

SUSAN ATHEY, STANFORD

Algorithms will run the world

Every year, the Jean-Jacques Laffont Prize rewards an internationally renowned economist whose work combines both theoretical and empirical research. Last year's recipient was Susan Athey, Economics of Technology Professor at the Stanford Graduate School of Business. Her interests range from microeconomic theory to industrial organisation and econometric methods, and her current projects focus on online advertising, media economics and machine learning.

During your TSE lecture in November, you spoke about the effects of search engines, news aggregators and social media on the news industry. How much impact do these platforms have on political outcomes?

It's pretty big. In the recent US presidential election, we could see an alignment of people's social networks with their opinions. In the 2012 presidential election, there were many educated people in cities who supported Mitt Romney

rather than Barack Obama. In the 2016 election, these people were overwhelmingly for Hillary Clinton. More than that, Clinton's supporters were very upset by the policies, opinions and values promoted by Trump.

As a result, social media feeds were very one-sided, especially for Clinton supporters. Facebook has shown what social networks look like geographically. So Californians have friends from California and also from Boston. In this election, people in Boston were a lot like people in San Francisco. Something similar probably happened with urban educated people in the Brexit referendum.

How might these political outcomes influence the reputation of platforms?

Traditionally, social networks and search engines have been very open. If you talked to a YouTube representative, he would say: "If we find someone uploading a video of a beheading, we'll take

it down. But we are not going to take down a video that is just generally racist or sexist, because we are an open platform. We want to make sure that if there is an oppressive government, people can put out a video against it. But we are not going to be in the business of making a community that has a set of predefined values."

"Ultimately, newspapers will become more consolidated to give them more bargaining power and save on fixed costs"

These 'openness' values are changing people's informativeness. The people in charge of these platforms are thinking hard about how to change the situation, but it would be a big change for them to start imposing values.

Some of my former PhD students at Facebook recently tried to demote "click-bait", releasing an algorithm to reduce the ranking of articles that had misleading headlines. However, the problem is not so much completely "fake news", but one-sided news with poor interpretation of facts. If a bunch of people want to share that information, it is very hard for a social media website to control that.

Historically, newspapers separated editorial from business and advertising. They also maintained this idea of journalistic integrity, where they gave people stuff that they didn't really want, and bundled it together with things that they did. They said: "Even though people don't like to read about Syria, we are going to tell them about Syria." Today, people can

choose article by article and see what their friends share, so it is very hard to make people read things.

What is the role of regulators regarding news aggregators?

Normally, antitrust laws would prevent collective bargaining by news organisations. However, when an aggregator or platform aggregates a large set of users, and there is a large set of relatively substitutable service providers that must go through the platform to reach the users, those service providers have basically no bargaining power. This is an example of a competitive bottleneck in a two-sided market, in which welfare would be improved if service providers can collectively bargain to reduce access fees or improve terms.

"In the near future, everybody will have introductory coding and machine learning. People who don't have these skills are in a declining industry"

For example, you can replace the stories from one newspaper with stories from other newspapers. The papers that pull out lose all their traffic without hurting Google News. So, Google says: "Well, a newspaper can always opt out" – but that is kind of an empty statement. If newspapers don't get enough advertising revenue they are not going to stay in business, or they will not have the incentives to produce quality news.

There may be policy options, like subsidising investigative reporting. For example, ProPublica's databases of US government

information make it easier for newspapers to do their research. Ultimately, newspapers will become more consolidated to give them more bargaining power and save on fixed costs.

Why do you find it interesting to do both empirical research and theory?

I was motivated to go into economics by policy problems, but during my PhD I focused on theory. Jean-Jacques Laffont had these really lovely theoretical papers about how you do empirical work. If you had a very large data set, what can be learned from it? That was what I saw Jean-Jacques do that was so inspiring. I was already doing theory of auctions, but now I could do theory of how to use auction data to answer questions. He showed me a clear path from theory to empirical work.

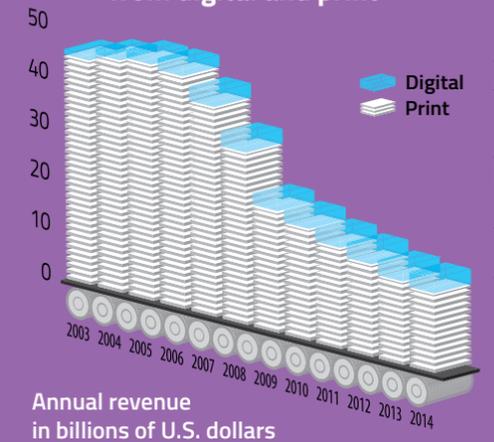
Economics and social sciences are mostly about causal inference. Machine learning hasn't focused on that as much, so now I am working on statistical theory for how you use big data to answer these types of causal questions.

You are the first female economist to win the John Bates Clark Medal. What are the challenges facing women in economics today?

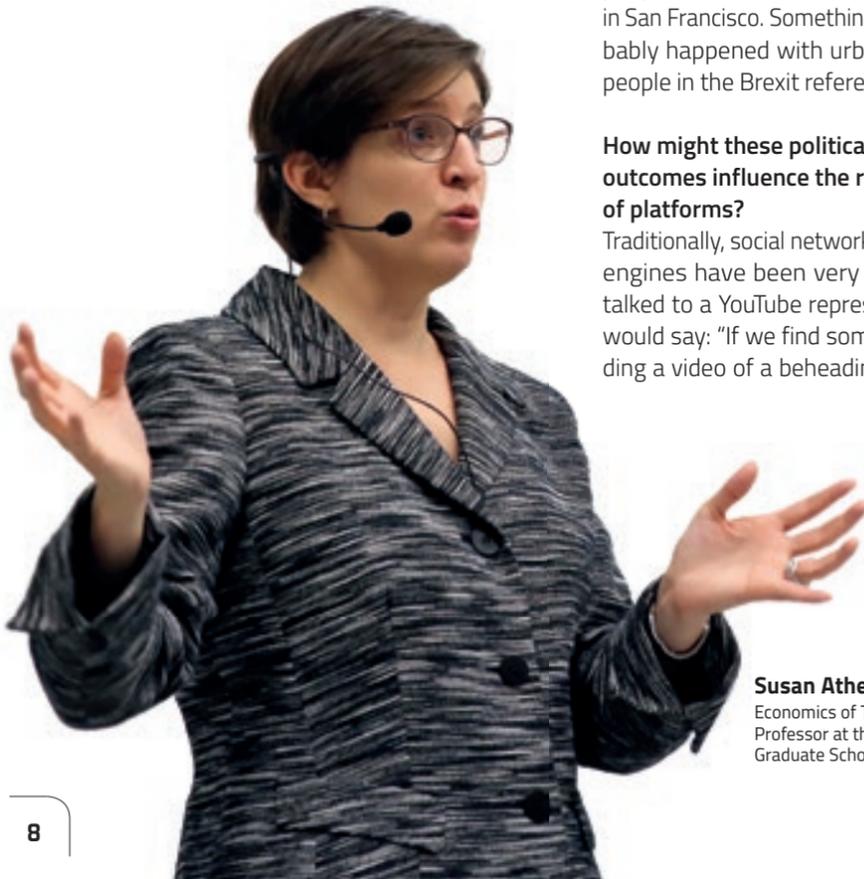
Ten years ago, I would have said that things are hardest at the beginning. Early on, when nobody knows whether you are good at things, stereotypes can matter a lot. I was trying to do very technical theory but I didn't look or talk the way people expected. People would ask: "Is she serious? She smiles too much". As I got more experienced and people got to know me, they thought less about my gender and more about my work. The more papers you have, the easier it is.



Newspaper ad revenue from digital and print



Newsroom employment is plummeting



Susan Athey
Economics of Technology
Professor at the Stanford
Graduate School of Business

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Different problems come when you become more senior and are supposed to be a leader. You make decisions about hiring; you advise students; people listen to your leadership about where the field is going; you have evaluations and power dynamics too. In some ways, it becomes even harder to make people feel comfortable with you being a strong woman because you can't just write more papers.

I hope it changes but it's very difficult for women to be involved in conflicts and power struggles. So my depressing advice is just to stay out of it. There are so many other interesting things to do. When a government or company approaches me, they don't care if I'm purple as long as I'm giving them good advice.

I changed a lot of things at Microsoft when I was their consulting chief economist. Now I am advising start-up companies, one of them is trying to reinvent finance. I change the way money moves around the world. I am advising the US government on how to use big data. That is probably a better use of my time than worrying about university politics.

Using your expertise to change the world is incredibly powerful. When you are the best person to solve a problem, people will come to you and make the situation work. But if the battle is just about power, about whose opinion or feelings matter more, or who should get to speak in a meeting, then gender can get in the way. When given the choice, change the world through channels where you don't have to waste a lot of time fighting against gender barriers.

How is economics important for technology jobs?

Europe is behind the US in educating people for those jobs. My 10-year-old daughter has been coding in summer camp for four years. Most of upper-middle class kids in the United States will have exposure to coding in elementary school. At Stanford, we have about 1,000 people a year taking our course on machine learning.

In the near future, everybody will have introductory coding and machine learning. People who don't have these skills are in a declining industry. The good news is that if an eight-year-old can learn how

to code, you can too. You can use Khan Academy, you can use Coursera – it is all available.

I am very confident that economists will have a huge role to play in the future because we know how to use data and how to think about equilibrium, feedback effects and incentives. Those 1,000 people taking the machine learning class aren't thinking about incentives. They also aren't thinking about causal inference. They don't even necessarily think about how to use data to answer a question beyond prediction. Using data to answer questions and evaluate policies is what economics is all about.

Our world is going to be run by algorithms. We need people to understand, manage, measure, evaluate, think about and put goals on them. But economists will not have a seat at the table unless they have enough technical skills. ■

This article is brought to you by TSE student magazine TSEconomist.



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