infrastructure at the expense of the next generation.

As is often the case in high-energy physics, the success of the Tevatron can be measured in orders of magnitude. Since the Tevatron's opening in 1985, its luminosity, a measure of the number of collisions produced, has increased by a factor of 20 million. Its detectors have gathered data at an exponential rate, along the way discovering the top quark in 1995 and the tau neutrino in 2000.

But few discoveries have emerged from the accelerator in the past decade. The search for heavier particles, such as the Higgs boson, a critical part of the mechanism for mass, uses higher luminosities and energies than the Tevatron could ever produce. To make up for its lack of power, the machine has been forced into a war of attrition: running for years beyond its expected lifetime in the hope of collecting enough data to spot something new. It is an inefficient way to do science.

Despite its mounting obsolescence, scientists have continued to push to extend the Tevatron's run. In the beginning, the case was made that it could yet beat its European rival, the Large Hadron Collider (LHC) at CERN, Europe's particle-physics lab near Geneva, Switzerland, to the discovery of the Higgs. That argument held some weight while the European collider was facing early teething pains, but last year the LHC roared to life and is now churning out data at a staggering rate (see page 282). The latest scientific case for keeping the Tevatron running until the end of 2014 revolves around its ability only to plug gaps in the LHC's work.

Although scientifically persuasive, this argument must be measured against the US$35 million needed each year to operate the machine. That sum might seem small in comparison to the US research budget as a whole, but it represents roughly 10% of Fermilab's annual operating funds. Lab leaders would like to put the money elsewhere: faced with the truth that the Tevatron cannot run forever, they are hoping to develop a strong programme in neutrino physics. The new direction will keep the scientists at Fermilab working for years to come and could even lead to future collider projects.

To administrators at Fermilab and the DOE, the decision was clear: the lab must shut down the Tevatron in order to move forward. In one sense it is a risky strategy — to trade a steady income for the promise of better to come. Funds for the new programme are far from guaranteed and could yet be a tall order in the current economic climate. But in making the sacrifice, the lab showed that it is serious about its new neutrino programme. It is also providing its political supporters with evidence that it is acting as a responsible research body, something that may help them win the additional money needed for the new programme.

"It can serve as an example to scientific communities that are clinging to ageing infrastructure at the expense of the next generation."

The move stands in stark contrast to other fields that have chosen to protect the old over the new. Some in the astronomy community have lobbied hard to keep 'historic' facilities such as the Arecibo Observatory in the United States and Jodrell Bank in the United Kingdom. Elsewhere in Europe, geriatric research reactors and synchrotron light sources are kept running more out of national pride than scientific need.

The case for closing many of these facilities is less clear-cut than the Tevatron, however. The collider has obviously been superseded by its European rival, and high-energy physicists have little choice but to move on. By contrast, telescopes and synchrotrons can always gather more data on another star or a new material. Yet at some stage, the scientific value of these facilities becomes so diminished that it must be weighed against the new opportunities the funding could give to the community. Rather than fighting protracted political battles against their inevitable closure, researchers should provide new ideas and facilities that could be leveraged using funds from the closure of the last generation. Such a strategy is more risky, but it will ultimately prove much more rewarding. ■

Natural wealth

Ecological models can be used to guide economic policy — but should they?

The first law of economists states that for every economist there exists an equal and opposite economist. In that spirit, *Nature* this week presents related articles that take contradictory stances on what the banking system could, or indeed should, learn from ecologists. In a Perspective (see page 351), Andrew Haldane, executive director of financial stability at the Bank of England in London, and Robert May, a theoretical ecologist at the University of Oxford, UK, and former chief scientific adviser to the UK government, argue that the stability of complex networks of linked dependencies that make up the world's financial system can be tested using a simplified ecological model. They say that the results of their approach highlight ways in which economic policy could be changed to make the system more secure. Regulation of elements such as liquidity ratios, banking structures and trade in complex derivatives, they say, should work to protect the system rather than individual banks.

In a News & Views Forum (see page 302), this approach is criticized as potentially dangerous by Neil Johnson, a physicist at the University of Miami in Florida who studies real-world complex systems. Johnson says that policy implications drawn from such a simplistic model will be unreliable, because they will depend so heavily on the assumptions used to prepare the model. But Thomas Lux, an economist at the University of Kiel in Germany, offers a more supportive view. He says that the similarities between financial markets and ecology are real and relevant. For example, the 2008 default of the Lehman Brothers financial services firm had contagious effects similar to those of a 'super-spreader' of disease. Researchers should go beyond Haldane and May's simple model, says Lux, and build in factors such as interbank credit lines.

Given such contrasting views, how seriously should policy-makers take lessons from nature when it comes to financial regulation? Using natural models to set policy has proven difficult, even for ecological policy. Witness the controversy that has surrounded the UK government's handling of foot-and-mouth outbreaks and whether to tackle bovine tuberculosis by culling badgers, which can spread the disease. In other areas, such as conservation and fisheries, research offers more clear-cut recommendations. But in such cases there is often a failure of political will to follow through. Which is the case in finance policy? Perhaps the best approach is to keep a cautiously open mind — or to remember that the second law of economists states that both the economists cited in the first law are wrong.

Wider discussion of the ideas raised by Haldane and May will inevitably throw up many questions. Among them, we expect, will be: why is *Nature* publishing research in economics? As a natural-sciences journal, most of economics falls outside our primary-research remit, and there are some fundamental differences in approach between the fields. For example, in financial systems, as Haldane and May point out, evolutionary forces often act for the survival of the fattest, rather than the fittest. But in this case, we think the clear links that the authors draw with ecology will make their study of interest to readers. More generally, we are happy to publish primary economic research that has significant scientific implications, for example in fields such as behaviour, conservation biology, systems biology or physics. With such an approach, perhaps both economic science and natural science can benefit. ■

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