TNIT newsletter

Toulouse Network for Information Technology

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Dear Readers

This special issue of the Newsletter aims at making you more familiar with the recent exciting research conducted by the TNIT members. We are sure you will enjoy it! We have extended summaries of the papers that Susan Athey, Jonathan Levin and Nick Bloom presented at our 2011 meeting as well as shorter overviews of the articles presented by Luis Garicano, Josh Lerner and Suzanne Scotchmer. We would like to thank Romesh Vaitilingam for writing those excellent summaries and overviews. Finally, although special, this issue keeps with the tradition of featuring a ''How, Why, When, Who, What'' article: included is a very nice piece by Nick Bloom on what impact the rise of China has on Western technological change.*

Jacques Crémer
and Yassine Lefouili

SPECIAL ISSUE

** Romesh Vaitilingam (romesh@vaitilingam.com) is a writer, media consultant and a member of the editorial board of Vox. He is the author of numerous articles and several successful books in economics, finance, business and public policy, including The Financial Times Guide to Using the Financial Pages (FT-Prentice Hall), now in its sixth edition (2011).*

CONTENT

The network is managed by Jacques Crémer (jacques@cremeronline.com) and Yassine Lefouili (yassine.lefouili@tse-fr.eu). Do not hesitate to contact us if you have any questions.

The Toulouse Network for Information Technology (TNIT) is a research network funded by Microsoft and managed by the Institut d'Economie Industrielle. It aims at stimulating world-class research in the Economics of Information Technology, Intellectual Property, Software Security, Liability, and Related Topics.

http://idei.fr/tnit/index.html

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Working from home

Do employees who start working from home improve their productivity or does it simply lead to 'shirking from home'? TNIT member Nicholas Bloom reports the results of the first randomized experiment on home-working, run by a NASDAQ-listed Chinese travel agent with more than 13,000 employees.

The proportion of American households in which both parents are working has increased from a quarter in the late 1960s to nearly a half today. There have been similar trends elsewhere in the developed world and given these rising work pressures, many governments have been investigating ways to promote the idea of 'work-life balance'.

In the summer of 2010, for example, the President's Council of Economic Advisers launched a report at the White House on policies to improve work-life balance. One of its striking conclusions was the need for research to identify the trade-offs in policies that might have an impact on work-life balance:

> *'A factor hindering a deeper understanding of the benefits and costs of flexibility is a lack of data on the prevalence of workplace flexibility and arrangements, and more research is needed on the mechanisms through which flexibility influences workers' job satisfaction and firms' profits to help policy makers and managers alike.'*

Given the lack of rigorous empirical evidence, firms too are very uncertain about which policies to adopt on home-working. There are widely different practices even among firms operating in the same industry. In the airline business, for example, Jet Blue allows all regular call-center employees to work from home; Delta and Southwestern have a policy of no home-working; while United has experimented with a mix of practices.

Having employees work from home seems to be a type of modern management practice whose impact is uncertain and for which adoption is therefore a gradual process. And given the uncertainty, it is a management practice with which many firms are currently experimenting.

In our research, we have had the opportunity to evaluate one such experiment. The firm, CTrip, is China's largest travel agent with 13,000 employees and a $5 billion valuation on NASDAQ. The firm wanted to experiment with home-working before deciding whether to roll it out across its whole operation.

The motivation was both to reduce office costs, which were becoming an increasingly high share of total costs due to rising rental rates at the firm's Shanghai base, and to reduce the firm's high annual rate of staff turnover (50%). On the downside, the management was concerned that allowing employees to work at home away from the supervision of their managers could have an extremely negative impact on their performance.

The experiment is unusual because one of our research team is also the co-founder and chairman of CTrip. This has naturally provided us with excellent access to both the experimental data and also to the management's views on working from home. As such, the experiment provides an insight into the adoption of a modern management practice by a large publicly listed firm, helping to address some of the questions about why so many firms fail to adopt potentially beneficial management practices.

CTrip decided to run a nine-month experiment with the Airfare and Hotel divisions in the firm's Shanghai headquarters. All employees with at least six months' experience with the firm and their own room at home were offered the option to work there for four days each week. Of the 508 eligible employees, 255 asked to work from home and after a lottery draw, those with even-numbered birthdays were selected for home-working while those with odd-numbered birthdays stayed in the office to act as a 'control group'.

Both home- and office-based employees worked the same shift period, in their same teams under the same manager as before, logged on to the same computer system with the same equipment and the same work order flow. The only difference between the two groups was the location at which they worked.

So what are the main results of CTrip's experiment? First, the performance of the home-workers went up dramatically, increasing by 12% over the nine-month experiment. This improvement came mainly from an 8.5% increase in the number of minutes they worked during each shift, which was due to a reduction in the number of breaks and sick days that they took. The remaining 3.5% improvement was because home-workers were more productive per minute worked, presumably because of the quieter working conditions at home.

Second, there were no negative spillovers onto the employees left working in the office: there was no change

in the performance of the control group. Third the rates of staff turnover fell sharply for the home-workers, dropping by almost 50% compared with the control group. The home-workers also reported substantially higher work satisfaction and less 'work exhaustion' in a psychological attitude survey.

Finally, at the end of the experiment, the management was so impressed by the success of home-working that they decided to roll the option out to the entire firm, allowing the treatment and control groups to make a fresh choice of working arrangements.

To the surprise of the management, about one quarter of the home-workers changed their minds and returned to the office, while three quarters of the control group (who had initially all requested to work from home) have as yet decided to stay in the office. This outcome highlights the fact that before the implementation of these types of management practices, their likely effects are as unclear to employees as they are to managers. The outcome also helps to explain the typically slow adoption of these practices over time.

How do our findings compare with previous research? There is an extensive body of case studies of individual firms that have adopted various home-working programs, and they tend to show large positive impacts. But the robustness of these results are hard to evaluate because of the non-randomized nature of the programs, both in terms of the selection of firms into working-from home programs and the selection of employees to work at home.

This self-selection effect is evident even in the case of CTrip: when the firm allowed a general roll-out of home-working, high-performing employees typically chose to move home while low-performing employees chose to return to the office. We are continuing to collect data on both current and former employees to evaluate longer-run impacts on recruitment, promotion and other work and non-work outcomes.

This article summarizes ***'Does Working from Home Work? Evidence from a Corporate Experiment'***

by Nicholas Bloom, James Liang, John Roberts and Zhichun Jenny Ying

www.stanford.edu/~nbloom/WFH.pdf

Nicholas Bloom, John Roberts and Zhichun Jenny Ying are at Stanford University.
James Liang is the co-founder and chairman of Ctrip.

news

Contrary to what we told you in the last issue of the Newsletter, the Seventh Toulouse Conference on the Internet and Software Industries will not take place in January 2013, but in **June 2013**. It will be part of the new TIGER Forum organized by the Toulouse School of Economics. More information to follow in the next issue.

Local news consumption: the impact of aggregators on traditional media

Are online news aggregators destroying journalism or do they help newspapers' websites get more traffic? To address this question, TNIT member Susan Athey and her colleague Markus Mobius have examined the effects of an opt-in 'local news' feature introduced by Google News in France.

In public debate about the impact of the internet on the news industry, one particularly contentious issue is the role of news aggregators. These are websites that do not produce much original content, but instead 'curate' content created by others using a combination of human editorial judgment and computer algorithms. The results are presented with a few sentences and perhaps photos from the original article: to read the full article, users can click through to the website of the original content creator.

'Pure' aggregators, such as Google News, generally do not make any payments to the original authors of the news content. Rather, they create their page by 'crawling' the web and then using statistical algorithms and editorial judgments to organize and rank the content. Only in a few cases does Google News have a direct commercial relationship with the outlets.

In contrast, websites like Yahoo! News and MSN mainly show content from contractual partners. A third kind of aggregator, exemplified by the Huffington Post, uses a hybrid strategy of curating blogs and aggregating news from other sources.

Why are these aggregators so controversial? Less than half of users' views of the Google News home page result in visits to any online newspapers. Thus, users may read their news from Google News without ever generating page views or revenues for any of the content creators. Clearly, this undermines the incentives for newspapers to invest in journalism.

In addition, news aggregators can substitute for the home page of an online news outlet such as the New York Times. The aggregator can index not just the content of the newspaper but all other news outlets, giving it an advantage in coverage. It may then take over the 'curation' function that gives the New York Times its differentiation and brand advantage over other news outlets.

As a result, curation of news may change from being primarily driven by human judgments to being primarily driven by computer algorithms. In addition, since advertising revenues per page are typically much higher than average for the home page of a newspaper, the online newspapers can lose highly valuable page views.

These concerns have been articulated by several industry participants, perhaps most colorfully by Rupert Murdoch. In a speech at the Federal Trade Commission in 2009, Ariana Huffington quoted Murdoch's various speeches referring to aggregators as 'parasites, content kleptomaniacs, vampires, tech tapeworms in the intestines of the internet, and, of course, thieves who steal all our copyrights.'

At the same conference, Murdoch himself called the internet a 'disruptive technology', arguing that: 'When this work is misappropriated without regard to the investment made, it destroys the economics of producing high quality content. The truth is that the 'aggregators' need news organizations. Without content to transmit, all our flat-screen TVs, computers, cell phones, i-Phones and blackberries, would be blank slates... To paraphrase a famous economist – there's no such thing as a free news story.'

But there is a counter-argument: rather than substituting for newspapers, aggregators may complement them. Users spend time and effort searching for news that may interest them. They will compare the expected benefits from visiting a news website to the expected costs of searching. Those costs include becoming aware of the existence of the site and finding out how to navigate it.

A typical user may forget about smaller niche websites, such as local news sites, or may decide that the benefits of visiting those sites do not outweigh the costs. Instead, a user may focus on 'big-name' sites such as CNN and the New York Times, together with a few personal favorites.

In these circumstances, the impact of aggregators would be to reduce the concentration of news browsing, increasing the share of news consumed on smaller outlets and decreasing the share on larger outlets. Aggregators might also allow users to become informed about the quality of a wider range of outlets, leading them to outlets that match their interests more closely. This may, in turn, increase a user's overall news consumption as well as their consumption of news aggregators.

Even if some outlets benefit from an increase in traffic, outlets may also see a change in the composition of the traffic. Outlets may see more 'casual' users and fewer 'loyal' users. This could have implications for outlets' ability to target ads (since they have more data on the preferences of loyal users) and for competition in advertising markets.

Our research aims to provide empirical evidence on the impact of news aggregators on news consumption. We study the effects of a 'local news' feature introduced by Google in France in late 2009. Our dataset is a sample of all browsing by 9.3 million computer users who use a Microsoft toolbar and have opted in to allowing their data to be used for research.

Of these users, 18% meet a criteria we call 'consistent' users, and 2% of those consistent users use the Google News home page at least twice a month.

Users of the local news feature enter their zip code, and on all subsequent visits to the Google News home page, they see news from local outlets prominently featured. We compare the news consumption of users who enable this feature ('treatment users') to that of a set of 'control users' who are similar in terms of the frequency and intensity of their internet usage, consumption of local news, use of Google News and location.

Our first finding is that users who adopt the local news feature almost immediately increase their use of the Google News home page by more than 50%. This could be due to users getting more benefit from a page with more personalized content.

The adoption of Google News leads in turn to greater consumption of local news. We see a 13% increase in clicks on local outlets from the Google News home page. We also see a 5% increase in direct navigation to local outlets, bypassing Google News. This is presumably because users learn that they like these outlets and actively choose them in the future.

But the increase in local news consumption diminishes over time. Towards the end of our eight-week period of analysis, most of the additional local news consumption derives from increased usage of Google News.

Our study looks at the composition of news browsing. We see an increase of more than 12% in the number of local outlets used. In addition, treatment users visit 10% more new local outlets than control users. Thus, the local feature does seem to introduce users to new local news sources, which they continue to visit.

Finally, we examine the extent to which the local news feature cuts into the 'curation' role of newspapers. We find that the ratio of news outlet home page views to Google News home page views falls by more than 16%. Many of the incremental page views on a typical news outlet originate on Google, with users sent directly to the article, bypassing the newspaper's profitable home page. Users may subsequently read other articles by following links they see on the same page as the original article, but their browsing may never take them to the outlet's home page.

So even though our results broadly support the hypothesis that news aggregators are complements for local news outlets, it is important to emphasize that the impact is mixed overall. Our results should not be interpreted as providing evidence that news outlets are better off because of the existence of Google News. Some outlets gain more than others, users spread their consumption over a larger number of outlets and the curation role of newspapers is diminished.

What's more, there are a number of longer-term threats to news outlets created by news aggregators. In particular, loss of the curation role affects the brand perception of newspapers as well as their ability to promote news not selected by Google News. The increased switching and tendency to bypass newspapers' home pages induced by aggregators also creates challenges for generating advertising revenue.

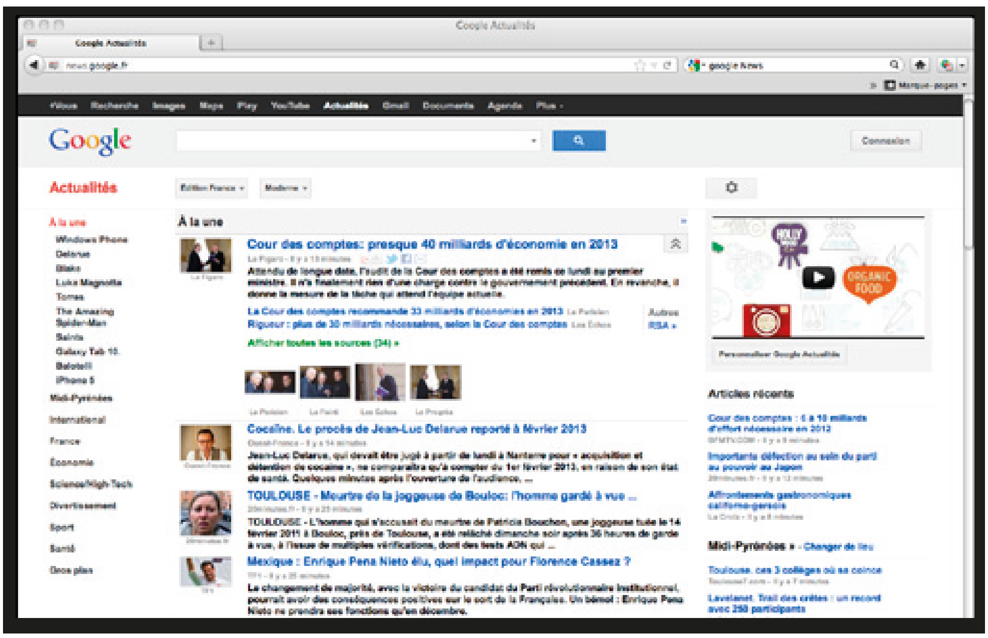
In future work, we intend to explore the supply side responses of news outlets to the demand changes induced by aggregators. An understanding of how supply and demand forces interact to determine the news that is created and consumed is crucial to addressing the pressing policy issues facing the news industry.

This article summarizes *'The Impact of News Aggregators on Internet News Consumption: The Case of Localization'*

by Susan Athey and Markus Mobius

kuznets.harvard.edu/~athey/localnews.pdf

TNIT member Susan Athey is at Harvard University and Microsoft Research. Markus Mobius is at is at Iowa State University and Microsoft Research..



Sales taxes and internet commerce

How do sales taxes affect people's online purchasing behavior? Research by TNIT member Jonathan Levin and colleagues analyses detailed data from eBay to explore the impact of variations in US state taxes on internet commerce.

Since the birth of internet commerce, online transactions across state lines have not been subject to the sales taxes payable on traditional retail transactions. Following a 1992 ruling by the US Supreme Court, it is only if an online retailer has a physical presence in a state – a store, an office or a warehouse – that it is obliged to collect sales tax from customers resident in that state.

There are growing demands for this to change. With internet retail in the United States now worth well over $100 billion dollars annually and the majority of transactions occurring across state lines, forgone taxes on those sales could amount to as much as $10 billion a year. Such revenues would be particularly welcome at a time of pressure on state budgets. Taxes on internet commerce would also be popular with store-based retailers struggling to compete with their online rivals.

So what is likely to be the impact of sales taxes on online purchasing behavior? Our research seeks to estimate the potential effects by analyzing data from eBay's online marketplace. The marketplace is large and diverse, with millions of buyers and a huge array of sellers and product categories. We take advantage of this size and diversity to observe buyers choosing across sellers located in different states, with correspondingly different tax regimes and changes in those regimes over time.

Our estimates rely on three sources of variation in sales taxes. The first is the difference, for online buyers, between in-state purchases that are taxed and out-of-state purchases that are not. But it is important to recognize that a direct comparison of intra-state and inter-state purchases may understate the effect of taxes if consumers prefer 'home-state' goods or sellers.

One way to address this issue is to use variation across states in tax rates, and compare customers' relative propensity to make intra-state purchases across low tax and high tax states. This research strategy is aided by the considerable variation in tax rates: in January 2010, state sales taxes ranged from zero (in Alaska, Delaware, Montana, New Hampshire and Oregon) to 7% or more (in California, Indiana, Mississippi, New Jersey, Rhode Island and Tennessee).

The variation in tax rates becomes even greater after taking account of county and local sales taxes. A third source of variation comes from the frequent changes in state and local tax rates. We use these three sources of variation to estimate the effect of sales taxes along different decision margins.

Our first approach exploits the fact that most people shopping on eBay only observe a seller's location – and hence the relevant sales tax – after they have clicked on a listed item. We use data from millions of these location 'surprises' to estimate the tax sensitivity of purchasing conditional on being interested in a given item.

This 'micro' approach allows us to control tightly for buyers' preferences and the desirability of items located in different states. The results indicate that purchases by interested buyers fall by roughly 2% for every one percentage point increase in the sales tax charged by the seller.

Our second approach uses more aggregated data on sales from one location to another, which allows us to estimate how much a tax rise in one state encourages buyers to use sellers in other states. The results suggest that a one percentage point increase in a state's sales tax leads to an increase of just under 2% in online purchasing from other states, and a 3-4% decrease in online purchasing from home-state sellers.

These finding are subject to some caveats. One is that the changes in US sales tax policy for internet commerce currently under discussion could have considerable effects on the decisions of online retailers about their pricing and the locations of their operations. These considerations are outside the scope of our analysis.

Another caveat is that the estimates come from a single online platform, which may not be fully representative. Nevertheless, we believe that eBay's overall market share – roughly $30 billion annually – is sufficiently large that our analysis provides insights that can be extended more broadly across the online retail sector.

This article summarizes
'Sales Taxes and Internet Commerce'
by Liran Einav, Dan Knoepfle, Jonathan Levin and Neel Sundaresan
www.stanford.edu/~jdlevin/Papers/SalesTaxes.pdf

Liran Einav, Dan Knoepfle and TNIT member. Jonathan Levin are at Stanford University. Neel Sundaresan is at eBay Research.

WHAT impact is the rise of China having on technological change in the West? **by Nicholas Bloom**

Twin specters are haunting Europe and the United States: the growing economic power of China; and where the West's own growth will come from after the crisis. Export subsidies, trade barriers and labeling China a currency manipulator are just some of the reactions. Western companies fret that they cannot compete with the scale and low wages of the Chinese manufacturing behemoth. Workers worry because their jobs are at risk, especially the less skilled whose wages get pushed down across the globe.

But the dramatic rise in Chinese exports is actually good news for our economic prospects, encouraging the best firms in the developed world to get even better and to make the innovations that will power growth in the future. Take footwear, a classic low-tech sector that conventional wisdom says should have all been offshored to China. Many Western shoe manufacturers have disappeared, but those that remain are innovating in designs that serve markets where China is less able to compete.

For example, Massai Barefoot Technology (MBT), which makes posture-correcting shoes, began when Karl Muller, an engineer with a bad back, relieved his condition through walking barefoot on Korean grass. He patented a design to emulate the effect, which has gone on to Companies that can find a niche for high-end style or technology can prosper in the face of stiff competition. Vermont-based Burton is a leading snowboard manufacturer, but also successfully designs and produces sportswear clothing. This year, Burton is offshoring the production of snowboards not to China but to Innsbruck, Austria. In short, firms like MBT and Burton have responded to the threat of China by investing in new technology and staff training, and by innovating in highly customized designs.

A big shock like China makes innovation relatively cheaper than continuing with business as usual. That shock first hit when China joined the World Trade Organization in 2001 and quotas on many Chinese goods were reduced. This led to a huge surge in imports, and a political battle between retailers and manufacturers as the latter succeeded in getting some quotas reinstated.

These events provide 'natural experiments' for examining the effect of Chinese competition. In the largest ever study of the impact of China on Western technical change, our research team tracked the performance of more than half a million manufacturing firms in 12 European countries over a decade.

A startling finding is that 15% of technical change in Europe can be attributed directly to Chinese imports, an annual benefit of almost €10 billion. What seems to be happening is that firms have responded to the threat of Chinese imports by increasing their productivity through better IT, higher spending on R&D and increased patenting.

Of course, not all firms have seized the opportunity. Inefficient low-tech firms have been much more likely to shed jobs and disappear. This in itself raises productivity through the brutal force of natural selection as economic activity is reallocated away from these inefficient enterprises to their more nimble counterparts. About a third of the overall effect is precisely this creative destruction. And the job losses for some firms explain the political resistance to trade and why pressure is mounting to 'do something'.

Openness improves overall prosperity, but the worry is that the burden of adjustment falls more heavily on the poor than the rich. Standard economic theory puts this down to increased pressure on the wages and jobs of unskilled workers who are now competing with workers in Beijing rather than just Birmingham or Brussels.

Previous research on this 'Heckscher-Ohlin' effect suggests that it has been pretty small. Our data show that a greater cause for concern is that there will be a fall in demand for the less educated because of a China-induced acceleration of technical change. The appropriate policy response is not Luddism, but increasing the human capital and easing the transition of displaced workers across jobs.

Consumers have enjoyed lower prices. Bigger export markets have spurred investment. And offshoring has enabled devices such as the iPod – produced in China but designed in Silicon Valley – to be enjoyed more widely. Paradoxically, companies that survive will be stronger, stimulated by Chinese competition into innovation.

How to win political support for openness to China? In the long run, the best way is through building human capital and innovation through, for example, strengthening tax support for research and granting more autonomy to universities. But there also needs to be support for workers, not firms, during the trade adjustment process, with extensive retraining and assistance in moving between jobs.

China's rise is undoubtedly a political challenge. But trying to keep China down by freezing it out of the world trading system would surely have been more politically dangerous than engagement and thus aligning its economic incentives with those of the developed world. If European and US policy-makers try to weaken China through trade barriers, the specter of China will not disappear. But the West's own growth would certainly be enfeebled, an unwelcome prospect even in good times.

Trade Induced Technical Change: The Impact of Chinese Imports on Innovation, IT and Productivity'

by Nicholas Bloom, Mirko Draca and John Van Reenen

www.stanford.edu/~nbloom/TITC_2011.pdf

Other research by TNIT members presented at our September 2011 conference:

Papers available online:

➔ *'Earnings Inequality and Coordination Costs: Evidence from US Law Firms'*

Luis Garicano (with Thomas Hubbard)

New organizational efficiencies - probably arising from developments in information technology - have contributed to the growing inequalities in earnings between people at the top of the income distribution and those in the middle. That is the core message of this study, which analyzes data from US law offices between 1977 and 1992, a period in which earnings inequalities within the legal profession increased substantially.

The researchers suggest that these inequalities arose from increasingly hierarchical organizations, in which top lawyers were able to manage bigger numbers of junior staff. Three facts suggest that the costs of working in hierarchical teams fell significantly during this period:

- First, the share of lawyers working in offices without any associates decreased by one third from about 30% in 1977 to about 20% in 1992.
- Second, the distribution of associate-partner ratios across offices changed so that the most 'leveraged' lawyers in 1992 were almost 50% more leveraged than the most 'leveraged' lawyers in 1977.
- Third, new information and communication technologies penetrated deeply and broadly into the industry. Contemporary accounts indicate that this had an important impact on how lawyers worked with each other. The evidence in this study indicates that the fall in organizational costs was related to the availability of computer-aided legal research services, such as Lexis.

www.nber.org/papers/w14741.pdf

➔ *'The Consequences of Entrepreneurial Finance: A Regression Discontinuity Analysis'*

Josh Lerner (with William Kerr and Antoinette Schoar)

Financing by angel investment groups has a significant positive impact on the performance of start-up business ventures, according to this study. Analyzing data on a number of professionally organized and managed US angel groups, the researchers find that angel investment is associated with improved firm survival rates, greater employment and stronger web traffic performance.

There is also evidence that angel group financing aids a venture's ultimate success in terms of achieving successful exits or reaching high employment levels. But evidence on the role of angel funding for access to future venture financing is more mixed. The researchers speculate that access to capital per se is not the most important value added that angels bring to a firm. It may be that some of their 'softer' contributions, such as mentoring and business contacts, may help new ventures the most.

Overall, the study finds that the interest levels of angels at the stages of the initial presentation and due diligence are predictive of investment success. The findings suggest that the selection and screening process is efficient at sorting proposals into approximate bins: complete losers, potential winners, truly exceptional opportunities and so on.

www.hbs.edu/research/pdf/10-086.pdf

➔ *'Picking Winners in Rounds of Elimination'*

Suzanne Scotchmer (with Junjie Zhou)

What is the best way to select projects or job candidates in situations where it is not possible to know at the start a project's intrinsic worth or a candidate's true ability? That is the question explored in this study.

One technique is to cast a wide net and then to eliminate candidates or projects that do not perform well. That is what happens with recruitment of university faculty: a department initially hires a large pool of assistant professors, gives them a few years to demonstrate their worth and then makes an 'up-or-out' evaluation.

Similarly, venture capitalists may give funding to many start-ups but cut them loose ruthlessly when they fail to perform. And in drug testing, many drugs are dropped after the first round of testing.

Among the study's analytical findings is the fact that the average ability of surviving candidates or projects in a single round of elimination is higher than with sequential rounds of elimination. The study also shows that a higher cost of holding on to candidates should lead to more stringent screening at round one, less stringent screening at round two and lower average ability among the ultimate survivors.

http://socrates.berkeley.edu/~scotch/winners.pdf

Work in progress:

➤ 'Innovation, Reallocation and Growth'
by Daron Acemoglu *(jointly with Ufuk Akcigit, Nicholas Bloom and William Kerr)*

➤ 'A Model of Online Retail and Recommendation Systems' by Glenn Ellison

➤ 'Property Rights and the Efficiency of Bargaining'
by Ilya Segal *(jointly with Michael Whinston)*

➤ 'Equilibria in Health Exchanges: Adverse Selection vs. Re-Classification Risk'
by Michael Whinston *(jointly with Ben Handel and Igal Hendel)*