INTERVIEW

Nicholas Bloom

Editor's Note: *This is an abbreviated version of EF's conversation with Nicholas Bloom. For the full interview go to our website: www.richmondfed.org/publications*

There's no question that the policies used to treat the Great Recession and its aftermath were extraordinary. After the housing decline and financial crisis cast doubt over trillions of dollars in financial assets worldwide, policymakers responded in kind with large-scale, unprecedented policies that generated uncertainty about future policy.

One question on many people's minds was, to what extent was policy uncertainty making the recession worse? And exactly how large had policy uncertainty become? Some said policy had created too much uncertainty, while others said policymakers hadn't done enough to mitigate the economic uncertainty caused by the recession.

This debate put Stanford University economist Nicholas Bloom's research in the spotlight. When Bloom started his Ph.D. at the University College of London in the mid-1990s, he was mainly interested in adjustment costs: how expensive it is to hire or fire a worker, or to buy a piece of equipment and get rid of it. Bloom thought adjustment costs would be even more important in an uncertain environment, which would make mistakes more likely. He has devoted much of his research career since then to quantifying uncertainty and measuring how it affects the economy, with several measures displayed on the website PolicyUncertainty.com.

After earning his doctorate in economics in 2001, Bloom worked at the management consulting firm McKinsey & Co. and became interested in a second hard-to-measure phenomenon: the effect of good versus bad management practices on the productivity of firms. With co-authors, he launched the World Management Survey, which documents management practices across more than 10,000 firms worldwide in manufacturing, retail, schools, and hospitals.

Large-scale measurement, Bloom says, is the next frontier in research on both uncertainty and management. It wasn't long ago that economists were skeptical of efforts to accumulate comprehensive datasets over time, such as the measures of aggregate economic activity that Simon Kuznets pioneered in the 1940s. Today, it is hard to imagine policymaking without them. With Bloom and his co-authors' continued efforts, research on uncertainty and the effects of management may follow the same path.

Renee Haltom interviewed Bloom via videoconference in October 2014.

EF: "Uncertainty" is a broad term. What does it mean in your research, and how can we measure it?

Bloom: There isn't a standard accepted definition. The average Joe on the street would say that uncertainty is not knowing the future. For example, the outcome of the Giants-Royals World Series is uncertain when it's happening. And that definition works well in most contexts.

In economic models this can be formally represented as the "stochastic [random] volatility" of factors — such as productivity or demand — that drive economic activity. When volatility is higher, uncertainty would be higher. That's the definition financial economists would use and I typically have used when modelling uncertainty shocks.

There is another definition going back to Frank Knight, the late Chicago economist. He defined "risk" as when you have a known distribution for a future outcome and uncertainty as when you have an unknown distribution. For example, the outcome of a coin flip is risky, while the economy was uncertain post 9/11 because it was almost impossible to predict what would come next. This definition of uncertainty is often called Knightian Uncertainty.

In terms of measuring uncertainty in the economy, we currently only have proxies — stock market volatility, newspaper mentions of uncertainty, or the volatility of macroeconomic data. But that's something I hope will improve over time.

The old example of an uncertainty shock that I used in my Ph.D. work in the early 2000s was 9/11. This event

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generated a spike in every measure of uncertainty. Then the Great Recession hit, and this made the 9/11 uncertainty spike look like a small blip. Measures of uncertainty — like the VIX index of stock market volatility [the Chicago Board Options Exchange Market Volatility Index], which measures the market's expected volatility over the next 30 days — went up by about 500 percent. Similarly, newspaper indices of uncertainty jumped up by about 300 percent. Even the Federal Reserve's Beige Book had a surge of discussion of uncertainty — before the Great Recession, each month had about three or four mentions of the word "uncertain," but after the Great Recession it hit nearly 30.

A lesson from uncertainty research is the medical principle of "first, do no harm." It may be that policy actions generate more uncertainty damage than help. Politicians often act based on partial information or hastily developed ideas, when often the best course would be to stay calm and inactive.

Interestingly, the Great Depression of 1929-1933 was another period where there was broad concern over uncertainty. Newspaper coverage of uncertainty and stock market volatility rose sharply in this period. In fact, one of Ben Bernanke's key papers before he became Fed chairman was, amazingly, on how uncertainty can impair investment. Christina Romer, chair of President Obama's Council of Economic Advisers during the Great Recession, had studied uncertainty too. So some of the key policymakers in Washington at the time were acutely aware of what uncertainty could do to an economy.

EF: To what extent does uncertainty cause recessions, versus recessions causing uncertainty?

Bloom: This is a key question in the literature. Economists love clean models and clean stories, but I think in this case we have to recognize that causation runs both ways.

Recessions typically start with a nasty shock — like an oil shock, a financial crisis, or a war — a negative "first moment" shock, in the language of economics models. These shocks also induce uncertainty, known as a "second moment" shock.

For example, both of the oil shocks in the 1970s pushed the economy into recession through higher oil prices, but they also increased uncertainty over future oil prices and global economic growth. Likewise, the recent U.S. and European housing and financial crises were both bad news but also increased economic uncertainty.

Moreover, recessions tend to induce uncertainty on an ongoing basis. As conditions worsen, businesses slow down, firms fail, and consumers change behavior. Likewise, as policymakers try to revive growth, they tend to try increasingly extreme policies, which have the negative side effect of increasing uncertainty. So recessions and uncertainty are tied together in a vicious cycle. Uncertainty leads to recession, which increases uncertainty, making the recession worse.

EF: What are the most important things we learned in the Great Recession and its aftermath about the effects of uncertainty?

Bloom: One obvious lesson is that high uncertainty can indeed slow economic growth in the short run. The basic idea is that firms and consumers struggle to make decisions if they are really uncertain about the future. The reason being that bad decisions, such as investments or hires that you come to regret in the future, are often costly to reverse. In economics terms, firms face "adjustment costs." So when uncertainty spikes, the natural response is to pause to avoid making a costly mistake. And of course, if every firm and consumer in the economy pauses, a recession ensues.

Therefore, the second lesson is the medical principle of "first, do no harm." It may be that policy actions generate more uncertainty damage than help. One reason is that policymakers have an incentive to be policy hyperactive. I saw this when I worked in the U.K. Treasury. Politicians had to be seen as acting in response to bad events; otherwise, the public and media claimed they were not responding or, worse, claimed they didn't care. So politicians would act, often based on partial information or hastily developed ideas, when often the best course would be to stay calm and inactive.

So hasty or unpredictable policy response to recessions can actually make the recessions worse. A classic example is the accelerated depreciation allowance that Congress debated introducing for several months after the 9/11 attacks. Many commentators argued that this delayed the recovery as businesses waited to see what the decision would be. In fact, the Nov. 6, 2001, FOMC minutes even contained an explicit discussion of the damaging policy uncertainty this introduced.

EF: How big a factor was policy uncertainty in the severity of the Great Recession and its slow recovery?

Bloom: That's a very tough question to answer. The full experiment is this: If you held everything else constant and did not have the rise in uncertainty, what would have happened to the drop in economic output? I think, based on some rough calculations I lay out in my 2014 *Journal of Economic Perspectives* paper, that the recession would have been about one-third less. So I think uncertainty was a major factor, though not the biggest factor, which I think was a combination of the housing and financial crises.

If you then break out policy uncertainty from uncertainty, it's even harder to tell. From my paper with Scott Baker and Steve Davis, the best evidence that it matters is when we look at individual sectors. We interact our policy uncertainty measure with sector-level measures of the exposure to

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➤ Present Position
Professor of Economics, Stanford University Economics Department; Professor by Courtesy, Stanford University Graduate School of Business; Co-Director of the Productivity, Innovation and Entrepreneurship Program, National Bureau of Economic Research

➤ Selected Previous Positions
Research Fellow, Centre for Economic Performance, London School of Economics (2003-2006); Management Consultant, McKinsey & Company (2002-2003); Business Tax Policy Advisor, Her Majesty's Treasury (2001-2002); Research Economist, Institute for Fiscal Studies (U.K.; 1996-2002)

➤ Education
B.A., Cambridge University (1994)
MPhil., Oxford University (1996)
Ph.D., University College of London (2001)

➤ Selected Publications
"Does Management Matter: Evidence from India," *Quarterly Journal of Economics,* 2013 (with Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts); "Identifying Technology Spillovers and Product Market Rivalry," *Econometrica*, 2013 (with Mark Schankerman and John Van Reenen); "The Impact of Uncertainty Shocks," *Econometrica*, 2009; numerous other articles in journals such as the *American Economic Review, Review of Economic Studies*, and *Journal of Public Economics*

government, meaning the share of sector revenue that comes from government contracts. The share is very high for defense, health care, and construction. When policy uncertainty was higher, those sectors had much more stock market volatility and had far bigger reductions in investment and employment. That's even after controlling for other factors, like the level and forecast of government spending. So policy uncertainty does appear to be damaging, particularly in government-dependent sectors like health and defense.

But aggregating those numbers, from one sector to the overall economy, is hard. My guess would be that policy uncertainty caused 10 to 20 percent of the recession, but that's a pretty wild guess. And even if we can show there's a negative effect of policy uncertainty overall, it's hard to talk about the effects of one individual policy or another. Hopefully that'll be the end game for this research, but we're not there yet.

EF: Another branch of your research has focused on how management practices affect firm and country productivity. Why do you think management practices are so important?

Bloom: My personal interest was formed by working at McKinsey, the management consulting firm. I was there for about a year and a half, working in the London office for industrial and retail clients.

There's also a lot of suggestive evidence that management matters. For example, Lucia Foster, John Haltiwanger, and Chad Syverson found using census data that there are enormous differences in performance across firms, even within very narrow industry classifications. In the United Kingdom years ago, there was this line of biscuit factories — cookie factories, to Americans — that were owned by the same company in different countries. Their productivity variation was enormous, with these differences being attributed to variations in management. If you look at key macro papers like Robert Lucas' 1978 "span of control" model or Marc Melitz's 2003 *Econometrica* paper, they also talk about productivity differences, often linking this with management.

Economists have, in fact, long argued that management matters. Francis Walker, a founder and the first president of the American Economic Association, ran the 1870 U.S. census and then wrote an article in the first year of the *Quarterly Journal of Economics*, "The Source of Business Profits." He argued that management was the biggest driver of the huge differences in business performance that he observed across literally thousands of firms.

Almost 150 years later, work looking at manufacturing plants shows a massive variation in business performance; the 90th percentile plant now has twice the total factor productivity of the 10th percentile plant. Similarly, there are massive spreads across countries — for example, U.S. productivity is about five times that of India.

Despite the early attention on management by Francis Walker, the topic dropped down a bit in economics, I think because "management" became a bad word in the field. Early on I used to joke that when I turned up at seminars people would see the "M-word" in the seminar title and their view of my IQ was instantly minus 20. Then they'd hear the British accent, and I'd get 15 back. People thought management was quack doctor research — all pulp-fiction business books sold in airports.

Management matters, obviously, for economic growth — if we could rapidly improve management practices, we would quickly end the current growth slowdown. It also matters for public services. For example, schools that regularly evaluate their teachers, provide feedback on best practices, and use data to spot and help struggling students have dramatically better educational outcomes. Likewise, hospitals that evaluate nurses and doctors to provide feedback and training, address struggling employees, and reward high performers provide dramatically better patient care. I teach my Stanford students a case study from Virginia Mason, the famous Seattle hospital that put in place a huge lean-management overhaul and saw a dramatic improvement in health care outcomes, including lower mortality rates. So if I get sick, I definitely want to be treated at a well-managed hospital.

EF: How much of the productivity differences that you just discussed are driven by management?

Bloom: Research from the World Management Survey that Raffaella Sadun, John Van Reenen, and I developed

suggests that management accounts for about 25 percent of the productivity differences between firms in the United States. This is a huge number; to give you a benchmark, IT or R&D appears to account for maybe 10 percent to 20 percent of the productivity spread based on firm and census data. So management seems more important even than technology or innovation for explaining variations in firm performance.

Coincidentally, you do the same exercise across countries and it's also about 25 percent. The share is actually higher between the United States and Europe, where it's more like a third, and it's lower between the United States and developed countries, where it's more like 10 to 15 percent.

Now, you may not be surprised to learn that there are significant productivity differences between India and the United States. But you look at somewhere like the United Kingdom, and it's amazing: Its productivity is about 75 percent of America's. The United Kingdom is a very similar country in terms of education, competition levels, and many other things. So what causes the gap? It is a real struggle to explain what it is beyond, frankly, management.

EF: What can policy do to improve management practices?

Bloom: I think policy matters a lot. We highlight five policies. One is competition. I think the key driver of America's management leadership has been its big, open, and competitive markets. If Sam Walton had been based in Italy or in India, he would have five stores by now, probably called "Sam Walton's Family Market." Each one would have been managed by one of his sons or sons-in-law. Whereas in America, Walmart now has thousands of stores, run by professional nonfamily managers. This expansion of Walmart has improved retail productivity across the country. Competition generates a lot of diversity through rapid entry and exit, and the winners get big very fast, so best practices spread rapidly in competitive, well-functioning markets.

The second policy factor is rule of law, which allows well-managed firms to expand. Having visited India for the work with Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts, I can say this: The absence of rule of law is a killer for good management. If you take a case to court in India, it takes 10 to 15 years to come to fruition. In most developing countries, the legal system is weak; it is hard to successfully prosecute employees who steal from you or customers who do not pay their invoices, leading firms to use family members as managers and supply only narrow groups of trusted customers. This makes it very hard to be well managed — if most firms have the son or grandson of the founder running the firm, working with the same customers as 20 years ago, then it shouldn't be surprising that productivity is low. These firms know that their sons are often not the best manager, but at least they will not rampantly steal from the firms.

The third policy factor is education, which is strongly correlated with management practices. Educated and numerate employees seem to more rapidly and effectively adopt efficient management practices.

The fourth policy factor is foreign direct investment, as multinational firms help to spread management best practices around the world. Multinational firms are typically incredibly well run, and that spills over. It's even true in America, where its car industry has benefited tremendously from Honda, Toyota, Mitsubishi, and Volkswagen. When these foreign car manufacturers first came to America, they achieved far higher levels of productivity than domestic U.S. firms, which forced the American car manufacturers to improve to survive.

The fifth factor is labor regulation, which allows firms to adopt strong management practices unimpeded by government. In places like France, you can't fire underperformers, and as a result, it's very hard to enforce proper management.

EF: Management practices can be viewed as "soft" technologies, compared to so-called "hard" technologies such as information technology. Do you see anything special about the invention and adoption of these "soft" technologies relative to "hard" technologies?

Bloom: The only distinction is that hard technologies, like my Apple iPhone, are protected by patents, whereas process innovations are protected by secrecy.

The late Zvi Griliches, a famous Harvard economist, broke it down into two groups: process and product innovations. Most people who think of innovation think of product innovations like the shiny new iPhone or new drugs. But actually a lot of it is process innovations, which are largely management practices.

Good examples would be Frederick Winslow Taylor and scientific management 100 years ago, or Alfred Sloan, who turned a struggling General Motors into the world's biggest company. Sloan pushed power and decision-making down to lower-level individuals and gave them incentives — called the M-form firm. It seems perfectly standard now, but back then firms were very hierarchical, almost Soviet-style. And then there was modern human resources from the 1960s onward — the idea that you want to measure people, promote them, and give them rewards. Most recently, we have had "lean manufacturing," pioneered by Toyota from the 1990s onward, which is now spreading to health care and retail. This focused on data collection and continuous improvement.

These have been major milestones in management technologies, and they've changed the way people have thought. They were clearly identified innovations, and I don't think there's a single patent among them. These management innovations are a big deal, and they spread right across the economy.

In fact, there's a management technology frontier that's continuously moving forward, and the United States is pretty much at the front with firms like Walmart, GE, McDonald's, and Starbucks. And then behind the frontier there are a bunch of laggards with inferior management practices. In America, these are typically smaller, family-run firms.

EF: What are the key challenges for future research on management?

Bloom: One challenge is measurement. We want to improve our measurement of management, which is narrow and noisy.

The second challenge is identification and quantification: finding out what causes what and its magnitude. For example, can we quantify the causal impact of better rule of law on management? I get asked by institutions like the World Bank and national governments which policies have the most impact on management practices and what size impact this would be? All I can do is give the five-factor list I've relayed here; it's very hard to give any ordering, and there are definitely no dollar signs on them. I would love to be able to say that spending $100 million on a modern court system will deliver $X million in extra output per year.

One way to get around this — the way macroeconomists got around it — is to gather great data going back 50 years and then exploit random shocks to isolate causation. This is what we are trying to do with the World Management Survey. The other way is a bit more deliberate: to run field experiments by talking with specific firms across countries.

EF: Speaking of the World Management Survey, is there any precedent for it, or is it the first of its kind?

Bloom: I'm not aware of anything long lasting. There have been previous attempts to do cross-country management surveys, but what happened is they ran one or two waves and then hit serious issues with comparability and sustainability. You've got to be very consistent on methodology across countries and across time, which is very hard. The alternative model is to have each country fund and run its own survey, but then you've got an apples and oranges problem. I think we're the first to be very systematic by trying to apply tightly the same methodology across countries.

The U.S. Census also ran a management survey in 2010. It's called MOPS, the Management and Organizational Practices Survey, and it surveyed 50,000 American factories. We're working with them on redoing that in 2015 to start tracking differences. The Germans, the Pakistanis, and the Canadians are also putting management questions into their censuses.

EF: You've spent a lot of your career trying to quantify the seemingly unquantifiable, such as uncertainty and the effects that trust and management practices have on productivity. Is that a coincidence?

Bloom: Anything that can be said to be "high" or "low" can be quantified, and economics is good at this; it's one of our strengths as a social science.

I chose these two topics — uncertainty and management — more by good luck than by design. During my Ph.D. studies, I became interested in estimating adjustment costs and from that moved into the literature on real options, which naturally led to uncertainty. I realized the empirical literature on uncertainty was relatively small compared to the theoretical literature, and I started to work on that. I was fortunate to have been doing that in the early 2000s, before the Great Recession, which kicked this topic up into public consciousness. And my interest in management came from working at McKinsey as a consultant and noticing the huge differences in management practices across firms and how this seemed to drive massive performance differences, but management was mostly ignored by economists.

There's an old saying: What gets measured gets managed. I think in economics it's what gets measured gets researched. A great example is the patents database at the National Bureau of Economic Research, put up by Bronwyn Hall, Adam Jaffe, and Manuel Trajtenberg. The database is unbelievable and has really generated enormous growth in the innovation field. Likewise with management — we hope if we can build a new multifirm and multicountry database, we can spur the development of the field.

EF: What are you working on next?

Bloom: A range of topics, but focused on uncertainty and management in particular. One is trying to improve our measurement and understanding of uncertainty. As I mentioned earlier, we currently only have proxies. I hope to more directly measure firm-level uncertainty, which is what ultimately drives business decisions, and use this to measure and model the impact of uncertainty on the economy. This measure would be based on the expectations of firms. I have been working with the Atlanta Fed and the Census Bureau to develop large-scale, monthly surveys of distributional expectations of many thousands of U.S. firms across the country.

A second area is trying to improve our time-series and cross-country measurement of management to get at many of the policy questions we've discussed. To understand, for example, the impact of the rule of law or competition on management and growth, we need to collect data before and after major reforms. Building large international panel datasets is the best way to do this. Alongside this, I am continuing to work on field experiments on management in the United States and abroad to try to pinpoint some key drivers in a laboratory-style environment.

As you've seen in the questions you've asked, on uncertainty in particular, it's still hard to address some of the policy questions on these topics. For both uncertainty and management, I think measurement is the way to get at causation and policy implications. **EF**