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Scientific vocations in crisis in France:

Explanatory social developments and mechanisms

Since the mid-1990s, increasingly fewer French students have been enrolling for science subjects at university. Speaking of a 'loss of interest in science among young people' is nevertheless premature. The phenomenon is primarily due to socio-demographic changes. As a result of their position in French higher education, universities, which do not operate a selective admission policy, are a last resort for students rejected by the selective options. Between 1985 and 1995, when student demographics grew apace, universities absorbed most of this growth. After 1995, the supply of selective training increased, while student demographics stagnated. As a result, university enrolments have declined, especially in the sciences. At the same time, holders of science baccalaureates have not been as top-notch, educationally and socially, as they were fifteen years previously. These students from more modest backgrounds and performing less well in education are shying away from the sciences which are reputed to be more difficult and less 'profitable' than other subjects.

Introduction

France is striving, like the rest of Europe, towards a 'knowledge economy', and is concerned, along with a number of its European partners, about the renewal of its scientific elites. Since the mid-1990s, increasingly fewer students have been enrolling for scientific disciplines at university; physics and chemistry were the first to be affected, followed by biology and mathematics. These very real symptoms, to be found in other European countries as well, may have led to an overly hasty diagnosis: 'a loss of interest in science among young people'. In this article, we shall try to show that, in France at least, there are other explanations for this development. In France, theoretical university courses are competing with short vocationally-based options and with the Grandes Ecoles and their preparatory classes which are, in French eyes, at the top of the educational ladder ([1]). Within universities themselves, theoretical scientific disciplines are competing with the technological subjects which have been introduced more recently. Choosing to study science at university has to be seen in the context of this system. For twenty years, the higher education supply and demand have been undergoing far-reaching morphological changes which have, over the years, greatly changed the composition of the student population and the opportunities for access to the various types of education: on the demand side, student demographics grew apace from 1985 onwards, making higher education much more democratic, but started to stagnate after 1995; on the supply side, technological and vocationally-based courses have continued to increase over the last twenty years, outside and even within universities, and enrolments in these courses are now on a par with enrolments in theoretical education.

The thrust of this article is that socio-demographic changes have brought about this decline in enrolments in theoretical science disciplines. The article has four parts. The extent of the problem is examined in Part I. The extent to which the decline in enrolments in theoretical university disciplines is due to the combined effects of the hierarchy of education and student demographics is analysed in Part II. Our observation is that these causes have had the same effects in all university disciplines (with the exception of sports subjects). Part III shows that there is nevertheless a specific problem with science studies connected, in our opinion, with the trends in the population of young people leaving school with science qualifications. Lastly, the relative replacement of theoretical science by technology in the choices of students with science baccalaureates is examined in Part IV.

The decline in enrolments for science education: myth or reality?

First of all, is this decline in enrolments in science universities the real picture? Or is it one of those alarms set off by symptoms hastily headlined in the media that a more systematic analysis would show to be misleading or wrong? The answer is not clear-cut. Since 1995, there has indeed been a substantial decline in enrolments in theoretical science disciplines in universities, but this decline has also affected medicine, the arts and humanities and law; numbers in technology and applied sciences are nevertheless on the increase. Statistics from the Ministry of Education (see Table 1) show that the total number of students in France fell slightly between 1995/96 and 2000/01 (-0.3 %). Over the same period, numbers in university science faculties fell by 11 %, the hardest hit being physics (-46 %) and life sciences (-14 %). In technology and applied sciences, however, numbers increased

([1]) Readers unfamiliar with the French education system should refer to the annex.

Trends in student numbers in science streams between 1995/96 and 2000/01 **Table 1**
(Metropolitan France + overseas departments and territories)

Streams	Total numbers 1995/96	Total numbers 2000/01	Trend (as %)	Including first cycle 1995/96	Including first cycle 2000/01	Trend (as %)
University - sciences (1)	**320 346**	**284 156**	**- 11,3**	**149 688**	**118 956**	**- 20,5**
Including Physics	*68 130*	*36 651*	*- 46,2*	*45 689*	*24 359*	*- 46,7*
Natural and life sciences	*97 871*	*84 374*	*- 13,8*	*53 516*	*39 179*	*- 26,8*
Industrial sciences and technology	*39 521*	*52 399*	*+ 32,6*	*8 412*	*10 891*	*+ 29,5*
Computer science	*12 186*	*17 009*	*+ 39,6*	*392*	*1 263*	*+ 222,2*
University – healthcare	152 811	140 669	- 7,9	55 821	46 877	- 16,0
University – sciences + healthcare	473 157	424 825	- 10,2	205 509	165 833	- 19,3
IUT, production sector (2)	47 256	51 917	+ 9,9	47 256	51 917	+ 9,9
IUT, computer science	7 399	9 934	+ 34,3	7 399	9 934	+ 34,3
STS, production sector (2)	87 049	89 686	+ 3,0	87 049	89 686	+ 3,0
CPGE, sciences	47 875	44 373	- 7,3	47 875	44 373	- 7,3
Engineers (3)	53 663	62 089	+ 15,7	8 366	10 349	+ 23,7
Total of scientific and technical streams	**716 399**	**682 824**	**- 4,7**	**403 454**	**372 092**	**- 7,8**
University, excluding sciences and healthcare	909 337	882 862	- 2,9	480 847	434 390	- 9,7
Non-scientific streams outside universities (4)	306 292	322 861	+ 5,4	220 227	242 488	+ 10,1
Total of non-scientific and non-technical streams	**1 215 629**	**1 205 723**	**- 0,8**	**701 074**	**676 878**	**- 3,5**
Total (4)	**1 932 029**	**1 888 547**	**- 2,3**	**1 104 528**	**1 048 970**	**- 5,0**
Grand total	**2 167 436**	**2 161 064**	**- 0,3**			

Sources: Lixi et al, 2001.
Ministry of Youth, Education and Research, 1996 and 2003.

(1) Including university engineering schools.
(2) Leading to occupations in industry or laboratories and therefore excluding administrative occupations.
(3) Not including university engineering schools.
(4) Not including schools of commerce, law and administration and schools of art.

over the same period, in both universities (+33 % in industrial technology, +40 % in computer science) and technology colleges (+16 % in engineering schools, +10 % in the Instituts Universitaires de Technologie [IUTs – University Technology Institutes] preparing for industrial or laboratory occupations, +3 % in the Sections de Techniciens Supérieurs [STSs – Higher Technician Sections]).

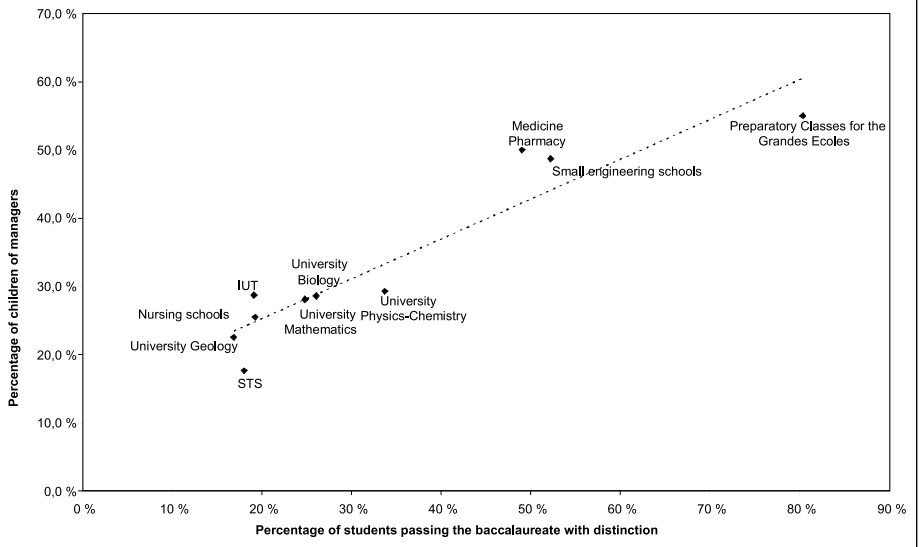
In the more recent period for which statistics are available, between 2000 et 2002, the number of students taking science subjects in universities seems to have stabilised (-0.9 %). A more detailed analysis nevertheless shows that this stabilisation is due in the first instance to a sharp rise in numbers of foreign students, in particular from Africa and more recently from Asia. After years of decline, this increase in the number of foreign students, starting in 1999, began to affect the global trend in science numbers from 2001 onwards. These variations suggest that policies to take in this population offset, with a time lag, demographic trends among the native student population.

The combined effects of the hierarchy of education and school demographics

For pupils gaining a science baccalaureate, enrolling to study science at university has to be balanced against alternative choices: the Preparatory Classes for the Grandes Ecoles (CPGEs), engineering schools admitting students with baccalaureates and short vocationally-based courses: IUTs, STSs, nursing schools. All these courses are in an educational and social hierarchy, of which the following graph gives an overview; in this graph, each type of education is characterised by the profile of the lycée pupils wishing to enrol in it (2): their educational profile (abscissa: percentage of students passing the baccalaureate with distinction) and their social profile (ordinate: percentage of children of managers). This graph shows that the profile of students choosing to study science at university is very different from the profile of pupils choosing to study in the CPGEs, engineering schools or in medicine. The former have been much less successful at school and are much more often from modest back-

(2) We used, for this purpose, individual data files containing a list of preferred choices of higher education for each pupil in the final year of the lycées of the Académie of Lille. This indicates their educational intentions or entrance applications. The selection process takes up this list of preferences. Account is taken here and in the rest of this article only of the first choice in the student's list.

Higher education in science and technology in terms of the educational and social profile of lycée pupils choosing the various options (Académie of Lille, 2001) **Graph 1**



grounds. In both these respects, they are more or less on a par with pupils choosing the IUTs.

This graph is based on educational intentions. At the time of actual enrolment, universities, which are the only higher education institutions not to operate a selective admission policy, will receive, in addition to students choosing them, students refused entry to the CPGEs or deciding against this choice themselves, and students refused entry to the short technology streams or considering that there is no point competing for them ([3]). This is a paradox of French higher education, on which education experts have often commented (Schwartz, 1983; Crozier, 1990; Jallade, 1991), but which has long been felt to have no effect by those making the decisions: selective vocational courses, such as the CPGEs and IUTs, often attract, precisely because of their selective nature, students likely to be successful in theoretical university courses, while, in contrast, a large proportion of those entering theoretical university courses, with no entrance selection, are students who have been refused by the selective streams and who are often less suited to theoretical education. The same contradiction can be seen from the point of view of teaching methods: university education is based around individual autonomy, whereas university students, often of an average educational standard and from modest social backgrounds (apart from medicine) are in particular need of teaching support; in contrast, in the case of the best students – those in the CPGEs – and generally for all students enrolled in selective courses, teaching methods are based around strict supervision.

The major variations in student demographics in France since the mid-1980s have to be seen against this backcloth. From 1985 to 1995, the numbers of lycée students obtaining the baccalaureate grew to an extent unprecedented in French school history, led by the then government's wish to get '80 % of an age cohort to baccalaureate level'. During this period, the number of students with general and technology baccalaureates increased by 64 %. At the same time, the selective higher education streams, especially the CPGEs and IUTs, although showing fairly sustained growth themselves, absorbed only a small proportion of these numbers. Universities had to take in most of this wave of new baccalaureate students. Between 1985 and 1995, numbers in the initial science cycles of universities more than doubled (+113 %).

Every year during this period universities enrolled students from increasingly modest backgrounds and with falling levels of performance ([4]), without this democratisation going together with any change in selection and teaching methods. Maintaining the status quo made it possible in practice to increase numbers at the lowest cost, the average expenditure per student, borne chiefly by the state, being much lower for theoretical university education than for the other types of higher education.

During these same years, the main concerns of the state and local authorities (increasingly being asked to play their part in financing an increasingly decentralised higher education supply) were quantitative: the main aim being to find places at university for an ever increasing number of pupils obtaining baccalaureates. Qualitative concerns, reflected by evaluations of teaching methods and student success, came to the fore only in the later period when the growth in numbers started to tail off.

There was, however, a sea change from 1994/95. After several decades of growth, the rate of entry for the baccalaureate of an age cohort peaked (around 62 %). Moreover, the number of pupils obtaining the gener-

([3]) A recent study by the Ministry of Education shows that 62 % of the students enrolled in the initial science cycles of universities would have chosen a different option, had it been possible.

([4]) As lycées are opening their doors ever wider every year, pupils who would previously have been channelled into vocational education at the end of the third year, because of their poor school performance, are now being offered places in general and technology lycées.

Numbers of pupils with baccalaureates and students in CPGEs, IUTs and initial university science cycles Change from 1985/86 to 1995/96 (whole of France) **Table 2**

	Pupils with general and technology baccalaureates	CPGEs	IUTs	Initial university science cycles
1985/1986	253 050	47 334	60 715	70 422
1995/1996	415 502	70 288	96 158	149 688
Trend	+ 64 %	+ 48 %	+ 58 %	+ 113 %

Source: Ministry of Youth, Education and Research, 1987 and 1996.

Average expenditure per student (2002 in euro) **Table 3**

Universities (excluding IUTs and university engineering schools)	IUTs	STSs	Engineers	CPGEs
6 850	9 100	10 870	11 910	13 220

Source: *L'état de l'école*. Ministry of Education, Programming and Development Directorate, October 2003.

Trends in flows entering the first year of the main higher education options (France, index 100 in 1990/91) **Table 4**

	1990/1991		1995/1996	2000/2001
Universities as a whole	228 379	100	122	107
IUTs	33 607	100	129	147
STSs	104 359	100	106	113
CPGEs	34 950	100	110	103
Nursing schools	24 800 (*)	100	115	125

Sources: Lixi et al, 2001.
Ministry of Youth, Education and Research, 1996 and 2003.

(*) For nursing schools, entry flows have been estimated from stock figures.

al baccalaureate decreased and the number of pupils with technology baccalaureates and in particular 'vocational' baccalaureates, who tend to go straight into the labour market, increased. The number of applicants for higher education consequently fell and its trend therefore became very dependent on the demographic trend of this age cohort which is set to decline between 2000 and 2010.

Universities then started to face recruitment problems; problems heightened by the fact that, at the same time, the supply of selective courses in IUTs, STSs and nursing schools, was continuing to increase (see Table 4). With the number of higher education applicants falling and the supply of short vocationally-based options increasing, fewer applicants were ipso facto rejected by these options and therefore fewer students were left with university as their only option.

While this development has undoubtedly affected the sciences, it has also affected the arts and humanities and law ([5]); opinion, however, has tended to focus only on the 'loss of interest in the sciences'.

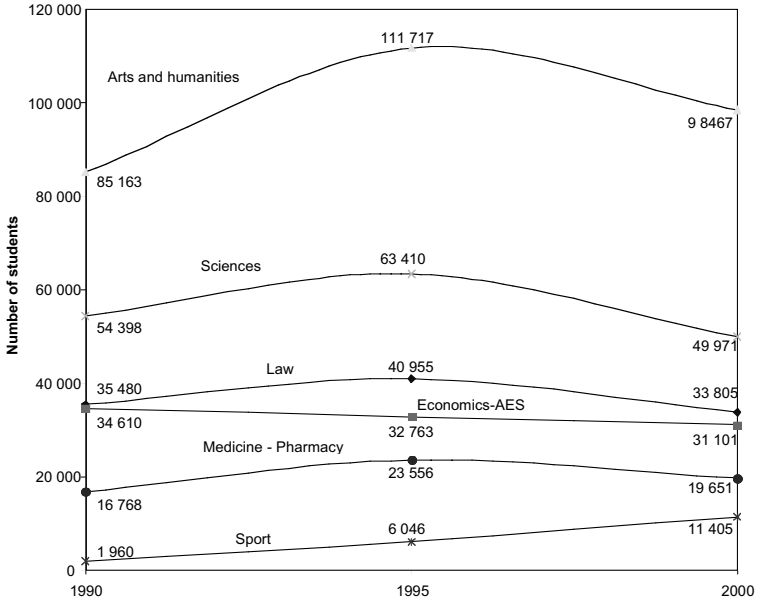
A hidden development: the fall in applications for the preparatory classes

The sciences are nevertheless the disciplines that have been most radically and most durably affected by the decline in numbers. There is undoubtedly a problem specific to the sciences, whose symptom is to be found less in the mechanisms described above than in a far less visible development: the decline in intentions to apply for the CPGEs.

It is evident from statistics showing educational intentions (see footnote 2), rather than actual enrolments, that the relative stability of the number of students enrolling for the CPGEs masks the fact that applicants for these classes, although continuing to exceed the numbers actually enrolled, are far fewer in number than before. The statistics on the educational intentions of lycée students in the mathematics-physical sciences streams (final year C prior to the 1995 baccalaureate reform and final year S, mathematics specialisation and physics-chemistry specialisation, following the reform) show an abrupt drop, after 1991, in the proportion of stu-

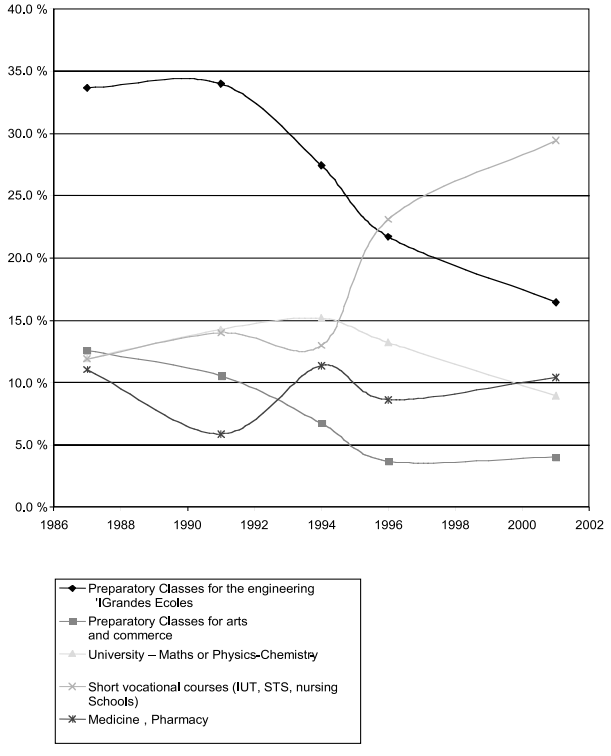
([5]) The STAPS (physical education and sports sciences and techniques) are the only notable exception to the general downward trend in university numbers. Since entrance selection based on sporting performance criteria was abolished in the early 1990s, this discipline has continued to grow apace.

Trends in flows entering the first cycle of various university subjects (France) **Graph 2**



Source: Lixi et al, 2001.

Percentage trends in the various education options based on the educational intentions of pupils in final year C (1987-1994) and final years S, mathematics and physical sciences specialisations (1995-2001) (Académie of Lille) **Graph 3**



Through an apparent paradox this decline has led, as a result of the 'communicating vases' phenomenon discussed above, to a deficit not in CPGE admissions themselves but in the first cycles of science universities and has exacerbated the effects described above.

Does this decline in intentions show, more than the actual decline in initial university cycles, a loss of interest in science studies? Here again, a more detailed analysis advises caution. It shows that in practice it is less the natural attraction of good pupils to the preparatory classes that has changed than the composition of the final science classes. The democratisation of lycées has had an effect even in the most elitist stream, i.e. stream S, mathematics specialisation. Previously, final year C (mathematics and physical sciences) was the preserve of the best male students from good social backgrounds who were also the typical candidates for entry into the CPGEs. As numbers have grown, however, the composition of the science streams has changed. There are now more girls, more pupils from modest backgrounds, and more pupils who have not performed as well, in the science streams. This change in the composition of the population has had an impact on educational choices. A detailed comparison, by type of pupil, between the intentions of pupils in final year C in 1987 and pupils in final year S, mathematics specialisation, in 2001 (which are the most comparable sections in this respect) shows that the decline in intentions to apply for the CPGEs is not uniform among the different types of pupil ([6]).

As can be seen, the decline in educational intentions to continue to the CPGEs does not affect the core of the population in the final science years, good pupils who are children of managers. However, for pupils from modest backgrounds, even when of 'target age', the decline is substantial and very substantial for all pupils who are 'behind'. The intentions of these groups have also shifted towards vocationally-based options.

In other words, since the first half of the 1990s, the final science years have been increasingly less selective (although they continue to be the most selective of the French educational landscape). Pupils from modest backgrounds, even when of 'target age', continue to be under-selected in these streams as they are in the whole of the school system, in comparison with the proportions applying for the short vocational options.

([6]) We divided numbers in these final years into eight types by cross-referencing, in pairs, the variables of 'gender', 'age at baccalaureate' and 'social background', each having two modes.

Intentions of pupils in the final years of the science streams in 1987 and 2001, by gender, social background and age (Académie of Lille) **Table 5**

		Girls				Boys				Total
		Father blue- or white-collar worker or small businessman		Father manager		Father blue- or white-collar worker or small businessman		Father manager		
		Target age	Behind	Target age	Behind	Target age	Behind	Target age	Behind	
1987 Final years C¨ (No = 3 006)	Science CPGE	32 %	11 %	24 %	15 %	50 %	32 %	53 %	33 %	39 %
	Short vocational courses (IUT, STS, nursing schools)	11 %	28 %	7 %	22 %	11 %	23 %	6 %	20 %	12 %
2001 Final years S, mathematics specialisation (No = 3 235)	Science CPGE and engineering schools	20 %	4 %	28 %	2 %	36 %	7 %	53 %	14 %	29 %
	Short vocational courses (IUT, STS, nursing schools)	22 %	46 %	11 %	41 %	27 %	42 %	13 %	44 %	24 %

Example: in 1987, 24 % of girls of target age whose fathers were managers (middle or senior) chose to continue their education in a Preparatory Class for the Grandes Ecoles.

Percentage of 1999 baccalaureate pupils passing the first two years of university in two years **Table 6**

Option / Bac stream	Law	Economic sciences	Arts	Languages	Humanities	Sciences	Sport
Arts	33,2	40,3	61,7	48,6	53,0	21,4	37,2
Economics	36,6	46,9	64,4	48,7	59,0	34,7	43,1
Science	54,0	58,9	69,6	59,8	70,4	42,4	65,9
Technology	6,2	14,8	33,2	11,6	22,5	8,8	19,2

Source: La réussite au DEUG, 2001.

tem, which was not the case fifteen years ago. These pupils from more modest backgrounds and performing less well at school, have less educational ambition and are more cautious in their choices. This caution and lack of ambition are reflected, when they are entering higher education, by a preference for the short options, although these students may go back to university in the second cycle, if their school results so allow, and enter the many kinds of more vocationally-based options that universities have created in recent years.

It is also the differences in the social composition of the final science year specialisations which explain, as we have shown elsewhere (Convert, 2003), why physics/chemistry has been the subject hardest hit by the decline in enrolments; a perverse effect of the 1995 reform of lycées which has exacerbated the effects described above.

This leads us to the last of the causes of the crisis in enrolments in theoretical science disciplines that we need to examine: the proliferation of applied science and technology courses and the career prospects that they open up, bringing about competition, even within universities, with traditional theoretical courses.

Theoretical science courses: difficult and 'not very profitable'

Theoretical university science courses are more 'difficult' than other university courses, in the sense that it is more difficult, all things being equal, to pass the examinations ([7]). The following table which measures the success of students in the various university disciplines by their specialisation in secondary education, shows both that science baccalaureate holders are more successful in all disciplines than all other baccalaureate holders (they are, for instance, more successful in higher education in the arts than arts baccalaureate holders) and that they are more successful in non-science disciplines than in science disciplines.

These two apparently contradictory phenomena reflect both the higher average level of science baccalaureate holders and the particular difficulty of university science courses ([8]). Science examinations are there-

([7]) According to the SOFRES survey commissioned by the Ministry of Education in December 2000, the main reason why lycée pupils were not applying for science courses was their difficulty.

([8]) These results are especially paradoxical as science baccalaureate holders enrolled for sciences are, on average, better pupils than science baccalaureate holders enrolled for other subjects. More of them obtained distinctions in the baccalaureate.

Indicators of the quality of the occupational integration of science graduates, by type of qualification (Université des Sciences et Technologies de Lille, graduates leaving in 1994 and 1995) **Table 7**

	Theoretical 2nd cycle	Theoretical 2nd cycle + competition	Vocational 2nd cycle (MST, IUP, MIAGE)	DEA (theoretical 3rd cycle)	DEA + competition	DESS (vocational 3rd cycle)	Doctorate
In stable employment (permanent contract)	37 %	92 %	84 %	57 %	97 %	74 %	82 %
Unemployed	19 %	1 %	4 %	15 %	1 %	9 %	0 %
In managerial occupation	11 %	93 %	65 %	51 %	89 %	74 %	100 %
Median wage (2002 in euro)	1 248	1 508	1 652	1 589	1 620	1 732	1 897
Numbers	*439*	*762*	*98*	*105*	*71*	*505*	*185*

Source: Observatoire des formations et de l'insertion professionnelle (OFIP), Université des sciences et technologies de Lille.

fore particularly difficult. What is the reason for this? Our hypothesis is as follows: while the initial science cycles of universities admit only, and without exception, science baccalaureate holders, in the first cycles of the arts, humanities and law, a minority of science baccalaureate holders study alongside a majority of non-science baccalaureate holders whose level of education is, on average, lower than theirs. In the initial non-science cycles, therefore, they benefit from the match between the level of difficulty of the examinations and the average level of the students enrolled to enable a sufficient number of students to obtain a degree ([9]).

However, it is also within science universities that theoretical courses are facing competition from technological vocationally-based courses which are less difficult and more 'profitable'. Whereas science universities only really offered theoretical courses in the past, a whole range of vocationally-based courses, at different levels, have sprung up over the last fifteen years, into which students can now be diverted. These courses are attractive because, like the Grandes Ecoles, they have a selective admission policy and make it more or less certain that the students admitted will be able to obtain the final qualification and put it to good financial use in the labour market. Their outlets are in practice better overall than those of theoretical courses. This can be seen from the following table, which compares the objective profitability of university science qualifications applying two criteria: job security and pay.

This table shows that access to a skilled job in the public service ([10]) offering both reasonable pay and greater job security is a risky pathway. It requires success in a competition taken following a theoretical option. In all the main cases, however, the holders of theoretical qualifications unsuccessful in this competition find it more difficult to find jobs (lower pay and less job security) than students who have taken a vocationally-based course of an equivalent level. Moreover, even for those successful in competitions, wages are lower than those of graduates of vocationally-based courses of an equivalent level. In a context of increasing proportions of students from modest backgrounds, more sensitive to guaranteed occupational prospects, the increased supply of vocationally-based courses is obviously causing, at each level, students to shift away from theoretical courses with less certain prospects towards 'profitable' courses.

Conclusions

In France, trends in the socio-demographic characteristics of the student population and in higher education supply seem to be key factors in explaining the decline in numbers in theoretical science disciplines and the increase in numbers in technology and applied science courses.

With a medium-term prospect of an increase in the number of jobs requiring long scientific and technical education (Commissariat général du plan, 2004), restricting access to most of these courses to science baccalaureate holders is a bottleneck in the French system. Improving the social and educational status of secondary technological education, often discussed but never implemented, is a potential solution to the shortfalls that are to be feared. Within higher education itself, there needs to be a change in attitudes so that those possessing a genuine technological education can gain access to the same types of knowledge as those possessing a more theoretical education.

([9]) Ministerial statistics show that, despite demographic fluctuations, the rate of entry into the second cycle of baccalaureate holders enrolled for the first year at university has remained constant since the early 1990s.

([10]) In the case of science graduates, these are chiefly occupations in primary, secondary and higher education and research.

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Annex: Brief description of French higher education

Pupils passing the baccalaureate who wish to continue on to higher education (see below for rates of higher education take-up by type of baccalaureate) can choose between universities and courses with selective admission.

Universities

Universities are open in France to all baccalaureate holders and have no entry selection. Since 2004/2005, education has been organised on the Degree-Masters-Doctorate model. During the Degree or Masters, students may enter vocationally-based streams either within universities themselves (vocational degrees, diplomas of university vocational institutes, vocational masters) or outside in engineering schools.

Prior to European harmonisation, the first cycle lasted two years and led to a Diplôme d'Études Universitaires Générales (DEUG – Diploma in General University Studies), the second cycle lasted a further two years (Degree and Masters) and the third cycle included two strands, one vocational, lasting a year and leading to a Diplôme d'Études Supérieures Spécialisées (DESS – Diploma in Specialist Higher Education), and the other theoretical starting with a one-year taught course leading to a Diplôme d'Études Approfondies (DEA – Diploma in Advanced Studies), and continuing with the preparation of a doctoral thesis.

Courses with entry selection

❑ **The Classes Préparatoires aux Grandes Écoles (CPGEs – Preparatory Classes for the Grandes Ecoles)** These are taught in lycées. They last two years and prepare students to sit the entry competitions of the Grandes Écoles. The Grandes Écoles are in particular schools of engineering and schools of commerce, but also include the École Normale Supérieure, which is a nursery for high-level researchers. Courses at the Grandes Écoles normally last three years.

❑ **The Instituts Universitaires de Technologie (IUTs – University Technology Institutes)** These Institutes are run by universities and have special status. They award the Diplôme Universitaire de Technologie (DUT – University Technology Diploma) following two-year courses after which students may enter working life or (much more frequently) continue their education in universities or other higher education schools.

Key words

Higher education,
pure sciences,
applied sciences,
choice of studies,
number of students,
access to employment.

Baccalaureate stream	General (1)	Technology (2)	Vocational
Baccalaureate passes in 2003	**268 335**	**142 799**	**91 537**
Percentage continuing education:			
at university	62 %	18 %	6 %
in CPGEs and engineering schools (3)	10 %	1 %	0 %
in IUTs	11 %	10 %	1 %
in STSs	10 %	45 %	14 %
in nursing and allied schools (4)	4 %	5 %	0 %
in other schools	3 %	1 %	1 %
Total (5)	99 %	81 %	22 %

(1) The general baccalaureate has three streams: arts (51 893), economics and social sciences (81 068), sciences (135 374).
(2) Including 35 271 in the industrial sciences and technologies section, 5 794 in the laboratory sciences and technologies section, 17 836 in the medical and social section and 76 098 in the service sciences and technologies section.
(3) Small number of engineering schools which can be entered directly after the baccalaureate (five-year courses).
(4) Evaluation from 2001/2002 data.
(5) Evaluation.

❑ **The Sections de Techniciens Supérieures (STSs – Higher Technicians' Sections)** Teaching is provided in lycées. Courses last two years and lead to a Brevet de Technicien Supérieur (BTS – Higher Technicians' Certificate) following which students can enter working life as skilled workers or (in a minority of cases) continue their education in universities or other higher education schools.

❑ **Nursing and allied schools** These schools are for the most part run by the Ministry of Health. Allied schools include other paramedical schools (opticians, physiotherapists, speech therapists) and schools for social workers. Courses last three years in most cases and lead to a vocational diploma.

❑ **Other schools** There are also schools for engineering, commerce and accountancy which can be entered directly after the baccalaureate. The higher schools of arts, especially architecture schools, are included in this group.