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Taxing Times for U.K. Academic Spin-Outs

In Britain at least, research scientists rarely comment when governments unveil their budget plans. In December of last year, though, a flurry of statements welcomed the latest plans announced by Gordon Brown, Chancellor of the Exchequer, the United Kingdom's senior finance minister. In his pre-budget statement—a statement of government spending plans in advance of the detailed budget announcements this spring—Brown said that he would "remove tax barriers to the formation of university spin-off companies."

The Institution of Electrical Engineers (IEE) summed up the sentiments when it welcomed in the announcement by Gordon Brown "that he will undo the tax changes that have, inadvertently, prompted a dramatic decline in spin-out activity from academic research."

This response gives a clue as to why the Chancellor's pronouncements suddenly aroused the interest of academics. Brown was actually undoing tax changes that he had implemented just two years previously. When their impact finally sank in, those earlier changes came as a shock to academics who, in planning to set up businesses to exploit the results of their research, suddenly faced large tax bills.

The issue goes back to a new tax regime introduced in April 2003. In that legislation, Brown set out to eliminate what many considered to be an abuse of the tax position with respect to shares in new businesses.

Before the rules changed, shareholders in startup businesses were not taxed on their shares until they realized a capital gain. As David Cheesman, a fund manager at Advent Venture Partners, a venture capital business that has invested in several academic spin-outs, said, "If you sell your shares, you get the money to pay the tax." With some careful tax planning, the academics would not have to part with money they did not have.

The new rules changed all this. They treated the acquisition of shares as income, triggering a bill for income tax. Academics suddenly faced bills for shares as soon as they created a business, long before they could sell those shares. As many technology startups take years before they generate income, and even longer before there is a market for their shares, the result was that academics, and other investors of money and resources, could end up paying for the privilege of participating in risky ventures.

Wendy Hall, head of the School of Electronics and Computer Science at the University of Southampton, explained that the problem under the new rules was that "you have to pay the tax at the valuation when it is spun out." The University of Southampton has a long history of creating new research-based businesses. One area where it has been particularly active is in photonic materials. For example, Cheesman of Advent is a director of Southampton Photonics, a spin-out from the university's Optoelectronics Research Centre, which commercializes fiber lasers for applications in telecommunications and materials processing. Another Southampton startup, Mesophotonics, is developing photonic integrated circuits.

Hall illustrates the position before the recent announcement with a quick calculation. If a company is valued at £1 million—a typical amount for the first round of financing—the academics' share could be £100,000, which could land them with an immediate tax bill of £40,000. "That is their salary for a year, with no guarantee that they will get it back," said Hall.

When the impact of the new tax regime became clear, UNICO, the University Companies Association, approached the Treasury. Tony Raven, director of Enterprise and Innovation at the University of Southampton and himself a "spinner-out" in the past, led UNICO's discussions with the Treasury. These failed to come up with a workable solution.

As a result, said Raven, universities put the brakes on their commercialization plans. "We all stopped any activity until we knew what was going on and could take decisions on what the tax liability was."

UNICO estimated that the number of spin-outs fell by around 50% in the first year after the rules changed. And many of the companies, there, were formed without knowing about the change in policy.

A particular irony of the situation was that Brown has championed technology transfer from universities to industry, and he had stressed the importance of startup businesses in this process. Indeed, a headline message in Brown's December statement was that by 2015 he envisages a Britain which "resolves to invest in hi-tech, high-value-added manufacturing and services through world leadership in science and technology."

The success of businesses born out of academic materials research lies behind some of the government's belief on academic spin-outs. One of the best known of these businesses is Cambridge Display Technology (CDT), set up at the beginning of the 1980s by a group led by Richard Friend at the University of Cambridge. CDT, a world leader in commercializing light-emitting polymers, finally gave its academic creators the first glimpse of a return on their commitment just before the end of 2004, when it closed its initial public offering (IPO) on the NASDAQ stock exchange.

Friend was also one of the academics behind Plastic Logic, a company set up in 2000 to develop "plastic" electronics. Backed with $17 million of funding, the company, based in the Cambridge Science Park, has nearly 40 employees and operates what it claims is the world's first plastic electronics "mini-fab."

To encourage others to follow these examples, the U.K. government has significantly increased its investment in research and development (R&D) and has introduced R&D tax credits for companies. Brown's pre-budget statement also included another increase in funding for the Department of Trade and Industry, the department responsible for most of the government's support for R&D that brings together industry and academia. Academics do notice that sort of statement, but it is a safe bet that in the future they will pay closer attention to the finer details of items buried in the depths of the government's financial pronouncements.

MICHAEL KENWARD

NSF Reports Increase in Science and Engineering PhD Degrees in 2003

After a 1998 high, the number of science and engineering (S&E) doctorates awarded by U.S. institutions annually has been declining. Now, according to data from the National Science Foundation (NSF), the

Spain Revamps Its Postdoc Repatriation Scheme

Like most (if not all) members of the European Union (EU), the Spanish government is concerned about the "brain drain." According to the European EU science news office, Europa, Spain's Education and Science Ministry has announced a scheme to provide greater job security for postdoctoral researchers, especially those returning from study abroad. A total of 900 permanent positions will be created, reports said.

In the plan unveiled on December 15, 2004, 300 permanent positions at universities and research centers will be created annually over a three-year period for postdoctoral candidates with four or more years of successful research. To fund the scheme, the ministry will set aside up to €10 million a year for different regional governments.

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Table I: Doctorates Awarded, by Field of Study and Year of Doctorate: 1994–2003

Field of Study	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Science and engineering	26,204	26,535	27,240	27,232	27,278	25,932	25,966	25,540	24,571	25,258
Engineering	5,821	6,008	6,309	6,115	5,924	5,330	5,321	5,502	5,071	5,265
Materials/metallurgical engineering	539	588	574	582	565	469	451	497	396	473
Ceramic sciences	39	39	41	39	24	33	22	17	13	18
Materials science	433	476	472	483	482	393	404	448	364	437
Metallurgical	67	73	61	60	59	43	25	32	19	18

Source: Extracted from the National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates.

Table II: Doctorates Awarded to Women, by Field of Study and Year of Doctorate: 1994–2003

	Number per Year										Percent	
Field of Study	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	1994	2003
Science and engineering	7,922	8,286	8,649	8,934	9,348	9,081	9,393	9,328	9,158	9,472	30.2	37.5
Engineering	635	696	777	750	774	788	837	928	888	896	10.9	17.0
Materials/metallurgical engineering	83	95	84	106	84	88	83	105	80	101	15.4	21.4
Ceramic sciences	9	5	3	8	2	9	8	3	1	1	23.1	5.6
Materials science	69	84	72	96	75	75	73	99	78	99	15.9	22.7
Metallurgical	5	6	9	2	7	4	2	3	1	1	7.5	5.6

Source: Extracted from the National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates.

25,258 S&E doctorates awarded during the 2002–2003 academic year represent a 2.8% upward tick. But despite that increase, the number of S&E doctorates awarded remains 7.4% below the 1998 peak.

The NSF report, *Science and Engineering Doctorate Awards: 2003*, also indicates that the newly graduated cohort of all doctorates reflects the diverse heritage of the U.S. population. Members of racial or ethnic minority groups earned 4528 doctorates, representing 17% of the U.S. citizens earning research doctorates in 2003—the highest percentage the survey has recorded. Minorities represent 24% of the general U.S. population. The number of S&E doctorates awarded to members of underrepresented minority groups only slightly decreased, from 1354 to 1337.

U.S. citizens received 68% of all doctorates earned in 2003 for which citizenship was identified (95% of doctorate recipients identified their citizenship). The number of U.S. citizens and permanent residents earning S&E doctorates increased from 15,508 in 2002 to 15,669 in 2003, while S&E doctorates awarded to students with temporary visas increased from 7688 to 8388.

"People who are concerned about U.S. science and engineering education may be encouraged by these numbers," said Joan Burrelli, an NSF senior analyst. "However, beneath the totals, we should note that the number of doctorates in some engineering fields (e.g., chemical engineering) did not increase, and decreases occurred in some of the biological sciences, physics, earth sciences, and some of the social sciences."

Some things, however, stayed the same. For instance, women received 45% of all doctorates granted in 2003 and 51% of the doctorates awarded to U.S. citizens—the same as in 2002.

And, as in previous surveys, newly enrolled graduate students took about 7.5 years to receive their doctorates, according to *Doctorate Recipients from United States Universities: Summary Report 2003*, released by the National Opinion Research Center (NORC), which conducted the survey for NSF.

The 2003 analysis includes a special section about where doctorate recipients received their undergraduate degrees. Over a five-year period (1999–2003), about 73% of the 186,868 doctorate holders earned their undergraduate degrees from U.S. institutions, while the rest earned those degrees from institutions abroad prior to coming to the United States to pursue graduate study. For S&E fields, doctorate recipients are more likely to have earned their undergraduate degrees outside the United States (33% of S&E doctorates versus 16% of non-S&E doctorates). Students with undergraduate degrees from Seoul National University (1655), National Taiwan University (1190), and Beijing University (1153) made up the largest non-U.S. contingents to doctoral programs in the United States.

"These data give us new insights into the links within the worldwide university community," said Tom Hoffer, director of the NORC survey project. "We can see how the patterns of education differ by field and nationality as well as examining the major institutions, both in the United States and abroad."

Tables I and II illustrate data collected on the materials field. The NORC report can be accessed at Web site www.norc.uchicago.edu/issues/docdata.htm.

Complete data about S&E doctorates awarded are published in NSF's *Science and Engineering Doctorate Awards: 2003*, which can be accessed at Web site www.nsf.gov/sbe/ srs/nsf05300/htmstart.htm.

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