Adaptability assures res

The Centre for Financial Research at Cambridge University's Judge Institute of Management, UK, has earned international respect in just six years.

The first thing that strikes visitors to the Judge Institute of Management is the beauty of the building, which, from its grand façade to the suspended walkways and flying staircases criss-crossing the vast and stylishly decorated atrium, is surely the ideal environment to encourage inspired thought. The building, refurbished just seven years ago, was the original site of Addenbrooke's Hospital. Now it houses Cambridge University's business school and a number of research centres in business, finance and management, one of which is the Centre for Financial Research (CFR).

Headed up by Professor Michael Dempster, the Centre for Financial Research shows clear signs of pedigree, one such being the speed of its evolution. The CFR has expanded from seven to about twenty researchers and associates in the six years since its inception and in that time has collaborated with more than thirty major institutions on dozens of cutting edge projects. Dempster gives an initial outline of the CFR's activities in characteristically dismissive style: 'You know, we publish, train students, all that kind of thing'—a reticence that is not too surprising given his association with this journal.

But probing him and his researchers a little more closely soon reveals that the CFR is the prodigy brainchild of a determined man. Dempster injects it with a steady stream of energy, direction and innovation and a dynamic, sometimes controversial approach, that is at least part of the reason that the CFR has rapidly earned such a prominent place on the map of financial innovation.

The CFR began life as a transferring group of researchers from Essex University—four students, a senior and a junior postdoctoral fellow and Dempster, their professor and founding director of the interdisciplinary Institute for Studies in Finance there—complete with funding and computers. Dempster had been appointed to the post at Cambridge as Professor of Management Studies in finance and management science, a culmination of the growing diversion from the mathematics side of his career that featured in previous posts at Oxford, Dalhousie and Essex universities. On arrival at Cambridge the group had to secure an abode and the infrastructure. Things moved swiftly from there. As well as securing UK and EU research grants, the CFR now takes on funded assignments from banks and other financial institutions and is much in demand with City firms looking to strike up partnerships.

For example, the CFR has just renewed a long-standing partnership with financial software company Algorithmics, which sponsors a 'RiskLab' at the centre, dedicated to the study and optimization of risk management techniques and software. Having delivered prototype software for integrated firm-wide risk management techniques to another partner Pricewaterhouse Cooper, current interests of the Cambridge RiskLab include dynamic portfolio replication using stochastic programming techniques.

The CFR is also working with several other well known sponsors—for example Citigroup on cross-currency swaps and HSBC on foreign-exchange technical trading. Meanwhile its risk management course, rated one of the best in Europe, benefits from Financial Trading System software, Moneyline Telerate data and a partnership with Carnegie Mellon University.

How did they come to be so well connected in such a short space of time? Part of the answer is the high quality of the work produced by the group, which itself is attributable to the quality of the researchers themselves. Cambridge University and the growing reputation of the CFR between them attract some of the best postgraduates in the field. Its personnel have played a key role in setting up the new Cambridge MPhil in Finance, a programme shared with mathematics and economics, which now has the most competitive entry in Europe and leads on to PhD research in finance. In addition, there is a pragmatism about its approach that differentiates the CFR from other academic outfits.

Short-term contract research

'The distinguishing feature here is that we are willing to work on short-term contracts, as consultants, for financial firms. This means we must show that we can solve problems relatively quickly. Our successes in the short-term contracts often lead to longer-term agreements', Dempster explained.

'In my opinion, individual consulting-type arrangements are the new way. We use them to augment normal grant-driven research. We can opt for other means of funding and so far we've not noticed the economic downturn at all.'

The academic benefits of this approach include strong connections with developments as they happen in the real world—and a genuinely current appreciation of market needs. In addition the CFR makes an effort to focus on research at the leading edge of modern finance and financial engineering. Never afraid to tackle the newest, trickiest problems, the group is currently immersed in asset liability management, real options, dynamic portfolio management and the design, pricing and risk control of derivative and more traditional financial products. This combination of practical driving forces and high academic standards gives CFR staff a characteristic edge that they think may be unique worldwide.

But it is clear that the people are the real essence of the success. Dempster lists them all, as well as some of those who have finished and moved on already, recalling their first degrees, particular strengths, countries of origin, hobbies, even their wives' and husbands' names, pointing out that, aided by Senior Research Associate Dr Elena Medova and other senior staff, the CFR has nurtured no less than ten students through their PhDs in six years, all of whom have progressed to good jobs in the City or other global financial markets.

A brush with these CFR folk leaves a distinct impression of this

earch centre's success

The atrium of the Judge Institute of Management building.

Professor Michael Dempster (left) in the CFR's computer lab.

sense of community and quality and everyone is keen to enthuse about their work. Shahab Kokhar, PhD research student, explained his research on the implementation of real options, a relatively new risk-sensitive project valuation model that can accommodate flexible future decisions and that offers advantages over the discounted cash flow (DCF) model. 'Real options are good for energy companies, internet portals and even drug development firms as, in each of these cases, decisions are made in relatively slow stages in the face of great uncertainty, each contingent on the outcome of the previous course of action', he explained.

The challenge for real option proponents, if the approach is to mature, is finding more straightforward ways of measuring the parameters. Despite this, real options are already in use within some companies—Kokhar and his co-workers, for example, are sponsored by Italian petroleum firm AgipPetroli, and have already valued two projects and developed appropriate software for them.

Software development

Software development—particularly using stochastic approaches—is the main string in the group's bow. Research associate Dr James Scott is one of the CFR's stochastic programming experts. The technique, he explained, enables Markowitz portfolio theory to be extended to produce a multi-stage model of how the real world might change—that is, to produce a simulation of the environment that includes all realistic future possibilities. 'In other words', he illustrated, 'for a global capital markets scenario, the idea is to capture every possible combinational change of every asset with respect to every other. The model works out the possibilities and then makes a decision that is a hedge with respect to all the different scenarios—so the risk mitigation is built in. This requires an enormous data structure.'

'We are willing to work on short-term contracts … this means we must show that we can solve problems relatively quickly'

The stochastic models created by Scott, Dr Giles Thompson and their colleagues at the CFR can cope with large numbers—up to tens of hundreds—of uncertain variables over time. They are also fast, efficient and effective at solving large and realistic problems compared with other approaches. In addition, they run in C on PCs, sometimes in parallel, precluding the need for massive capital investment in high-performance computing hardware.

Their typical application is in asset liability management, which fact has garnered sponsorship from other commercial firms such as Watson Wyatt, Frank Russell and, currently, Pioneer Investments. But the technique is flexible and can be applied to derivatives, logistics, pension funds and corporate risk management. 'Stochastic programming techniques will eventually scale down and become more widespread', predicted Scott. 'We could ultimately even see them as aids for personal financial planning.'

Other areas in which the CFR is making a name include operational risk management, new, more realistic spread option model valuations using fast Fourier transforms and artificial intelligence techniques for intraday foreign exchange trading. But don't expect the portfolio to remain the same for long.

'We must continue to adapt to the needs of the industry', concluded Dempster, 'so we will have to keep up with changes. The implications of the Basel II accord for risk capital allocation will be one of the next interesting things. We have just begun a joint project with Deloitte Consulting led by Dr Medova on precisely this. Hedge fund research is also up and coming.

'In the longer term we are setting up an advisory board of senior quants that will provide a formal structure for connection between and within academia and industry. We're also exploring the idea of bridging the gap between actuaries and bankers.' It looks like the CFR will not be slowing down for quite some time.

Further information

www-cfr.jims.cam.ac.uk

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