transformation of the universities.[15] The composition of the first *Claustros* after the approval of the LRU also contributed significantly to the failure of the new institutional set-

[15] See the Informe Miras (2013) for a recent proposal to change the governance system.

ting to reform the university and make it a new "beacon of learning". Had the LRU pretended to renovate and transform the university inherited from the Franco dictatorship, it would have made faculty selection one of the keys to success. That is what Humboldt did when he launched his new university. It was also the course embraced by Spanish legislators when they launched the successful reforms of the early 20th century with the establishment of the *Junta para la Ampliación de Estudios*. By contrast, the Spanish LRU of 1983 made ALL university professors, whether civil servants or not at the time of the approval of the law, *de facto* tenured, regardless of personal merits or social needs. Once full members of the new *Claustro,* they constituted the core of the governing bodies in charge of implementing the new law. As a result, even though the bill explicitly stated that "the university should not become the patrimony of today's members", meaning explicitly professors and students, actually this is what happened. University professors, entrusted with a collegial form of governance that allows them to privilege their personal concerns, lack any incentives to work up a useful partnership with industry that would have consolidated their autonomy from the state. Instead they have become a powerful and organized *lobby* bent on extracting larger rents from the state–in the form of annual transfers of public funds. Long-term trends, in students' enrollment rates and in basic indicators of research, among others, further support this interpretation: the LRU reform, as well as the LOUs later on, promoted uniformity and continuity rather than diversity and flexibility, and prevented the rise of a university system better suited to a modern, dynamic and innovative society which could only be based upon a demanding and competitive faculty recruitment process.

A public-university or a state-university?

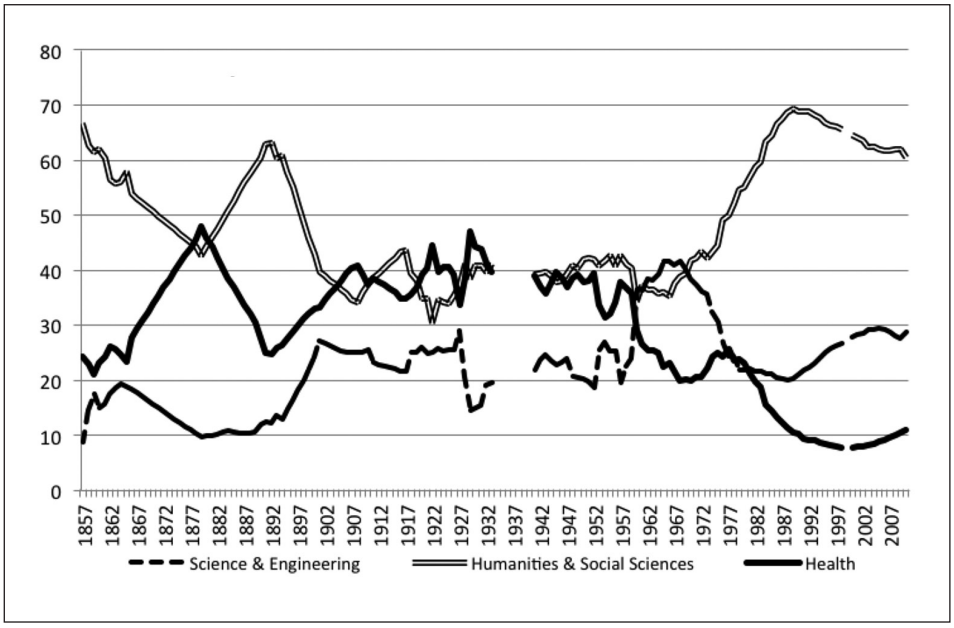
During the last century and a half, the number of Spanish university students increased from less than 10,000 to 1.5 million today (Graph 3). Enrollment rates for young people aged 20-24 moved from less than 1 per 100 to more than 30 per 100. Most of this increase took place quite recently: between 1950 and 1960 enrollment rates doubled from 4 to 8 per 100, they doubled again during the following decade and duplicated again between 1980 and 2000. Since then, enrollment rates have stabilized at around 30 per 100, figures similar to those of neighboring countries which are usually considered as a proof of success. They hide some long-term problems, however.



Graph 3: Higher education students by field of study (absolute numbers). Source: Núñez (2005) and CRUE (2010)

The Spanish state has shaped this expansion in a complex and atypical way. In the long term, the impact of the state upon the distribution of university degrees has not decreased with the reforms of the last decades. On the contrary, the state has become a greater demander of qualified civil servants to administer a large and growing welfare state than it was before. The number of civil servants in Spain has gone up from less than one million in the 1970s, 12 per 100 employed workers, to more than 3 million today, 20 per 100. To satisfy state demands, the expansion of the university system has been skewed in favor of those degrees required by the public administration itself –lawyers and economists—, the teaching and health professions, and even by the building of public infrastructures –civil engineers. Only occasionally degrees more directly related to private and directly productive activities have gained weight (Graph 4). The Humanities, with 60 per 100 of all students, and Health studies, with almost 30 per 100, dominated the late 19th century university in Spain, still a backward and poor country (see Graph 1). Science and Engineering students hardly represented another 10 per 100. Between 1900 and 1970, approximately, the raising trend in the absolute number of university students coincided with unprecedented growth in the number of those enrolled in applied disciplines. The Humanities and the So-

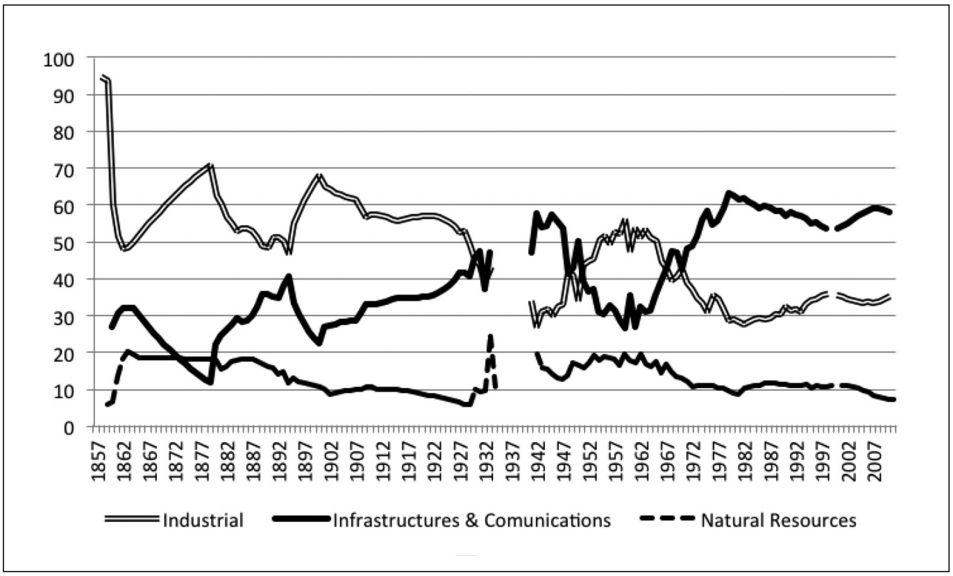
cial Sciences, on the one hand, and Health studies, on the other, were close to 40 per 100 each of all students enrolled, while Experimental Sciences and Engineering together increased their numbers to 25 per 100. During the last three decades of the 20th century, Health students dropped from almost 40 per 100 in the late 1950s, prior to the great increase in absolute enrollment rates, to around a mere 10 per 100 following a 1979 state regulation limiting the number of medical students to adjust them to hospital demands. Social Sciences together with the Humanities took the lead again with their largest numbers ever, between 60 and 70 per 100 of all university students. After reaching 40 per 100 in the 1960s and 1970s, the numbers of Engineering and Science students returned from the 1980s on to their standard 20 to 30 percent of registered undergraduates.



Graph 4: University students by field of study (%). Source: Núñez (2005) and CRUE (2010)

Surprisingly, most significant changes in the Spanish universities, as suggested by student enrollment rates, did not take place following the 1983 LRU, launched to transform them. Growth in the absolute number of students took place much earlier, from the late 1950s on and especially after the Stabilization Plan of 1959, implemented on the recommendations of the International Monetary Fund and the OECD. It was precisely then, in the

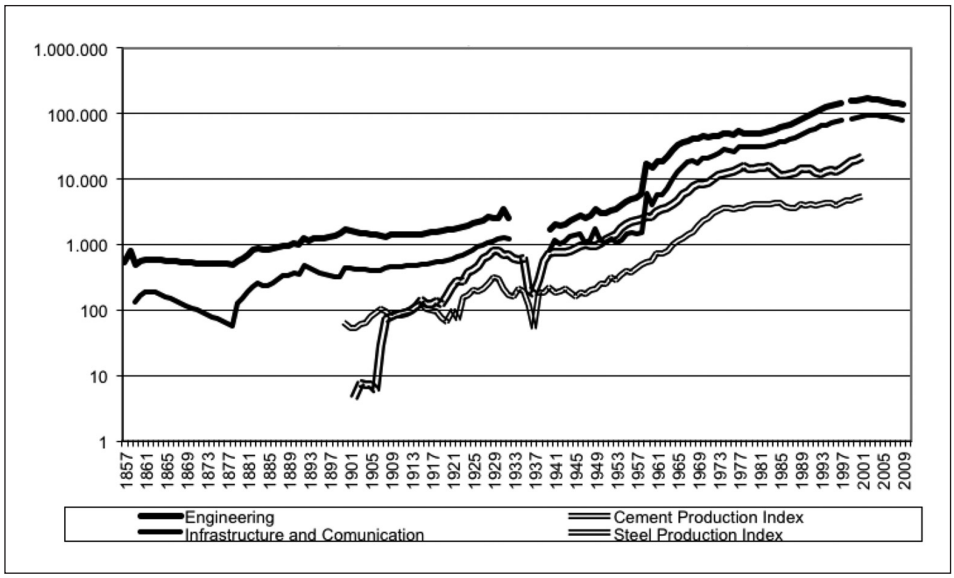
1960s, that the Engineering and Experimental Sciences reached 40 per 100 of all registered students, overcoming for a short while the largest group, that of Liberal Art students. During those years, known in Spain as those of "el desarrollismo" or fast economic development, industrial engineering surpassed infrastructure and communication engineering as the field of study attracting most students. A decade later, in the 1970s, growth in the absolute number of university students accelerated, and Liberal Arts studies, especially those related to the Social Sciences, took the lead again. Thus, in the 1960s, and in spite of being still centralized and state-directed, the universities veered towards the new industrial needs of the country; from the 1980s on, the newly "autonomous" universities expanded to unprecedented levels, yet they did so in more traditional and state-oriented fields. Less demanding access requirements might explain the higher concentration of students on the Social Sciences and the Humanities; they do not account, however, for the redistribution of engineering students away from Industrial engineering and in favor of civil works (Graph 5), which might be related to state needs.



Graph 5: Engineering students by field of study (%). Source: Núñez (2005) and CRUE (2010).

After the Spanish Civil War, industrial engineering led as a field of higher education in the 1960s and 1970s, as infrastructure and communication engineering had done before and was to do afterwards. During most

of the 20th century, civil engineering has dominated as a field of study led by substantial public investments in large infrastructure projects, much in the same way that steel and cement dominated industrial production (Graph 6). The process began in earnest in the 1920s, with the expansion of public works during the Primo de Rivera Dictatorship (1923-1930), and was resumed during the Franco Dictatorship (1939-1975), when huge dams were built. From the 1980s on European Regional Development Funds (ERDF) helped modernize the country's infrastructure, especially roads and high-speed trains. Even though technologically dependent, construction firms flourished and, during the last economic crisis, successfully competed for public works abroad.

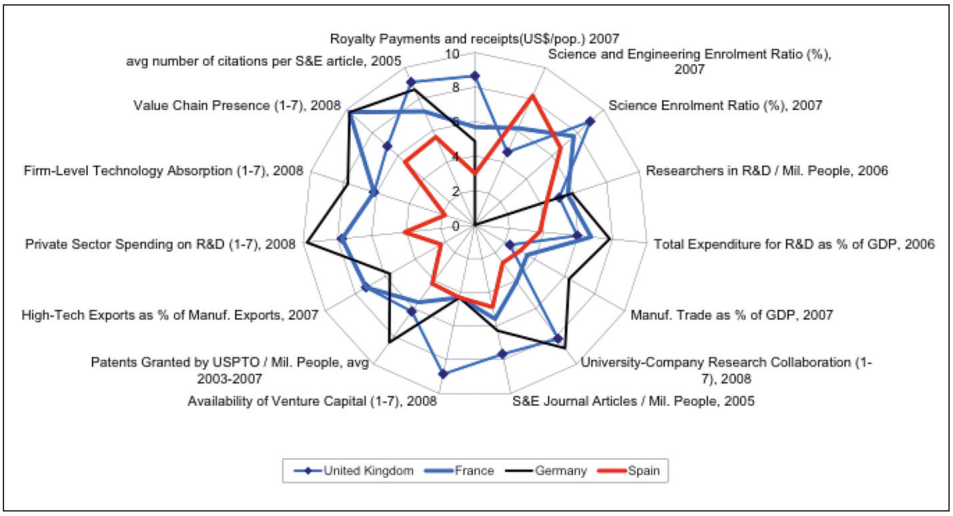


Graph 6: Engineering students (absolute numbers) and steel and cement production (Index numbers 1913=100). Source: Núñez (2005), CRUE (2010) and Carreras (2005)

Even though the distribution of higher education students by field of study is roughly similar to that of the average OCDE countries, Spain today has fewer Science and Engineering students linked to research, innovation and private enterprise.[16] As Graph 5 shows, in the long term only 10 per 100 of all students have registered in disciplines directly related to the management of natural resources –mining, agriculture and forestry, or fishing—, the main

[16] OCDE (2011).

export sectors during the 19th century and most of the 20th. Not surprisingly, foreign companies supplied the technology as well as the technicians needed to exploit most of the rich Spanish iron, copper and lead mines in the 19th century.[17] Furthermore, the modernization of Spanish Mediterranean-type agriculture, one of the most competitive in the European Union today, took place in the late 20th century, based upon foreign innovations, from California some of them.[18] The Spanish universities did not provide either economic sector with a competitive innovation edge, based upon original research. According to Ortiz-Villajos [1999] this reliance upon knowledge and innovation from abroad has seriously hampered the growth of those economic sectors in which Spain had a comparative advantage, such as mining and agriculture. Rather than lead the economic modernization of the country, these economic sectors were unable to generate their own technology and to extend forward and backward linkages over other economic areas. The annual COTEC reports stress that, even today, Spanish enterprises have a very low level of innovation and this has a significant negative impact upon their productivity. Today Spain ranks 25 out of 45 high-income countries by its innovation index, adjusted for population size, according to the World Bank Knowledge Index, and is behind most large UE countries except Italy, Greece and Portugal.



Graph 7: Indicators of the Knowledge Economy in some European Countries. Source: The World Bank (2012): Knowledge Economy Index

[17] For a summary see Tortella and Núñez (2013, pp. 148-50, 262-64).
[18] Morilla (1999).

But the influence of the state reaches still further. By subsidizing research projects, the state has also set the country's research agenda. Furthermore, in an attempt to favor university research, in 1989 a *Real Decreto* linked a small part of the retribution of university professors to their "research productivity", meaning number of publications. Neither patent production nor close relationship with industry have been considered relevant by state regulation of research funds, until very recently and within very restrictive limits (*2011 Science Bill*). As a result, the number of research publications has increased significantly in the last decades while that of patents has remained very low. Today, Spain contributes 3 per 100 of the world scientific production. Yet, our tenth position in terms of research papers fades to a mere 40th when accounting for their impact. Between 2002 and 2012, the number of publications for a five year period multiplied by 57 per 100, from 142,767 to 223,927; yet, quotations by article only increased by 32 per 100, from 4.30 to 5.69. All disciplines suffered from similar low impact levels: in social sciences Spain became the seventh country by number of publications, yet only the 76th, out of 106, by citations; in Biology the 9th in publications, and the 36th out of 93 in citations; in Computer Sciences 10th and 31th out of 81; in Clinical Medicine 11th and 39th out of 109; in Engineering 12th and 29th out of 97; etc…[19] The record for patent production is equally dismal: 4.22 in the period 2003-2007 against 8.44 in Germany, 6.22 in Great Britain and 5.56 in France The transfer of knowledge has not been successfully pursued by the Spanish universities and, as a result, the relative weight of business innovation in the country has been very poor: high-tech exports as a percentage of all manufacture-exports, firm-level technology absorption, or royalty payments and receipts, among other indicators, are the lowest among leading European countries such as Germany, Great Britain and France. Not surprisingly, private enterprise hardly contributes to finance university research and has remained mostly aloof from it (Graph 7). Thus, Spain's relatively low expenditure on research –50 per 100 of USA's expenditures and 70 per 100 of that of the EU15, weighted by population— is mainly explained by the low level of private research expenditure, which falls behind that of many other countries.[20] But, since the universities have turned their back on private enterprise, there is little hope that private firms might contribute to financing research in the immediate future. Unless the institutional setting changes and shifts towards the needs of private business, no significant increase in private funds is to be expected.

[19] ISI Web of Knowledge.
[20] Cotec (2010), Gámir y Durá (2010, p. 92).

Conclusions

Today, Spain has a large university and research system, yet no Spanish university figures among the top two hundred in the world, a striking case in countries of similar size and income.[21] Furthermore, as higher education enrollment rates from 1857 to 2009 reveal, the Spanish university system seems to have grown according to the demands of the state, whether for civil servants or for public works engineers, rather than to foster the skills and new knowledge which a competitive, industry- and business-oriented country needs. This is not to say that "all" university graduates work for the state, though great numbers do; it means that state demands have had a larger impact than the demands of business or private interests upon the universities.

Usually, lack of public financial support has been considered the main culprit of the problems of Spanish universities, whose governing bodies regularly complain of "insufficient public funding". Hardly any attention has been given to the institutional framework which regulates higher education and research in Spain and which is the focus of this article. The University Reform Bill (LRU) of 1983, the corner-stone of the system at present, failed to transform the centralized and state directed Spanish universities of the time into the dynamic and result-oriented institutions a modern economy requires. Since then, frequent though minor legal changes have not significantly changed the institutional framework. The universities supposedly had become "autonomus", but in fact they remained heavily regulated and subsidized by the state –by both the central and the regional governments— which has directly provided most of their financial resources. By so doing, the state crowded out industry and prevented a fruitful relationship between academia and society at large from emerging. Instead, Spanish Universities increasingly turned into a powerful and organized *lobby* bent on extracting larger public rents from the state while, at the same time, demanding more autonomy. They lacked any incentives to diversify, excel, compete among themselves, and work up a thriving partnership with society at large. This is one of the reasons why Spain is not among the leading innovation-generating countries of the world today.

[21] Academic Ranking of World Universities (2012). The Spanish higher education system has 77 universities, 50 of them public, in 184 campuses, plus a fully research-oriented institution, the CSIC, with 125 institutes and research centers, CRUE (2012) and CSIC (2012).

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