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University entrepreneurship in a developing country: The case of the P. Universidad Católica de Chile, 1985–2000

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Abstract. Privatization in higher education is usually understood either as the surge of private institutions or as universities' growing reliance on private sources of funding or otherwise operating more like firms. Joining the growing literature on university entrepreneurship, this is a case study on the less examined problem of entrepreneurial universities in developing countries. In a period of roughly 15 years, the Pontificia Universidad Católica of Chile, founded in 1888, turned itself from a mostly teaching institution to a research-oriented university, responsible for one-fourth of the Chile's mainstream scientific output and 40% of all Ph.D.s awarded nationally. Yet, public funding represents today only 17% of its revenues, down from almost 90% in 1972. How such academic development could have occurred as the State withdrew and the market took hold of Chilean higher education after the reforms introduced by the military rule of Augusto Pinochet (1973–1990) is the theme of this work. Universidad Católica's policies and strategies are described, and the factors contributing to its success, together with their limitations, identified. The case suggests that orientation to the market can be more a means for survival and growth under the pressure of privatization, than a result of a 'Triple Helix' strategy of universities, government and industry to generate innovation out of academic knowledge. Secondly, while in the industrialized world, higher education entrepreneurship is associated with knowledge production for economic development ('Mode 2'), entrepreneurial universities in the context of developing countries may just be finding their way to the academic, disciplinary mode of research.

Keywords: Entrepreneurial University, higher education Chile, higher education Latin America, mode 2 knowledge production, organizational change, private higher education, privatization of higher education, second academic revolution, Triple Helix.

Introduction

Private higher education, once a peculiar feature of the US, some Latin American countries, and the Far East, has expanded dramatically throughout the world in the past three decades. The former Soviet Bloc, China, Southeast Asia, Sub-Saharan Africa, India, Turkey, and all of Latin America except for Cuba have seen market-driven, private institutions emerge in great numbers to absorb increased demand for

tertiary studies, provide diversity, and choice, or make profits (Stone 1990; Tilak 1991; Pritchard 1992; Cummings 1997; Giesecke 1999; Mabizela et al. 2000; Levy 2002; Tan 2002).

The surge in numbers of private tertiary institutions, their enrollments, and the scope of their activities, which has made this sector ''one of the most dynamic and fastest-growing segments of post-secondary education at the turn of the 21st century'' (Altbach 1999, p. 1), is only one dimension of the privatization phenomenon. Equally important is the increasing reliance on private sources of funding and firm-like behavior among private and public universities alike (Jones 1992). Cost recovery, funding diversification, university entrepreneurship (Slaughter and Leslie 1997; Clark 1998; Jacob et al. 2003) ''usable'' knowledge production (Etzkowitz 1998, 2003a; Etzkowitz et al. 2000; Albert 2003; Meyer et al. 2003; Ranga et al. 2003), the ''marketization'' of higher education (Arimoto 1997; Guido 1999; Zemsky et al. 2001; Bok 2003), and for profit institutions (Brimah 2000; Ruch 2001) emerge as favorite objects of attention in recent literature on privatization, higher education, and knowledge production.

This article describes the transformation of a Chilean university under the pressure of privatization. The Pontificia Universidad Católica de Chile (PUC), founded in 1888, is nowadays one of the premier institutions of higher education in Chile, second only to the University of Chile (UCH) according to the indicators conventionally used to measure academic distinction – such as share of research funding, research output, and graduate enrollments – while it ranks first in the country in overall prestige, as gauged by opinion surveys of scholars, businessmen, government officials, and other opinion leaders carried out by the *Qué Pasa* newsmagazine every year.

PUC has 18 Schools, close to 2200 faculty (approximately 1000 full-time, 460 half-time, and the rest part-time, totaling some 1300 FTE), and enrollments of almost 20,000 with 1800 students in graduate programs. It offers 45 undergraduate and 41 graduate programs in all fields of knowledge,[1] and with 260 externally funded research projects active in 2002, and 1240 publications in international journals indexed by the Institute for Scientific Information (ISI) in the 3-year period ending in 2001, it originates one-fourth of the nation's research output, second only to UCH (Qué Pasa 2002, pp. 18–19). In 2000 it conferred 40% of all Ph.D.s awarded in Chile (Vio 2001, pp. 2). In its undergraduate programs, PUC enrolls close to 30% of the 5500 students with the best scores in the national standardized university entrance test (Rojas and Bernasconi 2002, p. 138).

The most striking aspect of these achievements is that they have been attained at the same time that PUC has seen its dependence on the public purse diminish year after year. The block-grant subvention received by PUC from the government, known as "direct public funding," decreased by 39% between 1982 and 2000 (Williamson n/d, p. 43). As PUC's budget doubled between 1990 and 2000 (Williamson n/d, p. 198), the university had to look to the private sector for fueling this growth. PUC's success in this endeavor is attested by the composition of its operational revenues in that period: sales of services represented an average 48% of revenues, tuition stood at 29%, and public funding at 17% average (the reminder corresponds to other sources; Williamson n/d:197). This 17% compares with 88% of public funding over total revenues in 1972, 70% in 1977, 40% in 1982, and 24% in 1988 (Desormeaux and Koljatic 1990, p. 102).

The transformation of PUC from its former dependence on public subsidies to its present reliance on private sources of funding, concomitant with a remarkable improvement of its academic performance, is the focus of this case study. Data were collected from PUC documents, as well as from interviews to former and current administrators, and former members of PUC's student government.

Higher education in Chile

Since the creation in 1842 of the University of Chile, the history of higher education in Chile was dominated by the State, even after six private universities emerged between the end of the 19th century and the 1950s (Levy 1986, pp. 66–76). The concept of the 'teaching State' encapsulates the notion, largely unchallenged until the last part of the 20th century, that education was the state's responsibility, and that private entities engaged in education were collaborators to the educational mission and function of the State.

In practice, for PUC and for the other private universities established since PUC's foundation in 1888, this meant that their students had to take examinations before commissions of professors of the University of Chile until well into the 1950s. On the other hand, it also translated into public financial support for private universities. These factors, together with the small size of higher education and the socio-economic and cultural homogeneity of the elite participating in it, explain the high degree of institutional homogeneity across public and private universities.

The higher education reforms enacted in 1981 by the military government of Gen. Augusto Pinochet (1973–1990) did away with the concept of the teaching state. Intent on expanding enrollments in the private sector, differentiating the higher education system, and bolstering competition, and inspired in a 'neo-liberal' economic agenda, the military regime authorized the creation of new private universities and non-university tertiary level institutions. In what many saw as an effort not only to achieve the aforementioned goals, but also to reduce and control the potential for political activism of the University of Chile and the State Technical University (a second public institution, founded in 1947), their regional colleges were transformed into 14 small, independent public universities.

As of 2002, there were in Chile 63 universities and 163 non-university, post-secondary institutions. A measure of the degree of privatization is the fact that 75% of all universities are private, as is 100% of the non-university tertiary sector.[2]

Enrollments follow a similar pattern. Not only did they rise significantly in the 1985–2000 period, but also the private sector has come to be dominant, with 71% of the 480,000 total higher education enrollments in 2001, and 59% of university students.[3] To put Chile's extent of higher education privatization in international perspective, it is worth noting that according to the World Bank, only the Philippines, Korea and Japan had in 1994 (latest data available) larger shares of private enrollments than Chile in 2000 (World Bank 2000, p. 30).

Funding was also redesigned in 1981. Public financial support was diversified into a direct public subsidy (*aporte fiscal directo*, or AFD) allocated among the universities according to the historic pattern of distribution of funding, and a new indirect public subsidy (*aporte fiscal directo*, or AFI), introduced as an incentive and reward for quality, distributed in proportion to the number of freshmen enrolled by each university among those with the highest scores in the national standardized university entrance test, the *Prueba de Aptitud Académica*, PAA. Universities were required to recuperate part of their costs by collecting tuition at levels as close as possible to actual unit cost, and a subsidized public loans program was created to assist those unable to make the tuition payments. Finally, a National Fund for Scientific and Technological Research (FONDECYT, for its Spanish acronym) was set up in 1982 to distribute research funding on a competitive, peer-review basis.

New private universities were to be funded privately through tuition revenues. Their students did not have access to subsidies and to the public loans program, but the universities were allowed since 1989 to

compete for AFI funding, and to submit research proposals to FONDECYT.

Today, public funding represents only one-fourth of Chile's expenditures in higher education, making Chile one of the world leaders in private financing of higher education.[4] Another measure of the privatization of Chilean higher education comes from looking at tuition revenues as a proportion of current expenses in public universities. In Chile, tuition represents an average of 36% of the revenues of public universities (Salmi and Alcalá 1998, pp. 10, 11). From an international comparative perspective, and both in terms of type of institutions and their enrollments, and in terms of funding structure, Chile exhibits one of the world's most private, and exposed to the markets, systems of higher education.

The situation in 1985

In 1985, for the first time since the 1973 coup, the military government had allowed for a civilian to be appointed by the Vatican to the rectorship of PUC. The new rector, Dr. Juan de Dios Vial, a professor at the Schools of Medicine and Biology, received from his military appointed predecessor, Admiral Jorge Swett, a financially strained and politically jittery university. The privatization reforms enacted by the government in 1981, together with the economic crisis of 1982–1983, had reduced government spending in higher education by 17%, in what turned out to be only the first half of a steep decline which, by the time the trend began to be reverted in 1991 by the newly democratically elected authorities, had reduced public funding of higher education by 40% since 1981.

So much did PUC academic salaries suffer that the professors' association decided to go public with their plight, in January 1986, with a press conference on the critical financial situation of the university. Research activities also resented the public funding crunch (Krebs et al. 1994, pp. 793, 797). PUC's problems then were not only an operational deficit resulting in high indebtedness, but also a wasteful, duplicative administrative structure, where same functions were carried out by different units at different levels of the organization (PUC 1982, pp. 13, 39)

Political repression had kept the campuses quiet throughout the 70s and the beginning of the 80s, but the opposition to the military government had slowly begun to organize and emerge in PUC's schools by way of elected student governments. As in the country at large, the opposition in PUC gradually turned more open and vocal, and made of

the denunciation of the military rectorship its main agenda. When rector Vial took office, not just a few school student governments, but also the university-wide Student Federation were led by students opposing Pinochet, and the fact that the new rector was a civilian and a professor at PUC did little to assuage political unrest.

Raising tuition to make up for the decline in public funding seemed one of the obvious ways of forestalling mounting budgetary deficits and rising debt. Tuition hikes, however, could only accomplish so much: politically, student organizations would always oppose them; economically, the overall economic situation of the country, together with the condition of the poorer students at PUC, would weigh down any attempt at a radical tuition increase. Tuition would need to increase, but alternative ways of funding would have to be tapped as well. PUC what not just another private university: it was a Catholic university, and there were important consequences to be derived from that definition.

PUC's Catholic identity

PUC was founded as a reaction by the Chilean Roman Catholic Church to what it perceived was growing liberalism and secularization among the government and the social elite. The university was conceived as the nucleus of the Chilean Catholic intellectual resistance.

The official juridical separation of church and state nonetheless arrived with the Constitution of 1925, but so important was the contribution of the Catholic University to the education of the elite's youth that two years later it was recognized by the law as a 'collaborator in the educational mission of the state,'[5] and given a monetary subsidy. Public subsidization of PUC had its ebbs and flows for decades, until it stabilized in the sixties, reaching more than 80% of its income in 1970 (Levy 1986, pp. 79–80).

The university reform movement of 1968, a process of intense discussion about the nature of the university and its role in Chilean society, and experimentation with new forms of organization and governance, pushed PUC's into a trajectory of secularization, which paired with PUC's funding structure to turn it into a quasi-public university: governance was reorganized, and under the banner of democratization, deans and directors of academic units began to be elected by the faculty, and representation of students and administrative personnel was introduced in governing bodies. The chair system of academic organization typical of the Continental tradition was replaced by departments.

A new type of academic emerged in PUC as in campuses nationwide: the full-time professor, who was expected not only to teach, but to carry out research too, leaving the paradigm of the 'professionalist' teaching university behind. No longer would the rector be a priest, nor would the faculty be expected to profess the Catholic faith.

After the coup the military rulers treated PUC better than other universities, perhaps because large student and faculty sectors in PUC had opposed the ousted Allende government. Still, PUC did not escape the appointment of a military 'rector-delegate' in 1973, and the governance reforms of the 60s were abrogated. With Admiral Swett at the helm, and its University of Chicago-trained professors of Economics and conservative Law professors advising the government, PUC began to be generally regarded as supportive of the military regime.

Rector Vial was convinced that the university had to return to its Catholic roots. Vitalized by the doctrine of Pope John Paul II, who visited PUC in 1987, the university sought to restore its Catholic identity and sense of mission. The rector believed public funding could always be used by governments, especially future ones, to restrict the autonomy of PUC to work towards its refurbished idea of purpose. In this sense, the pressing economic quandary was regarded by rector Vial as an opportunity to return to the financial independence and freedom from political power that characterized PUC's origins, and to realign the university with the original intention of its founders.

The strategy to compensate for the decline in public funding would include the diversification of funding sources, a policy of incentives for schools to raise their own funds, cost reductions in administrative units, the optimal utilization of the existing infrastructure through the expansion of undergraduate enrollments, and tuition hikes (Williamson n/d, p. 193).

This was not, however, a time of contraction for the university. Academic staff, numbering 1400 in 1985, rose to 2150 in 2000, while the proportion of graduate degree holders among them increased from 48% to 75%.[6] In the same period undergraduate enrollments grew 65%, graduate enrollments doubled (Williamson n/d, p. 68), while ISI-registered publications experienced a 64% increase between 1991 and 2000.

Diversification of the funding base: University enterprises

Since 1942 PUC had had a teaching hospital affiliated with its School of Medicine. Its mission was to provide clinical education to medical and

allied health students, and service to the community. Its business potential had remained undeveloped until its services begun to be expanded in 1985, with the aim of turning it into a full service hospital, capitalizing on the reputation of the School of Medicine to capture a larger, more affluent clientele. With these goals in mind, the university partnered in 1988 with a group of its Medical School professors to build a private clinic, adjacent to the hospital, offering PUC's highly regarded medical services in an upscale hospitalization environment not available in the middle-class oriented hospital itself. In 2000 the Clinic had sales for the equivalent of US$ 65 million. The second half of the 1990 saw the growth of ambulatory services through a network of community health centers throughout Santiago.

The story of the School of Engineering's Department of Scientific and Technological Research (DICTUC) is similar. Created in 1947 as a materials testing laboratory staffed by PUC's professors of Engineering, it began to expand its services in the 70s and 80s, including quality control and certification, professional development, and consulting. By 1994 it had become clear that a new juridical structure was needed to bolster services and revenues, and DICTUC, Inc. was born, 99% of which is owned by PUC. In addition to DICTUC's traditional services, the new corporation offers technological development and business incubator services. Engineering professors serve as project supervisors, earning a significant supplement to their academic salaries. DICTUC's sales for the year 2000 were equivalent to US$ 4.1 million.

The cases of the hospital and the testing and consulting services provided through DICTUC illustrate how up to the mid-80s the problem with the revenues stream was not the lack of business opportunities, but a cultural reluctance among academics to charge appropriately for their consulting work. The capacity and the network to generate money was already there in many units. What were missing were the regulation, the incentives and the legitimization for money-making endeavors, all of which were put in place by the end of the 1980s.

PUC also owns a sports center, a catering business and a professional training and development operation, among other enterprises, but Channel 13 open TV station has been for many years its largest and most profitable business enterprise. PUC's TV station started experimentally in 1959, and four decades later it has become the second largest commercial TV network in Chile, with a national audience, and Internet, cable, and international transmissions. During the 80s and the first part of the 90s the TV station was the key

financier of the operational deficit of the university. Only in the second half of the 90s, after debt had been eliminated, and the revenue base of the university had expanded through tuition hikes and the full-scale operation of the other ancillary enterprises, did the university achieve operational balance.

The overarching notion guiding entrepreneurial activities in PUC was to develop businesses as close as possible to the core activities of the university. Administrators considered but rejected projects to set up a pension fund, and an HMO, and they would often debate about the appropriateness of keeping the TV Station, a business regarded as too volatile for the good of the university (an argument as often pre-empted by the large profits earned by Channel 13 in the first half of the 1990s).

Considered as a holding, PUC has done remarkably well since 1985. Its volume of operations reached the equivalent of approximately US$ 220 million in 1999, an increase of 150% since 1986. In the same period, the hospital augmented its volume of activity by 400%, in great measure due to the success of the new clinic, and the University itself, the TV station and the other enterprises grew by more than 100%. The contribution of each major revenues source was for 1999 as follows: 33% sales of TV advertisement, 30% medical services, 20% tuition, 11% public funding (Williamson n/d, p. 191).

These results were possible chiefly due to two factors. First, is that business units are managed as business units. Their executives are professional managers who respond to a board where the university is represented, but otherwise the university does not meddle in the affairs of its enterprises. The independence is such that, for instance, the TV station has often come under fire from conservative sectors of society because of its programming. Although Channel 13 does not broadcast more nudity, profanity, soap operas, reality shows or other kinds of low-brow shows than the rest of the commercial networks, it is no BBC or PBS. Its commercial orientation is decried by those who would like it to be a 'cultural' network, but the University has made it clear, in practice if not in rhetoric, that the Channel is a commercial venture, that its goal is to capture massive audiences, and that in order to do that it has to be allowed to operate freely under the rules of the TV market. Success in these tasks is what opens the opportunity to offer high-brow programming.

A second reason for the success of the PUC holding is the general prosperity of the country: between 1985 and 1998 Chile experienced a period of high and sustained economic expansion, averaging over 6% GDP growth per year.

In short: PUC businesses flourished because of sound management as well as a result of those years' economic boom. PUC was 'out there' in the market, taking its share.

Tuition policy

Until the late 70s studying at PUC, as in the other public and private universities in Chile, had been free of charge. When the government pushed universities to charge tuition, they began to do so timidly, setting their fees well below the unit cost of teaching of most programs, and therefore, at a subsidized level. But that was not the result intended by the government's model: the idea was for tuition to approach unit costs, so that those who could afford it would pay for their education without a subsidy they did not need, and those who could not would receive a subsidized loan from the government. PUC was the first to bring tuition close to unit costs, which entailed raising tuition 40% in real terms between 1987 and 1992 (Koljatic 1999, p. 350).

Tuition hikes, resisted by the student government and by the most economically disadvantaged students, were made politically feasible after a quite machiavellian maneuver to change the socio-economic make-up of the student body succeeded in gentrifying new generations of PUC students, and, consequently, lowered the stakes on tuition policy on the part of the students. The strategy, implemented in 1996, consisted in an enormous raise of the registration fee, until then rather nominal in value, for the freshmen class. Since the government's student loans program did not include the registration fee, subsidized students had to come up with the money for the fee on their own, or simply forget about PUC. Obviously, the measure hit poorer students hardest, whose families had neither the money for the up-front payment, nor the access to credit. In effect, what PUC did was to erect a barrier against economically disadvantaged students. As the new cohorts became more affluent, soon enough the ranks of the stakeholders for low tuition fees had dwindled as much as needed to diffuse the potential for student unrest in the face of an aggressive program of tuition hikes. Students were not pleased, of course, but the great majority of them would rather not risk disciplinary action than vigorously oppose the authorities on grounds more of principle than of need.

Although this policy was supplemented with an expansion of student aid mechanisms, consisting of scholarships for low-income students and loans for middle-class segments, it was much decried within and outside the university. Critics charged that PUC had become socially elitist,

contradicting not only its Catholic mission, but its public service orientation too, which is the justification for the subsidies it receives from the government. The stigma of this policies is still very much part of PUC's identity today.

With average annual tuition of approximately US$ 2900 per year, (equivalent to 63% of Chile's US$ 4590 per capita gross national income in 2000), PUC is the most expensive of the subsidized universities.[7] The difference is large with the University of Chile, which follows PUC with an average tuition equivalent to US$ 2000. Only five universities, all of them private, are more expensive than PUC. On the other hand, PUC leads all other universities in students' preferences as first choice university, which, coupled with its selective admissions, means that the majority of students with scores and grades high enough to enroll in PUC come from private schools and upper-middle class backgrounds. As a result, only 35% of PUC students were on financial aid in 2001, but for the most part, nowadays it is not tuition level what prevents more students from low-income families from entering PUC, but a highly stratified school system that punishes needy students with a low-quality education in public schools. Not surprisingly, PUC was among the first universities in Chile to conceptualize the student as a client. Accordingly, large investments were made in the athletic program, health services, and cultural activities.

Decentralization and incentives

PUC's revenue strategy of tuition increases, rise in the prices of the medical services of its teaching hospital, and boosting the production and marketing of sellable services, was matched by an equally aggressive program to reduce costs and to decentralize decision making and operational responsibility from the central authorities to the deans and, in the cases of the ancillary enterprises, to their executives.

The centerpiece of the administrative reform was the reduction of the size of the administrative staff from 1600 to 1200, coupled with extensive outsourcing, and state-of-the-art information systems support for greater productivity. Retrenchment did not come at low cost. The university had to endure a 20-day strike promoted by its workers unions in 1990, but resistance was finally overcome when the university offered workers to improve salaries by distributing among them half of the savings from vacant positions. Hence, a powerful incentive was created for supervisors to keep their most productive workers, and fire the rest.

To illustrate the depth of the centralistic tradition of PUC, Koljatic (1999, p. 353) tells us PUC lore has it that Mons. Carlos Casanueva, rector from 1920 to 1953, used to carry the university's checkbook in the pocket of his cassock. A 1982 report issued by PUC's Academic Vice-rectory, thereafter known as the 'Blue Book,' set forth a sweeping decentralization plan, which gave Schools and their deans immediate responsibility for teaching, research, extension, and administration. The role of the central administration was defined as *subsidiary*, meaning that it would undertake only those functions that could not be adequately carried out by the schools. These entailed general norms and policies, finances, human resources management, physical plant, information systems, admissions and registrar, student welfare, student services, library system, university-wide teaching policy, external evaluation of study plans, the general education component of the curricula, and foreign languages training for students (PUC 1982, pp. 39–48).

Implementing the decentralization design proposed in the Blue Book proved difficult at first: deans were not prepared technically to assume their new administrative tasks. That hurdle began to be overcome when, in the mid 80s, the Vice-rector for Finance and Administration hired administrative assistants to support the deans. Thus assisted, deans began to exercise their new autonomy to 'manage their budgets, hire and fire their staff, set salary policy, create incentives, define workloads, develop programs, raise funds, buy equipment, etc.'[8] (Koljatic 1999, p. 354). They were required to discuss their budgets with the central administration on the basis of the results of a strategic plan for the school and performance indicators. Schools were allowed to keep any surpluses remaining at the end of the fiscal year, rather than returning them to the central administration. All revenues from graduate programs, minus a 10% overhead, were also to remain in the school offering them. If deans had the money, they could hire professors freely, as they could fire them unhindered but by the evaluation procedures prescribed in the faculty handbook.

The rector and his executive team maintained their decision-making role in defining general university policy, fostering academic development through central funds for the promotion of research and innovative teaching, managing cross-school and interdisciplinary projects, ensuring common standards across the university (degrees, infrastructure, computing) and, most importantly, overseeing the university's planning and budgetary process, which is based on the proposals of the deans (Koljatic 1999, pp. 354, 355).

A governance reform was also helpful: election of deans by the faculty was gradually replaced by selection of deans by search committees, 'so that the deans would be accountable to the rector and not to the people' as one of my interviewees put it. Moreover, Rector Vial believed that elected deans tended to 'federalize' the university, and that the people best suited for a deanship are usually not the best ones at campaigning for votes. The new deans were chosen with an eye on their entrepreneurial ability.

These transformations were as drastic as they were controversial and painful. The central administration lent the academic units the funds needed for severance payments, so unproductive faculty could be fired. Once the units had finished repaying the loan with the money liberated from the salaries of those dismissed, they were allowed to keep those resources for hiring new people or increasing the salaries of those who remained.

Academic units were encouraged to generate their own resources, by letting them keep the revenue for their own projects. From 1990 to 2000, through contract service and development activities, school revenues doubled.

Funding for research

In 1982 the government had created the FONDECYT program to distribute research funding to individual researchers on the basis of competitive, peer reviewed proposals. Funds allocated through this mechanism were not plentiful, but they were rapidly increasing, and since they were competitive, universities capable of presenting good projects could potentially reap large shares of the fund. PUC decided to increase its ability to compete for these funds by reorienting the mission of its Research Directorate from the distribution of internal research funds, to supporting PUC researchers in the development of competitive FONDECYT proposals, and fostering relationships with the private R&D sector and international cooperation.

In 1994 the internal research fund for projects exclusively financed by PUC was shut down. Nowadays, all research and graduate studies funding from the university's central administration is to complement, or fills gaps in, externally funded projects, save for a fund available for people settling in from abroad after a doctorate or a post-doctorate, which consists of a non-renewable 2-year grant. Non-renewable 1-year 'bridge' grants are also available as a stop-gap measure for researchers

who could not renew their FONDECYT funding. The expectation is that the following year the researcher will have reestablished his external funding, and the guiding principle is that faculty must get used to raising their research money. According to a PUC official I interviewed: 'If a researcher does not have the initiative to seek outside funding, he is a bad investment.' Even graduate students are forced to raise funds, and their success is rewarded with additional resources.

This has not meant a decline of the support PUC offers to its researchers. Rather, what has happened is that PUC has replaced research subsidies with research incentives. First is the transfer to the schools of the 90% of the graduate programs' revenue. Second, research overheads go entirely to the academic units generating them. Lastly, there are also powerful incentives to individual research performance, as will be discussed below.

Faculty salary policy

Salary policy was also decentralized to the schools. As a result, salary levels are not homogeneous. Several factors are considered by schools in defining compensation schemes: relative scarcity of qualified academics in the field, salary levels outside academia, and the salary range for professors of the same rank elsewhere in the university. Within each school, there is some homogeneity by rank, but with overlap. Higher salaries outside academia are not entirely reflected in the salary of faculty in professional schools, however. There is a discount of sorts, to account for the fact that being affiliated with PUC bring faculty greater professional opportunities for consulting and higher rates in the market. In other words, the market power of the PUC brand is explicitly an element in the university's compensation scheme. In the School of Communications, for instance, the reason why professors are required to bring their consulting business to the university, is that it is assumed that people are approached with consulting requests because of their affiliation with PUC.

Overall, PUC has a reputation for paying the highest academic salaries nationally. Salary levels are also competitive with the market average for the respective profession outside academia, and even higher than in the outside market in areas like arts and humanities. The goal of salary policy in PUC is to pay a decent, stable basic salary, enough for supporting a family, and allow professors to earn more through variable allowances and bonuses contingent upon performance.

The variable part of the salary is represented essentially by the exclusive dedication allowance, and by performance. The exclusivity allowance (or 'ample dedication,' as it is called in PUC) is intended to check the centrifugal forces exerted over professors by the vast opportunities there are in Chile to make extra money by teaching in new private universities. Ample dedication is a 40% bonus over salary that is assigned by schools to some of their professors every 3 years on the basis of a competitive process. Only 55% of PUC's full-time faculty have an ample dedication allowance. The allowance demands from the professor a pledge not to teach in other universities. This prohibition is the minimum requirement to qualify. Additionally, some schools request evidence that the ample dedication is put to good use, as gauged by productivity. In Engineering, for instance, the rule is 'two of four', the four being teaching, research projects, publications and services. Good performance in any two of the four are needed to obtain the allowance.

Incentives are plentiful. A bonus for each paper published in indexed journals is given to ordinary or adjunct faculty with 22 hours of contract per week or more. The size of the reward depends on the journal's impact index, as ascertained by ISI. The Research Director of PUC singles out this mechanism as the driving force behind the increased numbers and impact of PUC publications since 1996. People who publish well, i.e., in high visibility outlets, can get up to 2 or 2.5 extra salaries per year. 'ISI is what counts,' the research director concludes. Some schools give extra honorarium to FONDECYT and other external research fund winners, up to double the project's honorarium. Business and Engineering also pay additional lump sums for publications.

The central administration runs a fund for the development of teaching, with extra honorarium for faculty working on the development of multimedia or web-based materials, or in textbook development.

Finally, full-time faculty do substantial consulting and professional services through PUC units, such as the teaching hospital, or Engineering's laboratories clustered in DICTUC Inc., or the School of Agronomy's soil analysis, oenology, and animal nutrition services, among other business units.

Overall, more than half of a productive professor's salary is variable. While base salary variation across schools is around 70%, differences in final paychecks can be much higher because of the variable portion. Although base salaries in PUC are sufficient for a modest middle-class standard of living, most professors seek to complement it with what PUC offers by way of variable salary, or with external work.

It is important to point out that faculty who don't get the dedication allowance, or who are devoted only to teaching and cannot, therefore, participate in the rewards associated with research, typically engage in substantial outside work to complement their PUC salaries, their full-time appointments notwithstanding. Part-time academic work and moonlighting by nominally full-time professors are characteristic of the Latin American academic profession (Schwartzman 1993), and they go a long way to explain why variation in salary is not a source of tension in campus. Ultimately, faculty income levels tend to level off within a school, while the difference is just one of source: for research faculty the sole source of their total income is PUC and PUC-related activities, for the others, the sources are multiple. Across-school differences in income, on the other hand, have become widely internalized by faculty with lower salaries, if grudgingly, as a reflection of the different opportunity costs of academic work between, say, a professor of Finance and a member of the Literature department.

The academic core: Faculty recruitment, workload, and evaluation

The desirability of a PUC job among Chilean academics, stemming from its prestige, its research orientation, and its good salaries, has made it possible for the university to raise the quality of its professoriate substantially in the last two decades, as measured by the proportion of professors who are Ph.D. holders. Between 1985 and 2000 this figure rose from 23% to 31%. Still far from a majority, but impressive nonetheless if one considers that in 1967 only 4.7% of the professors of the University of Chile, then the strongest in this regard, had doctoral degrees (Brunner 1986, p. 27). If one counts both doctoral and masters' degrees, as well as medical specialties, then 86% of professors in PUC had a graduate degree in 2000 (Williamson n/d, p. 71), compared to 30% across all faculty nationally.[9]

In areas with good supply of Ph.D. holders the university is able to hire people already with doctorates. In sciences, for instance, people enter with a Ph.D., and post-doctorates are increasingly becoming an additional requirement. In areas less developed academically in Chile, like Sociology or Engineering, and in the professional schools, people usually start without a doctorate, but they are promptly sent abroad for graduate education from their schools 'nurseries.' These are academic training programs for teaching assistants or instructors interested in pursuing an academic path. After a couple of years working with a

senior professor, they leave for their doctoral education, with full support of the university, and an obligation to return after they graduate. Nurseries exists in the social sciences and engineering, for instance, and there used to be one in the Business School, which was phased out as a larger supply of doctors in Chile and abroad made it possible to hire directly from the labor market.

Full-time faculty are hired by the schools without the need of an approval from the central administration, as long as they have the resources to pay the salary, including a 10% tax on salary that goes into a university-wide severance fund, the purpose of which is for academic and administrative units to avoid getting stuck, for want of severance money, with people they wish to dismiss. This fund has been a key enabler of PUC's strict enforcement of productivity standards, and of its mandatory retirement policy (Koljatic 1999, p. 356).

Recruitment mechanisms vary from one Faculty to another, but they all have to satisfy the standard of 'objective selection,' i.e., selection based on demonstrable academic merit. Selection can consist of searches headed by the dean, with interviews, presentations, and approval by the department's faculty and then by the School Council, as in the Business School, or international public announcement and open competition (in Communications, Engineering, Biology, or Physics).

PUC grants permanency of employment (or tenure) only to full and associate professors. Assistant faculty are appointed for up to three renewable terms of three years. If after 9 years an assistant professor has not been promoted to associate, he is then fired or transferred to the adjunct track, although most schools do not wait that long to make up their minds. Tenure is not absolute. It can be lifted on academic grounds if a professor is poorly evaluated, or on disciplinary grounds, in case of a serious infraction to the Academic Code or to the Declaration of Principles of the University. Retirement is mandatory at age 65, and retiring faculty are offered a compensation package equal to at least 11 salaries. Extensions up to age 70 have to be approved by the School Council, and by the university's Superior Council beyond 70.

Workload policy is also a matter for the schools to define, and therefore it varies significantly across the university. However, the central administration expects that every full-time professor will attend 200 students per year (in two 50 student courses per semester, for instance), with a reasonable degree of flexibility depending on the program. Three courses per year are required in Business and Engineering, one or two are required in the Department of Biology, and two courses per semester in Journalism. But ultimately, what defines the

weight of teaching assignments is the strength of the research agenda of the professors. Very active researchers teach only one or two courses per year.

A research load is required to advance past the category of assistant, but not all schools enforce this norm with equal zeal. While the Business School requests one paper per year, and in Biology two publications per year is typical, nothing of the sort is required in Communications or Law.

A thorough evaluation of the quality of teaching, research, extension and administration, according to the tasks assigned by each school, is carried out every 2 years for assistant professors, and every 4 years for full professors, through each schools' assessment commission, which have 1/3 external members appointed by the rector. Faculty performance is measured on several predefined variables representing teaching, research, extension and administration. Good evaluations are necessary for promotion in rank, while poor performance is grounds for dismissal, diminution to part-time status, or transfer to the adjunct track. And indeed, such is the fate of one or two professors every year.

The cases of Business Administration, Engineering and Biology

The Business School, the School of Engineering and the Biology Department have all seen substantial transformation in the last 15 years. They illustrate many of the features that have come to characterize PUC, and as such, are worth a few additional notes.

About a decade ago the Business School was an overstaffed teaching school were faculty were paid salaries not competitive with their outside income opportunities and therefore did substantial private work to compensate for the difference. Doctoral degrees were scarce because they were too few of them in Chile and because of an academic ethos that valued business experience over academic credentials.

Today, the Business school has a faculty of only 25, 17 of which are Ph.D. holders. Research has become an integral part of the output of the school, and a requirement for permanence in it. The school continues to recruit the best undergraduate students in the country, ranks among the five most prestigious in Latin America, and its MBA programs are the only ones in Chile accredited by the Association to Advance Collegiate Schools of Business, AACSB.

The average market value of a person as a business executive (not as an academic elsewhere) rules salary. Professors earn differently

according to their specific field, but within a field, ranking takes precedence. According to the school's director, the scarcity in Chile of people with good graduate degrees, fluent English, and talent, is still so pressing that PUC's main competitors are banks, not other universities. In the 80s the business school lost many people to the private sector because salaries were much higher there. The lesson was clear: faculty had to be paid more, especially if in the 30–40 age bracket. So the school settled for the following formula: it pays 60% of the average market salary a professor would command were she a business executive instead, in exchange for three courses and one research paper per year, which should keep the professor busy for about 3 days per week. The rest of the time is for faculty to do personal business under a '5th day rule,' and the other 20% is devoted to university work paid separately (extra teaching, consulting, extension, etc.). The 5th day rule is not just meant to make faculty cheaper to hire, but to keep full-time faculty with an eye on the industry, for the benefit of their research and teaching.

In the 70s, faculty in Engineering only taught and did some extension. Research developed in the 1980s with the creation of FONDECYT. Now the school has a doctoral program, which is seeking accreditation, and it therefore needs Ph.D.s and ISI publications. Consequently, it has hired 25 new professors in 4 years. Now it has 100 full-time faculty, 70 of them with doctorates, while the rest are mostly young assistants or instructors studying abroad or ready to go abroad for their Ph.D.s.

Base salaries in Engineering are defined via a single scale based on rank and seniority, and are therefore quite rigid. The variable component comes from faculty's participation in DICTUC. Earnings made through DICTUC projects are split three ways between the professors who worked on them, their department, and the school. The system works because, not having labs of their own, professors cannot take the business home. It also helps that work at DICTUC counts towards assessment of performance. And, finally its method of wealth redistribution, 'a bit socialistic,' as someone put it, recognizes that even those who do not do DICTUC projects are contributing with their academic work to the reputation of the school, which is what brings in business.

In the 80s the Biology Department had over 100 professors earning very low salaries, of which perhaps 20 were doing genuine academic work and the rest were working outside, even in high schools. Unproductive staff were fired, and their salaries redistributed among the remaining ones. Biology has now 57 full-time academics, all of them

with doctorates and post-doctorates, and with an average mainstream research output in excess of two articles per year per capita.

Peer pressure is relentless. Young post-doctorates are appointed assistant professors for periods of 1 year. If after 3 years they don't have independent research and publications, they have to leave. The benchmark for Biology is what a good – not the top – American or European department would do, an official there told me. It seeks to work under First World standards.

Entrepreneurial academics

PUC's combination of high academic standards, tough evaluation policies, research orientation, and significant incentives for good performance has brought about the emergence of new actors in campus. These are highly competent, productive, dedicated researchers, who run their professional activities as CEOs of their research groups, obtaining and managing large research grants, serving in boards of private companies, advising the government, writing consulting reports, and charging for conferences, all along managing, unlike professors 15 years ago, both to make good science and a good living.

These academic entrepreneurs are not isolated intellectuals working quietly in seclusion. They mingle socially, talk with business types, talk to the press, and appear in hearings before Congress. They have to get their own money to do research. They then have to manage it, have an accounting system, deal with banks and requests for proposals, and travel a lot. Professional life is not as calm as it once was, it is more stressful, and challenging. Evaluation is permanent, and routine becomes rare. Professors have to be good at computing, organizing events, leading people, and other skills not taught in graduate schools.

Their profile approaches that of the 'entrepreneurial academic' described in the literature (Klofsten and Jones-Evans 2000; Meyer 2003), and they too act as leaders of a 'quasi-firm' (Etzkowitz 2003b) – their research group – in pursuit of research resources competitively allocated, and in ensuring adequate standards of process and output. Unlike their entrepreneurial colleagues at research universities in industrialized countries, PUC researchers' agendas are not predominantly focused on meeting the needs of a national system of technological innovation through applicable knowledge, the so-called 'Mode 2' (Gibbons et al. 1994; Etzkowitz and Leydesdorff 2000) – for there is no such system in Chile – but, rather, on obtaining the funds to carry out

academic-disciplinary, 'Mode 1' research. In other words, while science in the developed world is pushing through a "second academic revolution" (Etzkowitz and Webster 1998) Chile's researchers are making their way to the first. Both groups of scientists, however, have found in market-oriented behavior a powerful strategy to move forward.

Entrepreneurial professors can be found in PUC in all fields of knowledge. They are still a minority, and will likely remain a minority for years to come, but their impact on the culture of the academic profession transcends their numbers. These professors have ushered, or at least, they represent a shift in mentality among academics, entirely parallel to that of the university, from state dependence to self-reliance. Professors who were risk-averse, loath of change, solidarity bent, and full of projects that never got done because there was no money, became entrepreneurial CEOs of their research lines. "Go get the money" has become something of a marching order at PUC.

Of course, this change in mindset has not reached all academics and all schools with equal force. While some have made significant progress toward the habits of academic work typical of the entrepreneurial profile, others continue to neglect research and depend exclusively on the funding they receive from the central administration.

Enabling factors

As shown earlier, the higher education funding crunch and privatizing reforms of the 80s were key external factors in the transformation of PUC from State to private dependence. They shook the status quo and forced PUC to reinvent itself to adapt to a new environment. The return to democracy in 1990 brought freedom and political stability, while leaving largely untouched the market-driven political economy of the Pinochet years, and the legacy of its economic reforms. By the year 2000, the size of the Chilean economy had tripled, purchasing-power-adjusted per capita income reached close to US$ 10,000, poverty was cut by half, and extreme poverty was reduced to the low single digits. This 'shock therapy' rendered PUC fit to reap the fresh private resources generated with the upturn of the economy that began in the second half of that decade.

Moreover, PUC enjoyed almost a decade of head start over the bulk of Chilean universities, because while in the mid-80s their leaders everywhere were staking the development of their institutions to the hope that the end of the Pinochet regime would bring back the days of

generous public funding and minimal competition, PUC was practically the only institution to plan for the opposite scenario, betting, as early as 1982 (PUC 1982, pp. 5, 6) that there was not going to be a reversal of the new funding and competitive environment brought about by the reforms of 1980–1981, and starting to work in earnest within the new rules.

Public policy was also a significant factor in PUC's academic development. The government's higher education budget rose 85% between 1990 and 1999, and funding for research channeled through competitive grants grew 200% in the same period. Given that PUC's budget quadrupled over the period studied here, the expansion of public funding did not alter PUC's funding model, but it gave leverage to its research development. Since the late 80s, the government has been using performance indicators to allocate part of its funding to universities. These indicators reward faculty with graduate degrees, externally funded research projects and ISI-indexed publications. Accreditation of graduate programs, also begun in 1990, also requires faculty with doctorates, indexed publications and FONDECYT projects. PUC faculty, strengthened in credentials and research capacity, has benefited from policies consistently stressing research productivity.

PUC's reputation as one of the premier centers for higher learning in Chile, cemented over a century of history, and its position, during and after the military regime, as a part of the nation's social, economic and political elite, was the institutional capital that made it possible for the university to take bold measures without much of a risk of loosing the support of its clientele and constituencies.

The quality and stability of its leadership, and the preservation in the hands of the central administration of key strategic and financial levers, were important internal factors of success. The rectorship of Dr. Juan de Dios Vial, spanning 15 years, encompasses the whole period under study. Rector Vial had in the Catholic mission of the University a powerful motive for seeking its financial independence from the government, and made a compelling case for this otherwise quite unpopular, and in the eyes of many, unwarranted goal. Cutting costs and seeking additional funding became not simply a financial strategy, but a sort of crusade for the preservation of the identity and values of the University. Although decentralization has been great, it is far from total. The rector maintains the authority and the resources to define the strategic direction of the university and its general policies and norms. Undergraduate tuition fees and public funding continue to go to the central administration for their distribution to the schools, as do the

earnings of the ancillary enterprises. Deans have to negotiate their budgets with the central administration. Administrative services (maintenance, computing, grounds keeping, construction, etc.) are managed centrally and all degree programs have to be approved by the center. Through these mechanisms PUC has been able to benefit from the local initiative of each school, while keeping centrifugal forces in a short leash.

The costs of privatization

Switching from State to markets did not come at no cost. Some of the hard choices made in the 80s narrowed the scope of PUC functions and contributions to society. The exclusion of economically disadvantaged students could not be redressed through loans and scholarships, and PUC came to be seen as a school for the affluent and the well-connected. Even if student aid money were plentiful, it may take many years for PUC to lure back the segment of the population it turned away.

Secondly, the "extension" role, typically found alongside with teaching and research in the idealized sense of mission of Latin American universities, was completely subverted. While in the 60s extension meant the projection of a university's knowledge resources onto the disadvantaged, the marginalized, and the disenfranchised, with aims of social development, community building, and the deepening of democracy, PUC's extension has become a business unit catering to the cultural, educational, and recreational demands of firms and individuals in the upper segments of society. Although it could be argued that PUC is nowadays more closely attuned with the needs of society than in the past, that is only inasmuch as those needs translate into actual demand for goods and services in the appropriate market.

Thirdly, there are marked imbalances in the pace and degrees of success at which different schools have been able adjust to the new model. PUC is not uniformly a research-oriented university. Several of its schools do little else other than teaching undergraduates. As a result of this asymmetry a traditional teaching university remains inside of PUC, composed of a few entire schools and some pockets of the old regime within other schools. This bifurcation of the academic community may become a source of organizational friction in the future.

Ultimately, as PUC continues to develop a research profile, its reliance on public funds will have to increase. Similar is the situation of its physical plant projects. PUC's main campus was built in the early 70s

with an Inter-American Development Bank loan sponsored by the government. Recent investment projects have also been funded mostly through public grants, and it seems unlikely that PUC, even under its new financial conditions, would have been able to undertake them on its own. Autarchy will likely remain, and perhaps should remain, an elusive goal.

Conclusions

Although most research on university entrepreneurship examines the common trends in knowledge production across the developed Western Hemisphere, differences in the relationship between the knowledge economy and academics' research orientation have also been explored, for instance, across disciplines (Albert 2003), along the global–local axis (Deem 2001), and also in different parts of the world (Arimoto 1997; Ryu 1998; Guido 1999; Subotzky 1999; Tan 2002).

Consistent with these findings, the case of PUC shows that entrepreneurship can have substantially different meanings, goals, and manifestations outside the industrialized west. While in the developed world, higher education entrepreneurship is associated with knowledge production for economic development ('Mode 2'), PUC is mostly just finding its way to the academic, 'Mode 1' type of research, as expressed in scholarly publications, not in patents or profits.

Entrepreneurial faculty in PUC are engaged in procuring the resources to carry out basic science, and publish in mainstream journals, the output on which depend government funds and university rewards. They operate with their research groups as 'quasi-firms', but not like start-up companies working towards a marketable product, but seeking, rather, to obtain and manage efficiently the resources made available for science on a competitive basis.

PUC's ability to tap private resources and public funds targeted to scientific development, instead of giving form to a new role of the university as part of Etzkowitz's 'Triple Helix' of industry – government – university that propels technological innovation and economic competitiveness, is helping it overcome the government's unwillingness, or impossibility, to fund a research university in the entirety of its functions.

In the case of PUC, orientation to the market came about as a response to a steep decline in the availability of public resources to sustain growth. In this sense, entrepreneurship emerged, and was embraced first, as a means for survival, and then as a strategy for growth,

rather than as a result of an effort to reach out to the business sector to foster economic development and generate innovation out of academic knowledge.

Can the case of PUC hold insights for university entrepreneurship elsewhere, either in Latin America or beyond? The case of PUC is in many ways difficult to replicate outside of Chile, in the same way as Chile is, in the international context, an outlier when it comes to the structure of its higher education funding. The privatization program undertaken by the military rulers, the depth of the ensuing transformation and growth of the economy, and the stability and coherence of the structure of incentives defined through public policy are rather unique features of the Chilean experience in the Latin American context. However, as universities in the region and in other parts of the developing world face the increasingly common scenario of decreasing public subsidization and mounting pressure to turn to the private sector for support, PUĆs mode of entrepreneurship may become increasingly relevant.

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Notes

1. Data on number of programs from Consejo de Rectores' *Anuario Estadístico* 2000.
2. Source: Ministry of Education, Chile. Compendio de la Educación Superior: www.mineduc.cl
3. Ibid.
4. Source: World Bank's EdStats database, Thematic Data, Private Education Expenditures, at http://devdata.worldbank.org/edstats/Thematic Data On Education/Private Education Expenditure/tab 23.xls
5. Article 38, DFL No. 7.500, of 1927.
6. Data for the years 1985, 1992 and 2000, from Consejo de Rectores, *Anuario Estadístico*.
7. Source: Consejo Superior de Educación, *Indices* database, 2003.
8. My translation.
9. Source: Consejo Superior de Educación, *Indices* database, 2000.

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