

# A minute with Andrew Odlyzko

In each issue, *Algorithmic Finance* features a brief interview with one member of our advisory or editorial boards or another leading academic or practitioner. These brief conversations are intended to provide a glimpse of their current thinking. In this issue, we talk with Andrew Odlyzko.

Andrew Odlyzko is professor of mathematics at the University of Minnesota. He has had a long career in research and research management at Bell Labs, AT&T Labs, and most recently at the University of Minnesota, where he built an interdisciplinary research center, was Assistant Vice President for Research, and director of the Minnesota Supercomputing Institute. He has written over 150 technical papers in computational complexity, cryptography, number theory, combinatorics, coding theory, analysis, probability theory, and related fields, and has three patents. In recent years the focus of his research has shifted to electronic commerce, economics of data networks, and economic and financial history. Of particular interest to him are the bubbles that originate from interactions of finance and technological innovation. He is the author of such widely cited papers as “The decline of unfettered research,” “Tragic loss or good riddance: The impending demise of traditional scholarly journals,” “Paris Metro Pricing for the Internet,” “Content is not king,” and “Privacy, economics, and price discrimination on the Internet.” He may be known best for an early debunking of a key myth of the Internet bubble, that of Internet traffic doubling every 100 days. All his recent papers, presentations, and other materials are available at <http://www.dtc.umn.edu/odlyzko>.

## 1. What are your research interests right now?

Although I am engaged in some projects in pure mathematics, security, and economics of data networks, the main thrust of my research is on the origins of modern corporate capitalism in 19th century Britain.

When we look at that period, we find evidence that the key institutions of the modern economy were created less as a way to promote rational investments in an environment of uncertainty, and more to channel what the British elite regarded as irrational herding of investors into areas that would be at least moderately productive. The decisions of the British policy makers were often made under time and other pressures, and usually with incomplete, and frequently incorrect information. However, they were inspired by a good intuitive understanding of behavioral economics. While that term was unknown at that time, there was wide appreciation of the power of the endowment effect, overconfidence bias, and other phenomena that have been named and explicated only recently. Furthermore, the crucial role of promoters appeared to be understood far better then than it is today. These folks, often scornfully referred to as “snake oil salesmen,” are important in stimulating the imaginations of investors and entrepreneurs. If we follow Say and declare entrepreneurs to be the people who shift resources to more productive uses, then promoters might be called the agents who shift capital from the hands of passive investors to those of entrepreneurs. The problem is that even completely honest promoters often lead investors astray, as their skills often do not include a deep understanding of technology or markets. (There are obvious exceptions, such as Steve Jobs, but on the other side of the balance we have figures such as Bernie Ebbers and Bernie Madoff.) Thus promoters play a key role in greasing the wheels of corporate capitalism, but also contribute to its instability.

The key role of 19th century Britain in the development of modern capitalism is widely recognized, but it is missing some important elements, of which the role of promoters is just one. There is an extensive literature on the liberalization of limits on corporations. (The widespread prejudice against this form of organization, very prominent in Adam Smith’s “Wealth of Nations” and other sources, meant that until 1825, it

it was practically impossible to form a corporation in the UK. By the mid-1850s, not only were corporations widespread, but they could automatically provide limited liability to shareholders.) But even this area has not been explored completely, as modern publications are deficient in their coverage of the four great investment manias in 19th century Britain, and their connections to the growth of equity markets. Further, there are many features of that period (heavy national debts, liquidity traps, fiscal repression, extensive corruption, the flowering of the Industrial Revolution,...) that are prominent today, and their effect or treatment in the 19th century deserve more attention. In particular, as was stated by Kenneth Arrow in his interview in this series, the “emergence of the business cycle and financial crises in the early 19th century” that also is associated with those developments, “has never been well explained.” The tolerance and even encouragement that policy makers provided to promoters, which is so deeply embedded in modern institutions that we do not notice them, appear to explain much of this phenomenon. But there is far more, and I have been digging through the contemporary literature and collecting financial market price data to illuminate this period. Right now I am in the process of writing a series of papers on this research, and will soon start working on several books.

## **2. What do you see as academically exciting?**

It’s impossible to answer this, as there are so many exciting problems. Just in the areas I am most familiar with, from pure math to privacy, one could go on for hours discussing fascinating questions that appear amenable to investigations. Mathematical finance, too, even though I have less familiarity with it, has many challenges that are of both intellectual and practical interest. The reason I am so deeply buried in 19th century British economic and financial systems is that I found so much “low-hanging fruit there,” and so few others collecting it. But I am well aware of much else in the world that is exciting.

## **3. What would you work on if you had lots of time?**

Understanding modern financial systems and figuring out how to make them safer and more effective at promoting economic development. Most of what we find today can be traced back to the early 19th century, but there are several orders of magnitude of difference in the speed and complexity of modern finance compared to what we find there. Thus one cannot blindly apply lessons from that period to the modern world.