

Annual Report 2020



Highlights

Conference on Digital Platforms *page 5*

Research

Focus research programs *page 11*
Team members *page 11*
Scientific projects *page 12*
Key numbers, visitors *page 14*

Events

Conferences 2021 *page 16*
Conferences 2020 *page 16*
Workshops *page 16*
Seminars *page 17*

Outreach

Education *page 19*
Appointment *page 20*
Research grants *page 20*
Scholarships *page 20*
Press articles and media *page 20*

Publications

Policy papers and reports *page 23*
Articles in peer-reviewed journals *page 23*
Working papers *page 24*

New partnerships & projects

page 26

Editorial



As it wraps up its second year of activity, the TSE Digital Center reviews what has been a distinctive period marked by the global pandemic. Such a major crisis has had dramatic economic and social impact on all practitioners and stakeholders of our societies. This of course, includes our partners. The Center itself is no exception and has had to adapt its organization to overcome many issues. With meetings, collaborations and events moving online, the Center has, in all senses, become truly digital.

Beyond acclimatizing ourselves to the situation, in 2020 we launched a new seminar series, covering all aspects of the economics of platforms, including competition, strategy, design, governance, and policy issues. When it comes to platforms and the digital economy, the long-lasting effects of the pandemic lead us to believe that the research we conduct at the Center is more relevant than ever. Indeed, repeated lockdowns across the world have accelerated digital transformation initiatives and favored the surge of digital platforms. Thanks to the expertise of our researchers and TSE visitors working on cutting edge research in these fields, we are convinced the Center is in a unique position to develop innovative research on digital platforms.



2020 will also remain the year many governments started to challenge large digital platforms in an attempt to curb their increasing power, either by promoting new regulations or through antitrust actions. We are proud that our community has been very active and influential in the process, by promoting sound economic analysis in policy debate. Our researchers contributed to very influential reports on digital platforms, including a recent report by Yassine Lefouili on platform liability.

Our members also contributed to numerous roundtables. For instance, during the online Conference on Digital Platforms which gathered TSE economists, renowned researchers, executives and decision makers to debate the issue. And the new TSE Executive Program in Competition Law and Economics which organized two successful training days. It goes to show, our community is dedicated to following progress and continues to contribute to a thorough debate.

Despite the challenges raised by the pandemic, TSE-P has had the opportunity to embark on promising partnerships and projects, find out more on pages 26-27. Several others are in the pipeline. We are very excited about these new opportunities.

It has been one year since we succeeded Yassine Lefouili as co-directors of TSE Digital Center. We thank him warmly for his invaluable contribution to the development of the Digital Center and his ongoing support. Yassine will step in next summer as Director of TSE Partnership (TSE-P) and we are looking forward to future collaborations. This report presents an overview of the Digital Center's activities during 2020, as well as some information about ongoing research and planned events. We wish you a pleasant read and thank you very much for your interest.

Highlights

Conference on Digital Platforms

- Round Table *“Regulation and Antitrust of Digital Platforms”*

- Jacques Crémer
- Amelia Fletcher
- Eliana Garcés
- Pierre Régibeau

- **Keynotes**

- Jean Tirole
 - Marc Rysman
-

Conference on Digital Platforms: Opportunities and Challenges?

Online, October 27 & 28, 2020

Keeping pace with the digital revolution

The TSE Digital Center's October conference attracted eminent researchers and decision-makers who are pioneering developments in platform economics and the use of blockchain technology. Entitled '*Digital Platforms: Opportunities and Challenges*', this multidisciplinary event was held over several days and shared the stage with the TSE Sustainable Finance Center's Tokenomics forum.

In this section, we share some of the ideas that were put forward. Amelia Fletcher (*University of East Anglia*), Pierre Régibeau (*European Commission*), Eliana Garcés (*Facebook*) and Jacques Crémer (*TSE*) discuss the prospects for regulation of the digital sector; Nobel laureate Jean Tirole (*TSE*) reviews some of the economics of fintech; and Marc Rysman (*Boston University*) says we need to rethink our approach to two-sided markets.

Hosted virtually, the event's sponsors included Ant Group and Luohan Academy. TSE organizers Bruno Jullien and Doh-Shin Jeon look forward to welcoming you to the next edition in 2021.



Amelia Fletcher



Pierre Régibeau



Eliana Garcés



Jacques Crémer



Jean Tirole



Marc Rysman

Round Table “Regulation and Antitrust of Digital Platforms”

Digital platforms: Is it time to lay down the law?

How should governments respond to the breakneck speed of growth and change in the digital sector? Moderated by Jean Tirole, TSE's October conference featured a high-level roundtable on '*Regulation and Antitrust of Digital Platforms*'. Collectively, this distinguished panel of experts has substantial policy experience in the private and public sectors, and has made important breakthrough contributions in this research area.

Amelia Fletcher

Centre for Competition Policy, University of East Anglia

How do we design digital regulation? The first key element is a code of conduct or rulebook for the largest platforms. Ideally, this overarching framework would allow firms to self-assess their behavior across their business irrespective of whether any aspect of it has been scrutinized by the regulator. Clearly, such a code is incredibly intrusive, so it would be proportionate to apply it only to the largest platforms.

The second element is pro-competitive interventions. These would be much more tailored requirements to address specific issues, after detailed analysis and market studies. They could include rules regarding interoperability, data portability, data access, data silos, choice architecture facing users, design of algorithms, and so on. They could potentially apply to the entire market rather than just the largest platforms.

Getting the right balance between these two elements is a very tricky question. The code of conduct is better for getting quick outcomes because you've been clear about what you want; the pro-competitive interventions are more evidence-based and arguably more proportionate, but also more time-consuming to implement.

How do you decide which firms to include? We're seeing the biggest concerns around Google, Apple, Facebook, Amazon and perhaps Microsoft. But what about slightly smaller firms like Netflix, Uber, Booking, Ebay, Spotify? Some issues clearly apply to them and others don't. How do we avoid accidentally including platforms that we're not interested in like Visa, Mastercard, or the London stock exchange? We'll need to define at least three dimensions of criteria: digital platforms or ecosystems, embedded market power, and very large size. In the UK, the Furman Review recommended that firms designated as having strategic market status should be covered by the code of conduct. But there's a risk of the designation process taking a very long time. Providing legal certainty versus flexibility is always a really difficult tension.

On the substance of a code, the Competition and Markets Authority (UK) report on digital advertising recommended a hierarchy of overarching principles – fair trading, open choices, trust and transparency – followed by slightly more granular rules, such as a requirement to trade on fair and reasonable contract terms and not to unreasonably restrict how customers use platform services. If these rules are well designed, I'm hopeful they can be used more widely.

Should the code apply to all of the firm's business, even in those markets where it's effectively a new entrant or a minnow? Or does the ecosystem nature of these firms and the potential for leverage mean the code should apply throughout? How determinative do you make these inherently rather grey rules? Who carries the burden of proof?

A participative approach has to be the right approach. The markets are incredibly complex and there is a very real risk of the regulator doing more harm than good. The ideal is to have engagement and consultation with all stakeholders, allowing quick and flexible interventions. But we also need to think soberly about the incentives of the firms to participate and abide by the rules. So you do need a big stick: tight deadlines, and sanctions for non-engagement or non-compliance. Financial services regulation may be a good template.

 **The ideal is to have engagement and consultation with all stakeholders, allowing quick and flexible interventions. But we also need to think soberly about the incentives of the firms to participate and abide by the rules; so you do need a big stick.**

Pierre Régibeau

Chief Competition Economist, European Commission

Why worry about the digital sector? It's very big and growing very fast. We're also worried about the metastasizing, tentacular nature of the growth: the fact that the same players seem to be able to be successful in a succession of markets. These players seem to be able to leverage, legitimately or not, previous success into future success so that the growth of the sector seems to no longer be a guarantee of competition, at least in the first phases.

Is this a good sector for regulation? It's very complex. We still understand very little about the different kinds of data, or how they interact with each other. How much advantage do you get from a given algorithm? How hard is it for entrants to catch up? Generally speaking, if you don't understand a sector, you would say it's premature to regulate. After all, regulation is about relatively simple, ex ante rules that we're pretty sure are good rules. On the other hand, this is a very big sector, so we're going to have to find a way in between.

In an ideal world, we would start with market studies then some regulatory rules would emerge; then we would follow up with more market studies, gradually increasing the rules that we think fit.

As economists, we should start by defining property rights, especially in terms of data. Without such foundations, we cannot be sure that the regulatory edifice will be safe. We then have to think about interpretative standards.

attention to something if it is big; but not following the same logic is a problem. Similarly, we want to make sure that the rules imposed are for digital platforms; we do not want to impose general rules of conduct on all platforms, without having checked that they would be suitable for other platforms.

Are we going to focus just on rules that limit the potential damage that the big gatekeepers cause? Or do we impose rules that we think would also be good for others to follow? One big aspect of digital is that it is modular. That creates the issue of the tradeoff between system competition and competence-based competition. When we see how platforms have evolved and keep evolving, it's very important not to assume we know what the right market structure is.

How do we build things progressively? As economists, we should start by defining property rights, especially in terms of data. Without such foundations, we cannot be sure that the regulatory edifice will be safe. We then have to think about interpretative standards. In my view, rather than leaving it to the initiative of the private sector, there is room for a more interventionist approach to standard setting.

I also worry about the emergence of inconsistencies. Take the well-known example of a platform getting data from rivals operating on its platforms and using this to compete unfairly: what do we do about supermarkets and white products? We should pay more

Eliana Garcés

Director, Economic Policy, Facebook

The digital sector has well-documented economic characteristics including network effects, economies of scale and scope, and easy repurposing of technology and data. There are very few physical constraints for growth so very successful firms have a very large and consequential economic impact. We all agree on that. But how do we analyze this?

Here, we are a bit hostage to the beginning of this debate. As digital services appeared and grew, some traditional companies were displaced, or lost their role in the value chain. They framed their complaints to regulators to fit the antitrust framework in order to get relief. This has led to a damaging adversarial process, preventing us from broader, more sober analysis of the impact of this technology.

In the digital space, products and services are in constant evolution and the boundaries are very fluid. We can start a case against Facebook or TikTok today, and three years from now the space will be very different. Look at gaming now going very heavily into social media, or the increasingly central and complex role of messaging. Those things are shifting fast and make traditional market-based analysis very difficult. Competition in this space is not likely to come from "lookalikes".

This space is also still very young; some firms have grown very rapidly because they were operating almost in a void. We're going to see a lot more players and services, targeting platforms' audiences with alternative offers for different types of engagement. You can lose in this market from death by a thousand cuts.

That's why scale dynamics can be defeated. Not always or easily, but often. This space has very few frictions so if there's a good alternative people are going to go for it. Rather than data access itself, the determinant for success is the ability to understand what data is valuable to your business, to adapt quickly and to transform this data into something that produces value for users. Many industries that are complaining they can't compete are those that have been organizationally unable to adapt.

The risks of inadequate intervention are very high due to the problems being misdiagnosed. The analytical framework has not been adjusted to the technology and value process organization. We often forget that you cannot have a surgical intervention in this new space; anything you do can have enormous repercussions on the kind of services provided and where the technology is going to go.

We need to start from scratch and build a principled approach with very clear standards of intervention. We must accept the fact that we are in a different world, with markets that operate differently from before. What is the measure of success? What are the benefits of digital technologies that we want to preserve or promote? They might include accessibility, innovation, convenience, and efficiency. How can we best achieve these benefits and mitigate risks such as exploitation, fraud, and exclusion?

The role of aggregation, data, modularity, access rules, and contract terms in the value process need to be better understood. Digital regulation cannot be based on static analysis or on relatively commoditized markets. We need more empirical evidence, observing behavior to analyze market dynamics. One of the big risks in this space is the reliance on very intrusive regulation based on presumptions derived from very stylized and empirically irrelevant models.

We often forget that you cannot have a surgical intervention in this new space; anything you do can have enormous repercussions on the kind of services provided and where the technology is going to go.

Jacques Crémer

Professor, TSE

There are many regulatory tools that we are not discussing enough. For example, to force Booking to make it very clear if a hotel has paid to be ranked highly, it's much easier to use consumer protection law than competition law. The same would be true for Amazon's self-preferencing of products.

We have tried to regulate the digital sector mainly through three tools: competition policy; data protection policy; freedom of speech and media law. These tools are useful. Of course, they need to be adapted for the digital world. But competition law is a difficult instrument to handle, and there are other regulatory instruments – such as contract law, consumer protection law – which seem a priori promising, much easier to deploy and enforce.

One of the problems with competition policy is that proving anti-competitiveness is extremely difficult. The opacity of platforms means that no one knows exactly how algorithms determine Amazon's choice, or Booking's rankings. This problem can be eased by changing the burden of proof, as Yves-Alexandre de Montjoye, Heike Schweitzer and I argued in our report for the European Commission. You could say that multihoming is illegal, for instance, unless the platform can show it's pro-competitive. There are other ways to ensure that markets managed by platforms are competitive, and to improve interoperability, the transparency of platforms, etc. However, this will still be very difficult to enforce and probably too slow. It also does not provide much legal certainty.

Sectoral regulation is another potential tool but it needs to have a relatively light touch. It would probably be useful to have a digital regulator in charge of enforcing consent decrees and lightweight regulations.

There are many other regulatory tools that have not been discussed enough. For example, to obtain that hotel reservation websites make it clear if a hotel has paid to be ranked highly, it's much easier to use consumer protection law than competition law. The same would be true for self-preferencing of products on marketplaces. There could be aspects of contract law we can use to address unfairness to sellers on other platforms. And labor law could be used to improve the way we treat Uber drivers.

We have to adapt these laws to the digitization of the economy. One of the problems is that everything is becoming a digital platform: lots of firms, even if they are not mainly digital, can have a digital part that is dominant in an important sector of the economy. There's also a problem of cohesion between these different laws and regulations. Another problem is that there are very few people working on developing a coherent economics of regulation – there are certainly nothing like the major contributions of Jean Tirole and Jean-Jacques Laffont in the 90s. And many new issues are arising.

To efficiently coordinate labor law, contract law, consumer law, etc., we need to ensure that they are developed in conjunction with each other. We need a better vision of the overall regulation which the digital sector is facing.

Keynotes

Fintech economics – Jean Tirole

Traditional financial practices are being overturned by a rising tide of new technologies, including digital payment systems. Avoiding the pitfalls will not be easy, TSE founder Jean Tirole reminded the audience, but a focus on fundamental economic principles may help to ensure that both businesses and consumers benefit from fintech's impressive potential.

The contours of digital payments are still in the making. Recent years have seen the emergence of new instruments best exemplified by public cryptocurrencies like Bitcoin and by Big Tech payment systems like Alipay. These developments in the private sector have in turn fueled discussions and projects around the creation of central bank digital currencies.

Digital currencies have a lot to offer. They can provide consumers with user-friendly, low-cost means of payment and facilitate the integration of payment systems across borders. They may also offer alternatives in countries with dysfunctional national monetary systems. On the supply side, private digital currencies can be a source of funding (such as initial coin offerings) and allow businesses to retain consumers and to collect information.

Which form of digital currency will eventually prevail has yet to be seen. In their current form, popular permission-less cryptocurrencies lack the price stability necessary to serve as a store of value: accepting a payment in Bitcoin exposes a merchant to costly financial risk. Stable coins pegged to a central-bank currency and backed by safe collateral (Tether or Libra, for example) are an attempt to dim excess volatility. But this guarantee creates new challenges: collateral must be segregated and prudentially supervised to ensure consumer protection. It is unclear which authority would have the capacity and incentives to provide that supervision for a global digital currency. More generally, if left unsupervised, a private global digital currency could raise a range of public policy issues ranging from tax fraud and money laundering control, to loss of seigniorage revenue, impediments to monetary policy, and the potential threat to financial stability.

In this context, Central Bank Digital Currencies (CBDC) may provide a solution that combines the convenience of private digital money with the institutional support of a state. But the scope of a CBDC's deployment needs to be carefully calibrated: a CBDC directly held by wholesale or retail depositors would compete with bank deposits, possibly limiting banks' ability to engage in their essential function of maturity transformation through long-term credit.

Overall, the deployment of new technologies for payments has the potential to create meaningful value for consumers. However, technological disruption does not upend the fundamental economic principles that have shaped our financial systems and regulatory framework. Applying these principles may be our best chance to understand the ongoing fintech revolution.

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Platforms as strategies – Marc Rysman

Marc Rysman is a Professor of Economics at Boston University, and a leading expert in the study of network effects, two-sided markets, standardization and compatibility. As a keynote speaker at the TSE Digital Platforms Conference, he discussed some of the issues and cutting-edge techniques involved in developing empirical analysis in this area. Here, he argues that we need to change the way we think about platform markets.

The right way to think about two-sidedness is on a continuum and as an endogenous choice. Instead of two-sided markets, we should talk in terms of two-sided strategies.

What lessons have economists learned about platforms? Marc defines platform economics, with some hesitation, as the study of intermediaries and the choices they make. *"Two-sided markets - or, equivalently, platform markets - are important, exciting, and intellectually challenging,"* he says. *"Platform economics studies firms that connect participants, where participants' payoffs depend on the choices of other participants. Platform firms connect agents in ways that exhibit network effects."*

Two-sidedness is a continuum

But Marc's view of two-sided markets differs from the usual interpretation in two important ways. To begin with, he rejects binary definitions of markets and firms as either one-sided or two-sided. *"I think of two-sidedness as a continuum. I see platforms everywhere! In practice, all firms exhibit some elements of two-sidedness and one-sidedness. For instance, people count Amazon as a platform company but my impression of Amazon Web Services is that it's one-sided, and of course Amazon started by selling books in a one-sided way. Even within Amazon marketplace, sellers can have various levels of integration, potentially using Amazon for payments, shipping, or inventory. No one counts Ford as a platform firm but much of its valuation comes from managing a platform between its car dealers and consumers."*

Instead of worrying about whether a firm is two-sided or not, Marc believes, researchers should focus on how important a firm's two-sidedness might be for understanding outcomes that they are interested in. *"The importance of 'platforminess' may depend on the question we ask. For example, are we studying Amazon Web Services or Amazon Marketplace? Are we thinking about Ford's two-sided relationship with dealers, or other one-sided aspects of its operations?"*

Two-sidedness is a choice

Marc also underlines that two-sidedness is a strategic choice that firms make. *"Amazon sells books one-sided but many other products as a platform. Microsoft sells Windows in a three-sided way: there are consumers, software developers, and hardware manufacturers, and it's also integrated into hardware for Xbox. These are conscious choices by the firms. People think of search as a platform but AOL used to deliver search and significant internet content for many consumers. And to the extent that Google owns internet content on YouTube and Maps, and self-preferences in search, Google chooses to be less two-sided."*

"So the right way to think about two-sidedness is on a continuum and as an endogenous choice," Marc concludes. *"Instead of two-sided markets, we should talk in terms of two-sided strategies."*

FIND OUT MORE - Marc has worked on industries including telecommunications, payment cards, consumer electronics and Yellow Pages directories. He is currently working on a handbook chapter on two-sided markets with TSE's Bruno Jullien. For more information about Marc's research, see sites.bu.edu/mrysmn/

Research

Focus research programs

Team members

Scientific projects

Key numbers, visitors

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Digital platforms

In many industries, platforms allow two (or more) groups of economic agents to interact with each other. Our research program on digital platforms aims at understanding the business models of these firms and their impact on society and welfare. We produce both theoretical and empirical research that sheds light on the functioning of platform markets and offers policy recommendations to public authorities regarding the regulation of such markets.

Program leader:

Bruno Jullien works on industrial organization, in particular network economics, IT, competition policy and the economics of multi-sided platforms.

Analytics and economics of Big Data

This research program gathers mathematicians developing optimization techniques, applied econometric tools and game theory concepts that help to handle high-dimensional random phenomena, and economists studying data-related issues such as privacy protection, the markets for data, and the impact of data on competition.

Program leader:

Sébastien Gadat works on applied mathematics involved in machine learning and artificial intelligence, with an emphasis on statistics and stochastic on-line optimization algorithms.

Artificial intelligence and society

The researchers involved in this program investigate the ethical expectations that citizens and consumers hold for artificial intelligence, in order to smooth the transition to the new AI society. The team is also conducting research in the high-stake domain of algorithmic justice and is also interested in other areas in which AI and powerful algorithms can redesign the social fabric.

Program leader:

Jean-François Bonnefon works on decision-making and moral preferences. He explores the kind of ethics people want for self-driving cars and other machines.

Financial technologies and digital markets

The objective of this research program is to investigate the implications of key features of FinTech and cryptocurrencies, and their impact on social welfare. The research team involved in the program studies in particular the way markets, institutions and regulations should be designed to mitigate problems such as coordination issues, information asymmetries and other market failures.

Program leader:

Christophe Bisière works on FinTech, blockchain and cryptocurrencies.

Intellectual property in the digital economy

This research program aims at improving our understanding of intellectual property protection and transfer in the digital economy. The researchers involved in this program work on topics such as patent litigation involving IoT players and the licensing of intellectual property to manufacturers of connected devices. They also investigate the economic effects of making platforms liable for intellectual property infringements by third parties operating on them.

Program leader:

Yassine Lefouili works on law and economics of intellectual property, competition policy and digital economics.

Scientific team: 50 researchers involved

Bruno Biais
Milo Bianchi
Christophe Bisière
Jérôme Bolte
Jean-François Bonnefon
Marcel Boyer
Emilio Calvano
Stéphane Caprice
Catherine Casamatta
Daniel L. Chen

Frédéric Cherbonnier
Claude Crampes
Jacques Crémer
Vessela Daskalova
Alexandre de Cornière
Fany Declerck
Roberta Dessi
Isis Durrmeyer
Anna D'Annunzio
Daniel L. Ershov

Sébastien Gadat
Daniel F. Garrett
Fabien Gensbittel
Bertrand Gobillard
Renato Gomes
Alexander Guembel
Johannes Hörner
Marc Ivaldi
Doh Shin Jeon
Bruno Jullien

Augustin Landier
Yassine Lefouili
Estelle Malavolti
Nour Meddahi
Sophie Moinas
Antonio Penta
François Poinas
Jérôme Renault
Patrick Rey
Mathias Reynaert

Arnaud Reynaud
Andrew Rhodes
Anne Ruiz-Gazen
David Salant
Wilfried Sand-Zantman
Paul Seabright
Christine Thomas-Agnan
Jean Tirole
Stéphane Villeneuve
Takuro Yamashita

Scientific projects

The projects presented in this section are just a few examples of the many ongoing projects of the Digital Center. Here, we focus on projects from research programs **Artificial Intelligence and Society** (Algorithmic collusion, Digital dystopia) and **Digital Platforms** (Two-sided platforms and biases in technology adoption, Platform fees and price parity, Sharing when stranger equals danger).

Algorithmic collusion

Daniel Ershov (TSE)



Pricing-algorithm technology has become increasingly sophisticated in recent years. Although firms made use of pricing software for decades, technological advancements have created AI-powered algorithms that can handle vast quantities of data and interact, learn, and make decisions with unprecedented speed and sophistication. The evolution of algorithmic-pricing (AP) software has raised concerns about competition. The potential for the use of algorithms as a means to facilitate collusion has been a popular discussion-point among antitrust authorities, economists and competition-law experts. As of yet, there is no empirical evidence of any such effects.

This paper supplements existing theoretical literature and conducts the first empirical analysis of the impact of wide-scale adoption of AP software. We focus on the German retail gasoline market, where, according to trade publications, AP software became widely available beginning in 2017, and for which we have access to a high-frequency database of prices and characteristics for every retail gas station in the country from January 2016 to December 2018.

We test for structural breaks in pricing behaviours related to the use of sophisticated pricing software to identify the adoption of AP by stations. We then compare mean prices and margins (above wholesale prices) between adopters and non-adopters, using an instrumental variables strategy to address endogeneity concerns. Our main IV is the adoption decision by a station's brand (i.e., by brand headquarters).

We find that adopting station margins increase by 0.8 cents/liter (9%). Prices also increase. To isolate the effect of adoption on competition, we compare monopoly and non-monopoly markets. Adoption increases margins and prices only for non-monopoly stations. In duopoly markets, margins increase by 3.2 cents/liter (38%) and prices increase by 4 cents/liter only if both stations adopt. Overall, our findings suggest that AP software adoption softens competition.

Digital dystopia

Jean Tirole (TSE)



How transparent should our life be to others? Modern societies are struggling with this issue as connected objects, social networks, ratings, artificial intelligence, facial recognition, cheap computer power and various other innovations make it increasingly easy to collect, store and analyze personal data.

On the one hand, these developments hold the promise of a more civilized society, in which incivilities, corruption, fraud, and more generally non-compliance with the laws and norms we deem essential to successfully live together would be a memory of the pre-big data past. On the other hand, citizens and human rights courts fret over mass surveillance by powerful players engaging in the collection of bulk data in shrouded secrecy.

This paper shows how autocratic regimes, democratic majorities, private platforms and religious or professional organizations can achieve social control by managing the flow of information about individuals' behavior. Bundling the agents' political, organizational or religious attitudes with information about their prosocial conduct makes them care about behaviors that they otherwise would not. The incorporation of the individuals' social graph in their social score further promotes soft control but destroys the social fabric. Both bundling and guilt by association are most effective in a society that has weak ties and is politically docile.

Two-sided platforms and biases in technology adoption

Doh-Shin Jeon (TSE) – **Jay Pil Choi** (Michigan State University)



Doh-Shin Jeon

Over the past two years, there have been several initiatives to update the current policy framework in order to promote competition in the area of digital platforms. Challenges arise from the fact that many two-sided platforms provide free services to consumers and generate revenue by charging the other side, such as advertisers. When the service is free, consumer harm can be manifested in terms of low innovation. Additionally, the digital platform industry is a dynamic one in which innovations play a major role. Therefore, it is crucial to understand how market power shapes digital platforms' incentives to innovate.

This paper investigates the relationship between market structure and platforms' incentives to adopt technological innovations in two-sided markets. We consider innovations that affect both sides in an opposite way and compare private incentives with social incentives. We find that a bias in technology adoption depends crucially on the business model of a platform. Subscription-financed platforms or any platform without market power exhibits a bias toward consumer-surplus increasing technology whereas advertising-financed platforms with strong market power exhibit a bias toward advertiser-surplus increasing technology.

Our results allow us to make the following predictions regarding digital platforms which charge zero price to consumers. Initially when they are nascent and face fierce competition, they have strong incentives to innovate in order to increase consumer surplus. However, once the market tips to them or after their market power becomes entrenched, the same platforms, which were consumer advocates, have strong incentives to introduce innovations or policies that increase advertiser surplus to the detriment of consumer surplus. Therefore, our results provide a rationale for a tougher competition policy to curb concentration if competition authorities are more concerned with consumer surplus relative to advertiser side surplus.

Platform fees and price parity

Renato Gomes (TSE, CNRS, CEPR) – **Andrea Mantovani** (TBS)



Renato Gomes

Online marketplaces, such as Amazon's, or online travel agencies, such as Booking.com, greatly expand consumer information about market offers, but also raise firms' marginal costs by charging high commissions (which in some cases reach 25%). To prevent show-rooming, platforms adopted price parity clauses, which restrict sellers' ability to offer lower prices in alternative sales channels. Whether to uphold, reform, or ban price parity has been at the center of the policy debate, but so far little consensus has emerged.

In this paper, we investigate a natural alternative to lifting price parity; namely, we study how to optimally cap platforms' commissions. The optimal cap reflects the Pigouvian precept according to which the platform should not charge fees greater than the externality that its presence generates on other market participants. Employing techniques from extreme-value theory, we are able to express the optimal cap in terms of observable quantities. In an application to online travel agencies, we find that current average fees are welfare increasing only if platforms at least double consumers' consideration sets (relative to alternative ways of gathering information online). This suggests that, in some markets, regulation capping commissions should bind if optimally set.

Sharing when stranger equals danger

Marc Ivaldi (TSE, EHESS)– **Emil Palikot** (Stanford GSB)



Marc Ivaldi

Pandemic notwithstanding, equitable and cost-effective transportation systems are indispensable to the functioning of modern economies. Meanwhile, over the past year, public health experts have repeatedly called to avoid crowded and enclosed spaces, both typically associated with public transportation.

Ridesharing involves small groups of people traveling together; hence, it might be an attractive alternative to traditional means of public transportation during a pandemic. As France was emerging from the first Covid-19 induced lockdown, the government encouraged the use of ridesharing. In this paper, we study how the pandemic affected the largest French ridesharing network - BlaBlaCar.

To dive into the reality of ridesharing during the pandemic, we collected data on daily trips between major French cities. Using this data, we show that the perception of health hazards shapes the overall level of activity on the platform and impacts prices. In addition to descriptive analysis, we exploit the misreports



of daily levels of cases to suggest a causal relationship between perception of health risk and the level of prices. Finally, we studied how pandemic impacted the ethnic composition of cars. We observe an increased level of across-ethnicity mixing, mostly due to a higher share of ethnic minorities using the platform than before the pandemic; however, we also show signs of exacerbated ethnic discrimination.

To conclude, this paper provides evidence that the perception of health risks shapes the level of prices and ease of access. Therefore, decision-makers encouraging ridesharing during the pandemic should account for these effects and find ways to ensure fair access.

Key numbers / Visitors

13 Donors

50 Researchers

2 International conferences

4 Digital workshops

16 Seminars on the
Economics of Platforms

19 Working papers

24 Articles in peer-reviewed journals

1 Report

In-Uck Park (University of Bristol)
February 24–28, 2020

Adam Smith (University College London)
February 18, 2020

Markus Reisinger (Frankfurt School of Economics)
February 4–5, 2020

Lei Xu (Bank of Canada)
January 7–14, 2020

Estrella Gomez-Herrera (European Commission)
January 6–24, 2020

Gary Biglaiser (UNC Chapel Hill)
January 6–24, 2020

Hal Varian (UC Berkeley/Google)
January 6–8, 2020

TNIT Toulouse Network for Information Technology



Created in 2005, TNIT aims to foster high quality economic research on the software industry, the development and role of the Internet, intellectual property, cloud computing, antitrust and competition policy. The aim of the network is to encourage some of the best academic economists in the world to engage on the issues generated by the rapid development of information technology.

Members pursue active research in areas of interest of the network and participate in a yearly meeting where they discuss each other's research and interact with high-level practitioners about the evolution of the industry. The 2020 meeting has been postponed until 2021.

The network also publishes regular newsletters, including a 2020 special issue on the current pandemic and its consequences to the digital revolution.

Members of the TNIT network:

Daron Acemoglu (MIT), **Susan Athey** (Stanford University), **Nicholas Bloom** (Stanford University), **Glenn Ellison** (MIT), **Joshua Lerner** (Harvard Business School), **John Levin** (Stanford University), **Matthew Gentzkow** (Stanford University), **Heidi Williams** (Stanford University).

Scientific coordinator: Jacques Crémer (TSE)



Events

Conferences 2021

Conferences 2020

Workshops

Seminars

Conferences 2021

The 14th Digital Economics Conference, Online, January 7–8

This conference brings together great minds to discuss the digital economy and its consequences for modern societies. In keeping with the spirit of previous years, the conference will feature contributions in economics, theoretical, econometric, experimental and policy oriented, as well as contributions from other social sciences and computer and data science.

4th Doctoral Workshop on The Economics of Digitization, Toulouse, May 18–19

Postponed in 2020, this two-day international workshop, hosted by TSE will gather doctoral students involved in research in the field of the Economics of Digitalization with both theoretical and empirical focus.

Keynote speakers:

- Luis Cabral (New York University)
-

TSE Economics Summit, May 27–28

This two-day event organized with the media group Challenges will gather academics and practitioners to exchange views and perspectives on how to save the common good. Main themes include inequality, energy and climate change, digital, health and sustainable finance. The international event will be hosted in Toulouse but available live worldwide, in English and in French.

Conferences 2020

The 13th Digital Economics Conference, TSE, January 9–10

2020's conference featured keynote speakers Erik Brynjolfsson (*MIT Sloan School*) and Judith Chevalier (*Yale University*).

Joint conference: Digital Platforms and Tokenomics 2020, Online/TSE, October 26–28

TSE's Sustainable Finance & Digital Centers hybrid event covered topics relative to blockchain economics and digital platforms. Tokenomics is an international forum for theory, design, analysis, implementation and applications of blockchains and smart contracts, bringing together economists, computer science researchers and practitioners working on blockchains in a unique program. The event featured key speakers such as Ittai Abraham (*VMware Research*), Long Chen (*Luohan Academy, Ant Financial*), Marc Rysman (*Boston University*), Jean Tirole (*TSE*), and Timothy Zakian (*Novi, Facebook*).

Annual Jean-Jacques Laffont Prize lecture and seminar, Online, November 16

The 2020 Jean-Jacques Laffont Prize was awarded to Matthew O. Jackson (*Stanford University*), unable to travel to Toulouse for the ceremony, we held an online seminar where he and TSE researchers discussed the roles of social networks in economic inequality and immobility.

Digital Workshops

- Willy Lefez (TSE), "*Price Recommendations and the Value of Data: A Mechanism Design Approach*", Online, December 9
 - Leonardo Madio (TSE), "*Platform Liability and Innovation*", Online, October 14
 - Daniel Ershov (TSE), "*Algorithmic Pricing and Competition: Empirical Evidence from the German Retail Gasoline Market*", Online, September 30
 - Zhijun Chen (Monash University), "*Data-Driven Mergers and Personalization*", Online, September 16
-

Online seminars on the Economics of Platforms

- Özlem Bedre-Defolie (ESMT-Berlin), *"Hybrid Platform Model"*, December 15, 2020.
- Seth Benzell (MIT Initiative on the Digital Economy), *"How to Govern Facebook: A Structural Model for Taxing and Regulating Big Tech"*, December 1, 2020.
- Jay Pil Choi (Michigan State University), *"Two-Sided Platforms and Biases in Technology Adoption"*, November 17, 2020.
- Zhijun Chen (Monash University), *"Data-Driven Mergers and Personalization"*, November 3, 2020.
- Benjamin Leyden (Cornell University), *"Platform Design and Innovation Incentives: Evidence from the Product Ratings System on Apple's App Store"*, October 20, 2020.
- Gregory Lewis (Microsoft Research), *"The Supply and Demand Effects of Review Platforms"*, October 6, 2020.
- Andrew Rhodes (Toulouse School of Economics), *"Platform Design when Sellers Use Pricing Algorithm"*, September 22, 2020.
- Nikhil Vellodi (Princeton University and Paris School of Economics), *"Privacy, Ratings Design and Barriers to Entry"*, September 8, 2020.
- Ananya Sen (Carnegie Mellon University), *"The Editor vs. the Algorithm: Economic Returns to Data and Externalities in Online News"*, July 28, 2020.
- Lester Chan (Boston University), *"Divide and Conquer in Two-Sided Markets: A Potential-Game Approach"*, June 15, 2020.
- Andrey Fradkin (Boston University), *"Dog Eat Dog: Measuring Returns to Scale Using a Digital Platform Merger"*, June 30, 2020.
- Maryam Saeedi (Carnegie Mellon University), *"Optimal Rating Systems on Platforms"*, June 16, 2020.
- Özlem Bedre-Defolie (ESMT-Berlin), *"Platform Competition for Exclusivity with a Marquee Seller"*, June 2, 2020.
- Renato Gomes (TSE), *"Regulating Platform Fees under Price Parity"*, May 19, 2020.
- Hui Li (Carnegie Mellon University), *"Information Transparency, Multi-Homing, and Platform Competition: A Natural Experiment in the Daily Deals Market"*, May 5, 2020.
- Andrei Hagiu (Boston University), *"Data enabled learning, network effects and competitive advantage"*, April 21, 2020.



Outreach

Education

Appointment

Research grants

Scholarships

Press articles and media

Education

Master degrees

Machine Learning for Economics

The main goal of this course is to familiarize students with a number of machine learning methods for prediction and causal inference. Both supervised and non-supervised methods are studied. In particular, the course covers the following methods: Lasso and Ridge regression, random forest and boosting, neural networks and deep learning, as well as support-vector machine and kernel methods.

Big Data

This course is dedicated to machine learning methods for big data problems. It starts with a reminder of optimization algorithms and then tackles several problems and machine learning algorithms. In particular, it deals with collaborative filtering, the Netflix problem, mixture models, unsupervised classification problems, tree-based methods, and sequential prediction with online methods.

Digital Economics

This course aims at exploring how the internet and digitization affect firms, consumers and markets. The first part of the course will involve a mix of theoretical models and policy discussions dealing primarily with network effects, online media platforms, big data and privacy. The second part will explore empirical papers on topics such as search, reputation mechanisms and copyright. Master students will also learn about the different kinds of data that are available with online markets and how to look at this data.

Market Regulation in the Digital World

This course at the master's degree level was created in 2016. The course discusses recent regulatory issues and competition policy topics related to the digital economy. Lectures cover the following topics: net neutrality, uses of personal data online, bundling in platform markets: economic analysis of the Microsoft and Google cases, news aggregators and their effect on traditional media and the sharing economy.

Economics of Innovation and Intellectual Property

This lecture introduces the Master students to a selection of important current issues in the economics of intellectual property (IP). After the introduction to the current situation of the IP world and firms' IP strategies, it reviews important economic contributions to topics such as: standard setting organization licensing - litigation - weak patents and patent pool.

TSE Executive Education Courses and Seminars

TSE's Executive Education program in Competition Law & Economics offers a unique possibility to learn from some of the best industrial economists and competition law practitioners in the world on how to bridge the gap between cutting-edge economics and the practice of European competition law. During these one-day seminars and courses, our participants can gain insights on thought provoking and trending topics of high relevance.

The future of digital competition policy: should antitrust and regulation be merged?

In October 2020, we gathered online over 100 participants including leading business people, lawyers and economists to discuss the European Commission's New Competition Tool (NCT) and the ex-ante regulation of digital platforms. Key speakers at this seminar included Isabelle de Silva, President of the French Autorité de la concurrence and Pierre Régibeau, Chief Competition Economist at the European Commission. The seminar was followed by a full day course on the recent developments in the economics of platform markets. A leading group of TSE economists gave nontechnical lectures on: vertical relations in platform markets, self-preferencing, marketplaces, and the interplay between data, competition, and privacy.

Find out more about TSE Executive Education and upcoming courses on the web page tse-fr.eu/executive-education



Appointment

Congratulations to **Jean-François Bonnefon** who was appointed to the Horizon 2020 Commission expert group to advise on specific ethical issues raised by driverless mobility. Debating such topics as: ethics of connected and automated vehicles, recommendations on road safety, privacy, fairness, explainability and responsibility.

Research grants

In 2020, 5 TSE researchers and Digital Center members were awarded funding from the European Research Council.

Isis Durrmeyer, "*Understanding price dispersion: new structural models of price discrimination and applications*", Daniel Garrett, "*Dynamic Mechanisms*" and Renato Gomes, "*Competition and Regulation of Platform Markets*" were awarded "Starting Grants". This funding supports the creation of excellent new research teams and strengthens others that have been recently created.

Bruno Jullien, "*Information services: competition and ex-ternalities*" and Jean Tirole, "*Markets and their limits*" were awarded ERC "Advanced Grants". These support exceptional research leaders of any nationality and any age to pursue groundbreaking, high-risk projects that open new directions in their respective research fields or other domains.

Scholarships

- PhD Students, **Jacopo Bregolin**, **Willy Lefez** and **Sarah Lemaire** were each awarded a Digital Center scholarships in 2020 to fund their studies.
 - All the best to **Emil Palikot** who leaves TSE with a PhD in Economics after receiving a Digital Center Scholarship to complete his final year in 2020. He joins the Stanford Graduate School of Business Golub Capital Social Impact Lab.
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Press articles and media

- Paul Seabright, "*Covid-19: Le système de traçage a un rôle important à jouer dans la gestion de la pandémie*", Le Monde, December 2020
 - Jacques Crémer, "*Bolstered by pandemic, tech titans face growing scrutiny*", France 24 & AFP, December 2020
 - Jacques Crémer, "*Sommes-nous les esclaves d'Amazon, Facebook et Google ?*", Le Point, November 2020
 - Jean-François Bonnefon, "*Une IA peut être un agent moral*", Philosophie Magazine, October 2020
 - Emil Palikot, "*La discrimination en ligne existe mais elle peut être réduite*", La Tribune, August 2020
 - Jean-François Bonnefon, "*Faut-il avoir peur des algorithmes*", France Inter, July 2020
 - Daniel Chen, "*A Better Way to Onboard AI*", Harvard Business Review, July 2020
 - Daniel Chen, "*Releasing Nonviolent Accused Makes Us Safer in Covid Era*", Wall Street Journal, June 2020
 - Paul Seabright, "*Mieux vaut être crédule et bien portant...*", Le Monde, June 2020
 - Paul Seabright, "*Quand Facebook s'éteint, le bien-être augmente*", Le Monde, May 2020
 - Paul Seabright, "*Easing lockdown – digital applications can help*", Vox.eu, May 2020
 - Marc Ivaldi, "*Surveillance par Stop-Covid: Se laisser tracer, c'est s'auto-tester*", France Soir, April 2020
 - Jean Tirole, "*'Tracer' pour mieux soigner? La mise en garde de Jean Tirole*", L'Obs, April 2020
 - Frédéric Cherbonnier, "*Révolution technologique et emploi: la grande inconnue*", Les Echos, February 2020
 - "*Prix des données personnelles*", La Gazette du Midi, February 2020
 - "*TSE planche sur le prix des données*", La Dépêche du Midi, January 2020
 - Jean-François Bonnefon, "*Questions éthiques sur la voiture autonome*", Radio Campus Paris, January 2020
 - Marc Ivaldi, "*De l'importance de la valeur de nos données*", La Tribune, January 2020
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Publications

Policy papers and reports

Articles in peer-reviewed journals

Working papers

Policy papers and reports

Liability Rules for Online Intermediaries: An Economic Analysis

Report for the European Commission by Yassine Lefouili and Leonardo Madio (forthcoming)

This report investigates the economics of platform liability and analyzes six different liability regimes for online intermediaries, including the current regime in the European Union. It highlights the incentives and trade-offs underlying the effects of a change in platform liability on several key economic variables such as prices, terms and conditions, business models, and investments. It also emphasizes the need to take account of the interdependence between the actions of platforms and those of third parties that are either involved in, or affected by, their activities. The report shows that a radical overhaul of the current liability regime for online intermediaries, such as the shift to a no-liability regime or a no-exemption regime, is likely to be undesirable. However, it supports the need for an upgrade of the current liability system and discusses the benefits and shortcomings of three potential candidates for such an upgrade.

Articles in peer-reviewed journals

- Anna D’Annunzio and Antonio Russo, “*Ad networks and consumer tracking*”, *Management Science*, vol. 66, n. 11, November 2020, p. 5040–5058.
- Jacques Crémer and Gary Biglaiser, “*The Value of Incumbency When Platforms Face Heterogeneous Customers*”, *American Economic Journal: Microeconomics*, November, 2020, p. 1-43.
- Jean-François Bonnefon and Iyad Rahwan, “*Machine Thinking, Fast and Slow*”, *Trends in Cognitive Sciences*, vol. 24, n. 12, October, 2020, p. 1019-1027.
- Jihyun Kim and Nour Meddahi, “*Volatility Regressions with Fat Tails*”, *Journal of Econometrics*, vol. 218, n. 2, October 2020, p. 690–713.
- Anna D’Annunzio, M. Mardan and Antonio Russo, “*Multi-part tariffs and differentiated commodity taxation*”, *The RAND Journal of Economics*, October 2020, Vol. 51, Issue 3, p. 786-804.
- Marc Ivaldi and Emil Palikot, “*Sharing when stranger equals danger: Ridesharing during Covid-19 pandemic*”, *Covid Economics*, issue 46, September 2020.
- François Bachoc, Mark G. Genton, Klaus Nordhausen, Anne Ruiz-Gazen and Joni Virta, “*Spatial Blind Source Separation*”, *Biometrika*, vol. 107, n. 3, September, 2020, p. 627-646.
- Yassine Lefouili and Joana Pinho, “*Collusion between two-sided platforms*”, *International Journal of Industrial Organization*, vol. 72, n. 102656, September, 2020.
- Marc Ivaldi, Liberty Mncube and Marina Sánchez del Villar, “*Measuring Unilateral Effects under Data Scarcity: A Merger Case in South Africa*”, *Concurrences Review*, vol. 3, n. 95906, September, 2020.
- Jérôme Renault and Bruno Ziliotto, “*Limit Equilibrium Payoffs in Stochastic Games*”, *Mathematics of Operations Research*, vol. 45, n. 3, August, 2020, p. 889-895.
- Sébastien Gadat, Clément Marteau and Cathy Maugis, “*Parameter recovery in two-component contamination mixtures: the L2 strategy*”, *Annales de l’Institut Henri Poincaré*, vol. 56, n. 2, August, 2020, p. 1391-1418.
- Andrei Hagiu, Bruno Jullien and Julian Wright, “*Creating platforms by hosting rivals*”, *Management Science*, vol. 66, n. 7, July, 2020, p. 2801-3294.
- Jérôme Bolte, Zheng Chen and Edouard Pauwels, “*The multiproximal linearization method for convex composite problems*”, *Mathematical Programming*, vol. 182, July 2020, p. 1–36.
- Rida Laraki and Jérôme Renault, “*Acyclic Gambling Games*”, *Mathematics of Operations Research*, vol. 45, issue 4, June 2020, p. 1237-1257.
- Gabrielle Demange and Karine Van Der Straeten, “*Communicating on electoral platforms*”, *Journal of Economic Behavior and Organization*, vol. 174, June, 2020, p. 402-419.
- Daniel L. Chen and Eric Reinhart, “*Incarceration And Its Disseminations: COVID-19 Pandemic Lessons From Chicago’s Cook County Jail*”, *Health Affairs*, vol. 39, n. 8: Covid-19, June 2020.

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- **Iyad Rahwan, Jacob W. Crandall and Jean-François Bonnefon**, *"Intelligent machines as social catalysts"*, Proceedings of the National Academy of Sciences of the United States of America, vol. 117, n. 14, April, 2020, p. 7555-7557.
 - **Hanna Halaburda, Bruno Jullien and Yaron Yehezkel**, *"Dynamic competition with network externalities: how history matters"*, The RAND Journal of Economics, vol. 51, March, 2020, p. 3-31.
 - **Emilie Salvia, Katell Mevel, Grégoire Borst, Nicolas Poirel, Grégory Simon, François Orliac, Olivier Etard, Astrid Hopfensitz, Olivier Houdé, Jean-François Bonnefon and Wim De Neys**, *"Age-related neural correlates of facial trustworthiness detection during economic interaction"*, Journal of Neuroscience, Psychology, and Economics, vol. 13, n. 1, March, 2020, p. 19-33.
 - **Edmond Awad, Sohan Dsouza, Richard Kim, Jonathan Schulz, Joseph Henrich, Azim Shariff, Jean-François Bonnefon and Iyad Rahwan**, *"Reply to: Life and death decisions of autonomous vehicles"*, Nature, vol. 579, n. E3-E5, March, 2020.
 - **Edmond Awad, Sohan Dsouza, Jean-François Bonnefon, Azim Shariff and Iyad Rahwan**, *"Crowdsourcing moral machines"*, Communications of the ACM, vol. 63, n. 3, March, 2020, p. 48-55.
 - **Jean-François Bonnefon, Edmond Awad, Sohan Dsouza and Azim Shariff**, *"Universals and variations in moral decisions made in 42 countries by 70,000 participants"*, Proceedings of the National Academy of Sciences of the United States of America, vol. 117, n. 5, February, 2020, p. 2332-2337.
 - **Edmond Awad, Sydney Levine, Max Kleiman-Weiner, Sohan Dsouza, Joshua Tenenbaum, Azim Shariff, Jean-François Bonnefon and Iyad Rahwan**, *"Drivers are blamed more than their automated cars when both make mistakes"*, Nature Human Behaviour, vol. 4, n. 2, February, 2020, p. 134-143.
 - **Sébastien Gadat, Sébastien Gerchinovitz and Clément Marteau**, *"Optimal functional supervised classification with separation condition"*, Bernoulli, vol. 26, n. 3, 2020, p. 1797-1831.
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Working papers

- **Doh-Shin Jeon and Jun Yan**, *"Data, Targeted Advertising and Quality of Journalism: The Case of Accelerated Mobile Page (AMP)"*, TSE Working Paper, vol. 20-1171, December, 2020.
 - **Brian Love, Yassine Lefouili and Christian Helmers**, *"Do Standard-Essential Patent Owners Behave Opportunistically? Evidence from U.S. District Court Dockets"*, TSE Working Paper, vol. 20-1160, November, 2020.
 - **Alexandre de Cornière and Miklos Sarvary**, *"Social Media and the News: Content Bundling and news Quality"*, TSE Working Paper, n. 20-1152, October 2020.
 - **Justin Pappas Johnson, Andrew Rhodes and Matthij Wildenbeest**, *"Platform Design when Sellers Use Pricing Algorithms"*, TSE Working Paper, n. 20-1146, September 2020.
 - **Jay Pil Choi and Doh-Shin Jeon**, *"Two-Sided Platforms and Biases in Technology Adoption"*, TSE Working Paper, n. 20-1143, September 2020.
 - **Daniel L. Chen, Moti Michaeli and Daniel Spiro**, *"Legitimizing Policy"*, TSE Working Paper, n. 20-1123, July 2020.
 - **Marc Ivaldi and Jiekai Zhang**, *"Platform Mergers: Lessons from a Case in the Digital TV Market"*, TSE Working Paper, n. 20-1112, June 2020.
 - **Jérôme Bolte, Edouard Pauwels and Rodolfo Rios-Zertuche**, *"Long term dynamics of the subgradient method for Lipschitz path differentiable functions"*, TSE Working Paper, n. 20-1110, June 2020.
 - **Sean Ennis, Marc Ivaldi and Vicente Lagos**, *"Price Parity Clauses for Hotel Room Booking: Empirical Evidence from Regulatory Change"*, TSE Working Paper, n. 20-1106, May 2020.
 - **Anca Cojoc, Marc Ivaldi, Frank P. Maier-Rigaud and Oliver März**, *"Horizontal cooperation on investment: Evidence from mobile network sharing"*, TSE Working Paper, n. 20-1100, May 2020.
 - **Claire Borsenberger, Helmuth Cremer, Denis Joram, Jean-Marie Lozachmeur and Estelle Malavolti**, *"Data and the regulation of e-commerce: data sharing vs. dismantling"*, TSE Working Paper, n. 20-1094, May 2020.
 - **Elias Carroni, Leonardo Madio and Shiva Shekhar**, *"Superstars in two-sided markets: exclusives or not?"*, TSE Working Paper, n. 20-1083, March 2020.
 - **Luis Abreu and Doh-Shin Jeon**, *"Homophily in Social Media and News Polarization"*, TSE Working Paper, n. 20-1081, March 2020.
 - **Jérôme Bolte and Edouard Pauwels**, *"Curiosities and counterexamples in smooth convex optimization"*, TSE Working Paper, n. 20-1080, March 2020.
 - **Alexandre de Cornière and Greg Taylor**, *"Data and Competition: a General Framework with Applications to Mergers, Market Structure, and Privacy Policy"*, TSE Working Paper, n. 20-1076, February 2020.
 - **Marie-Laure Allain, Claire Chambolle, Patrick Rey and Sabrina Teyssier**, *"Vertical Integration as a Source of Hold-up: an Experiment"*, TSE Working Paper, n. 20-1062, January 2020.
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New partnerships and projects

Competition for Attention between Digital Services

Facebook sponsored research project

This project is led by **Renato Gomes** and **Patrick Rey**, involving a panel of TSE researchers including Alexandre de Cornière, Jacques Crémer, Daniel Ershov, Doh-Shin Jeon, Bruno Jullien, Yassine Lefouili and Jean Tirole.

The research objective is to investigate the implications of key features of online markets on competition among social networks and between social networks and other digital services.

In 2020, our researchers and Facebook representatives met twice virtually to discuss issues related to innovation in multi-sided market platforms, usage patterns on online platforms and services, competition for attention, incumbency advantage: competition and entry in the online platform space and privacy.



Renato Gomes



Patrick Rey

Financial Inclusion Through Interoperability

Research initiative funded through philanthropic support

Working on this project, with support from the Bill & Melinda Gates Foundation, opens new exciting perspectives for TSE! We look forward to developing policy relevant research aimed at informing the regulatory debate and ultimately at improving access to finance for low income consumers.

In November 2020, Toulouse School of Economics launched a new project thanks to funding received from the Bill & Melinda Gates Foundation. The FIT IN Initiative (Financial Inclusion Through INteroperability) will catalyze new research and leverage economic insights and prior research to constructively influence the design and regulation of interoperable digital financial services systems in low- and middle-income countries.

Milo Bianchi and **Emmanuelle Auriol** will be leading this multidisciplinary partnership with TSE researchers and external members. TSE faculty, postdocs and graduate students will all be involved in the project. The initiative will also receive contributions from external contributors, with the creation of a formal academic and policy affiliate network and the launch of a request for research proposals.

The main objective of this four-year research initiative is to better understand the implications of alternative competition and regulatory policies and ultimately inform policies to expand the scope, improve the quality and reduce the cost of digital payment systems for impoverished users.

Topics of competition, incentives, regulation, governance, technology adoption, and welfare impacts related to features of and choices in designing interoperable payment systems will be central to the research agenda of the initiative. Specifically, the initiative will strive whenever possible to pay attention to the effects on vulnerable populations and women in particular, with the ultimate aspiration of reducing the socio-economic and gender gap in access to formal financial services.

Connections between TSE's Digital Center, Sustainable Finance Center and the future TSE Infrastructure and Network Center will bring together an array of researchers. The initiative will involve a combination of descriptive, theoretical and empirical research, drawing on expertise from literature on industrial organization, digital finance, technology adoption, development economics, mechanism design and public policy.



Emmanuelle Auriol



Milo Bianchi

The TSE Centers showcase research and academic activities, supporting Toulouse experts in their efforts to build new analytical tools to meet contemporary challenges.

The three existing centers are the Digital Center, the Energy and Climate Center and the Sustainable Finance Center.

Bringing together the skills and experience of leading industrial and academic partners, the centers are created around wide, overreaching topics with the scope to cover a range of industrial and policy issues affecting society at all levels.

Main donors



Research project sponsors

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