



NEWSLETTER – May 2020

Paying for the pandemic: TSE experts on Covid-19

Jean Tirole
Christian Gollier
Stéphane Straub

Research highlights **The leverage delusion: All that glitters is not gold**

Tiziana Assenza

Did the banks get fixed?

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News	<i>p.4</i>
Paying for the pandemic: TSE experts on Covid-19	<i>p.5</i>
Research highlights <i>The leverage delusion: All that glitters is not gold Did the banks get fixed?</i>	<i>p.10</i>
Outreach <i>Sustainable Finance Center hosts first conference</i>	<i>p.14</i>
Media	<i>p.21</i>

Director's message

Sustainability is the only way forward

Following a highly successful inaugural conference in December, the TSE Sustainable Finance Center moved into an innovative new building designed by award-winning architects. But Covid-19 has forced us to temporarily close our home and find new ways to focus researchers' expertise on the multitude of policy challenges linked to the current crisis.

As the focus in Europe shifts from virus containment to reopening for business, governments will need economists to join epidemiologists at the decision-making table. Interacting online, the TSE Macro group has begun work on a project to define the optimal policies for managing the pandemic and a sustainable exit from lockdown.

TSE researchers have been prominent in the wider debate, and in this newsletter we feature some of their perspectives on how to absorb the economic shock. Jean Tirole outlines the options for the EU while Christian Gollier and Stéphane Straub call on financial markets to bear their fair share of the burden. Also in this issue, a study by Fabrice Collard on banking regulation suggests that we still have much to learn from the 2008 financial crisis. In the burgeoning realm of behavioral economics, Tiziana Assenza identifies a new cognitive bias that can be hazardous to our financial wellbeing.

In just a few weeks, Covid-19 exposed the fragility of our health services, financial systems, and global supply chains. It has also lifted the edge of the curtain on the far greater, slow-burning threat of environmental disaster. This health crisis has been a call to arms for sustainable practice. It has shown us the value of scientific expertise, planning ahead, and collective endeavor.

Our researchers are committed to helping society make better choices about the future. We are united in our belief that sustainability must be the cornerstone of post-pandemic reconstruction. This process will be immensely difficult, but it offers radical new opportunities and incentives to embrace socially responsible behavior, long-term perspectives and sustainable investment. We have no other shield against existential threats such as climate change.

More immediately, the coming weeks will be crucial in managing Covid-19's economic, social and financial fallout. In the face of radical uncertainties, we hope that policy decisions will be guided by the analytical tools of economic science.

We wish you good health as we work toward a brighter future.

Sophie Moinas

Director, TSE Sustainable Finance Center



News

Climate finance project wins backing from French energy transition agency



Frédéric Cherbonnier



Christian Gollier



Ulrich Hege

TSE researchers **Frédéric Cherbonnier**, **Christian Gollier** and **Ulrich Hege** received a substantial grant from ADEME, the French energy transition agency, for a three-year project on the “*management of climate transition risks*”.

Their project aims to investigate a number of fundamental questions related to climate finance and consists of three parts. The first builds on the analysis of the optimal carbon trajectory and its intimate link to the optimal discount rate for investments that increase or mitigate climate risks. This part will develop tools to evaluate carbon reduction efforts, taking into account the “climate beta” (which depends on the correlation between climate risk and macroeconomic risks) and the way in which various sources of macro, technological and environmental uncertainty interact. It will in particular account for learning and dynamic readjustments; that is, the gradual discovery by decision-makers of the true nature of climate risks as well as of possible technological breakthroughs. Both could lead to revisions of the “carbon budget”, particularly when climate tipping points are identified.

The second part consists in developing models and tools to help economic decision-makers in their long-term, energy-related investment decisions. It will use dynamic modelling to calibrate the intertemporal allocation of the carbon budget and to study how the key variables of uncertainty influence the optimal trajectory of the climate mitigation effort and of the carbon price, investigating different carbon-price growth scenarios.

The third part studies the consequences for prudential financial regulation related to climate risks, by differentiating between categories of real assets according to their contribution to or mitigation of climate risks. The objective will be to better understand to what extent investments that aggravate or mitigate climate risks should be accompanied with specific regulatory measures, such as differentiated capital requirements.



Paying for the pandemic: TSE experts on Covid-19

Coronavirus and the ensuing lockdown have exacted a heavy toll. Many have paid with their lives, but the economic price will be colossal too. Who will pay the bill?

TSE honorary chairman **Jean Tirole** sketches four scenarios for getting Europe back on track while his colleagues **Christian Gollier** and **Stéphane Straub** stress the importance of financial markets as shock absorbers.

How will Europe pay for the corona crisis?

Jean Tirole

Repudiation of the colossal corona debt, monetization of the debt, new taxes or international solidarity are the four possible ways to get Europe's economy back on track, writes TSE founder Jean Tirole. For public opinion in northern countries, however, support from the ECB may be a more palatable option than directly financing the countries which have been hit hardest.



Public spending related to the Covid-19 crisis is essential. But it will leave States with considerable debts if, as is likely, the health crisis persists. Who will pay the bill? Several hypotheses are possible.

First hypothesis: debt repudiation

This is a risky solution, as it would affect confidence in the State. No longer able to borrow, the State would be required to balance its budget at the same time as having to continue to pay its current expenses, restarting the economy, investing in hospitals, etc.

Second hypothesis: tax

States levy exceptional taxes on the wealthiest, for example on property, as well as on the middle classes, to fill the large hole in public finances. Another form of disguised tax is to oblige banks to accept new issues of Treasury bills, at rates that do not reflect the ensuing inflation (economists call it "financial repression"). Inflation is a classic post-war phenomenon. This is how the United States and Great Britain reduced their public debt after the Second World War.

Financial repression would be difficult in the Eurozone, and not only because of the fragility of its banks. It would require agreement between countries on the degree of repression. And it would worsen the risk-taking that has already been tolerated by regulators since the Eurozone crisis. In Italy, for example, banks have a lot of Italian government debt, and bank regulators do not require them to have equity capital to resist a loss in value of that debt. The country's difficulties then hit the banks - and vice versa (economists refer to a "death loop").

Third hypothesis: monetization of the debt

The central bank buys public debt. In principle, this debt must be purchased on the secondary market and then repaid. These two constraints are, however, more formal than real. The new debt can be bought on the primary market by a bank which resells it to the ECB. And there is no formal deadline for reimbursement by nation states - what is temporary can become permanent.

Such purchases are presumed to be inflationary. But there was no inflation following "quantitative easing", the massive purchases of debt made by central banks after 2008. This increase in liquidity should have increased demand and pushed prices up. But this did not happen due to deflationary expectations and hoarding. Could inflation restart tomorrow after strong monetary creation? No one knows. If this were to happen, the "payers" would be the holders of funds in euros and current accounts.

Monetization could be interesting, with two conditions. The first is to pay attention to the poorest, whose only savings are often housed in a bank account. The second, "the bull in a china shop", is to preserve budgetary discipline within the Eurozone, in a situation where any government could spend freely by sharing the consequences with the rest of the zone. This requires reinventing the Stability Pact to allow the heavy spending necessary for restarting the economy, while preserving solidarity.

Fourth hypothesis: solidarity

Solidarity between countries with solid public finances and more fragile countries can be difficult to implement at a time when all countries are affected by the coronavirus. But there are antecedents, such as the Marshall Plan after World War Two and European solidarity in the euro crisis over the past decade. The argument for solidarity is very strong. For example, Italy is not responsible for the pandemic.

Several pooling mechanisms are in place in the Eurozone. In addition to the debt buyout by the ECB already mentioned, the European Stability Mechanism can raise up to €700 billion on the markets thanks to a guarantee from the European Union, but it is difficult to implement because it requires unanimity from the finance ministers of the Eurozone and can only offer conditional help to States in difficulty. A third mechanism is on the table: nine countries in southern Europe, including France, have proposed a joint issue of "coronabonds".

The ECB solution

It would be beneficial to Southern Europe, but a pooling of debts seems unlikely. Solidarity is easier to organize when each country can be both a beneficiary as well as a loser. The asymmetry of starting points can allow for solidarity driven by empathy or well-understood interests (geopolitical or economic effects of the default of the other country), but this solidarity easily reaches its limits.

Support from the ECB therefore seems more likely to me than budgetary support: it is quicker to set up and does not require unanimity. Above all, it is less transparent for public opinion in northern European countries, which have less debt (Germany has reduced its debt to less than 60% of GDP) and are worried about having to finance southern Europe.

The Hammer and the Dance: Public policy in a pandemic

The TSE Macroeconomics Group - Tiziana Assenza, Fabrice Collard, Martial Dupaigne, Patrick Fève, Christian Hellwig, Sumudu Kankanange, and Nicolas Werquin - are working on a dynamic model to simulate optimal policy during a pandemic.

How should governments weigh economic prosperity against mortality risk? Should we rely on private incentives or public enforcement? What are the short-run and long-run tradeoffs? What is the exit strategy from confinement? When should states follow epidemiologists' advice, and when should they heed economists?

Covid-19 raises many policy questions, as well as specific challenges related to its fast propagation and asymptomatic transmission, through which many infections go undetected.

The TSE group's model simulates the interplay between economic behavior and infection risks, characterizing optimal policy paths. Using the metaphor of the hammer and the dance, their theoretical predictions suggest there is strong economic justification for current lockdown strategies but offer a more nuanced perspective on optimal deconfinement strategies which are expected to be very gradual and much more difficult.

With many natural extensions of the model possible to take into account the use of face masks, testing and contact tracing, we look forward to providing details of this ongoing project in future TSE publications.

Coronavirus, risk and the role of finance

Christian Gollier & Stéphane Straub



Christian Gollier



Stéphane Straub

If our economies are to bounce back from the Covid-19 pandemic, financial markets must play their role as risk absorbers, write TSE economists Christian Gollier and Stéphane Straub. The coming debt crisis is a reminder that the burden of shocks must be shared equitably.

Socialization of losses will result in a massive public deficit in 2020, perhaps 10% of GDP, which will have to be gradually repaid. Unfortunately, the French treasury's room for maneuver is limited, and the State has few assets to smooth the shock. Given the huge fall in stock-market valuations, it would be unwise to immediately dispose of Aéroport de Paris, EDF or the assets held in the Pension Reserve Fund. In the present circumstances, the suspension of budgetary discipline rules is welcome. However, our inability to balance the public budget over the long term will have to be reckoned with one day.

Italy has the joint misfortune of being the European country most affected by the pandemic and by sovereign debt. If the EU does not socialize the corona loss on our continent, it will lose credibility. A European corona-bond should be issued with member states sharing responsibility for its reimbursement. Failing this, the rule capping purchases of sovereign debt should be exceptionally suspended and the widening of government bond yield spreads should be contained. In the short term, the ECB must also avoid a liquidity crisis by offering cash to all financial institutions that request it. This is so that the latter can in turn finance solvent companies which are struggling to meet payments.

Financial markets

The equity capital of companies is the first cushion of the capitalist system against economic fluctuations. As long as they can, at the level of these reserves, they insure employees against the hazards of entrepreneurship. The volatility of prices on the stock markets reflects this insurance. Shareholders are in the front line to bear the risk of entrepreneurship, and that is fine. Unlike employees, who can hardly diversify their activities between different companies, shareholders are in a much better position to bear the risks by pooling them across a multitude of assets, sectors and countries. The most extreme macroeconomic shocks cannot be eliminated, but shareholders are handsomely remunerated for bearing this risk, at around 6% per year over the past century.

In the case of covid-19, the direct replenishment of companies' equity is therefore much less justified than the replenishment of household income. Financial markets must play their role as risk absorbers. Only the risk of insolvency and loss of industrial knowledge can justify a state bailout of companies.

French savings

In France, individual shareholding is relatively underdeveloped, which implies that this shock-absorber role remains ineffective. This will force the State to use more public money to stabilize our economy and to insure workers, especially as a tax advantage is offered on the French people's preferred savings instrument, life insurance in euros. However, this policy offers a 100% guarantee on the capital invested, for a total of around €1,400 bn, so French people's savings do not shoulder any of the collective risk. In France, more than elsewhere, it will therefore be the State that suffers most of the losses. This contractual guarantee leads insurers to invest in risk-free assets, which essentially no longer yield any return. All this is also lost for the financing of our companies. The new PACTE law is unlikely to change much in this worrying landscape.

The pension system must share risks between generations. Under the veil of ignorance, everyone would prefer to live in a world where shocks are borne equally by all. In the points-based pension system, it would make sense for the value of the point to fall temporarily as workers suffer the violent shock of covid-19, especially if they are not fully compensated by the State.

Research highlights



The leverage delusion: All that glitters is not gold

Do we know how wealthy we are?

Tiziana Assenza

Many of us are mistaken about how rich we are. In a new paper, Tiziana Assenza and her coauthors find that our struggle to correctly assess our own wealth occurs even in a controlled environment where values are risk-free and unaffected by price variations. Their empirical results suggest that those of us who misperceive wealth have lower levels of cognitive ability and attention, and are more likely to borrow and spend.



Tiziana Assenza

Many theoretical and empirical studies in behavioral economics show that individuals frequently fail to correctly evaluate their income or net wealth, both in absolute terms and relative to others. Wealth misperception may be due to many reasons, from money illusion (which leads individuals to confuse the face value of money with its real purchasing power), to different expectations about future earnings.

Can wealth misperception also arise in the absence of “frictions” such as probabilistic attributes, money illusion, uncertainty or heterogeneous beliefs? If so, what lies at the root of misperception in a frictionless environment? To address these questions, Tiziana and her coauthors conduct a lab experiment consisting of different tasks and a survey

Leverage bias

In the first task, each subject is shown pairs of financially equivalent balance-sheet profiles that have the same net worth but different levels of assets and liabilities. Subjects are asked to compare the profiles in each pair based on their perceived financial soundness, a proxy for perceived wealth. Importantly, the experimental environment is free of any distortions because both assets and liabilities are non-interest bearing, financially certain, risk-free and predetermined. Hence, a rational, unbiased subject should perceive the profiles as fungible (or interchangeable) and associate the same level of wealth to both.

Standard consumer theory predicts that a rational individual treats money as fungible – a dollar is a dollar – so the composition of the balance sheet is irrelevant for perceptions,

preferences and choices. Surprisingly, Tiziana and her colleagues find that more than 80% of their subjects perceive one of the equivalent portfolios as financially superior – a substantial departure from the theoretical benchmark. Of all possible answers, the one associated with the largest probability of bias (roughly 70%) is the one corresponding to a preference for profiles with greater asset-debt ratios, both when net worth is positive and negative. The researchers label this prevailing pattern as the leverage bias.

In a second task, subjects have to simultaneously grade the financial soundness of 10 balance-sheet profiles with the same net worth but different levels of assets and liabilities. The researchers find a strong positive correlation between the asset-debt ratios of the profiles and the average grades assigned by biased subjects.

Thinking fast and slow

The researchers then use incentivized tasks and a set of questions to evaluate possible explanations for leverage bias. They first elicit individual risk preferences using a standard multiple price list method structured as a game of 10 rounds. To test the role of financial education, the selection process is designed to identify subjects with financial training while information on credit-card ownership serves

as a proxy for financial experience. But the researchers’ results do not support explanations related to risk preferences or financial literacy: even financially educated subjects exhibit the same pattern of answers.

Instead, Tiziana’s analysis suggests that wealth misperception may be explained by differences in the way we think. To measure subjects’ cognitive sophistication, the researchers introduce an incentivized version of the Cognitive Reflection Test (CRT). Developed by psychologist Shane Frederick (2005), this test evaluates subjects’ ability to override an incorrect ‘gut’ response and engage in further reflection to find a correct answer. To adopt the terminology of dual-process theory, CRT assesses the balance between two ways of thinking: System 1, which is fast, automatic and spontaneous; and System 2, which is analytical, deliberate and takes up a great deal of attention.

The researchers’ results show that subjects with the leverage bias perform significantly worse in the CRT compared to unbiased subjects. This implies that the misperception of wealth is related to a predominance of intuitive, inattentive, System 1 thinking.

Hey, big spender!

Tiziana’s research suggests that leverage bias can be hazardous to our financial health. Responding to survey questions, subjects liable to wealth misperception are more comfortable with the use of credit to finance consumption and to deal with financial emergencies. They are also more likely to borrow under financial profiles characterized by higher asset-debt ratios, while unbiased subjects make borrowing decisions that are neutral to the composition of the balance sheet. Biased subjects have larger average propensities to spend, and are more likely to increase spending after unexpected gains.

In the last part of their paper, the researchers build a model with two types of agents: (I) a standard rational agent; and (II) a behavioral agent who has a mistaken perception of wealth due to inattention and low cognitive sophistication. In line with the experimental results, the model shows that the biased agent has a greater propensity to consume and lower debt aversion than the rational agent.

Research implications

The researchers’ results suggest that removing potential sources of frictions may not be sufficient to prevent the formation of biases that, through our misperception of wealth, can impact spending and borrowing behavior. Similarly, greater financial literacy or experience with basic financial instruments do not have any impact on wealth misperception and the associated consumption and debt decisions.

Further research should investigate whether the correlation between low cognitive abilities and the greater probability of being biased may be related to the presence of cognitive load that temporarily limits attentional resources at the time of perception formation and decision-making. The presence of a cognitive load creates a tax on the brain that produces limited bandwidth and attention, and it is also associated with poorer financial decisions.

Summing up

Tiziana and her coauthors show that, contrary to standard consumer theory, financially equivalent balance-sheet profiles may not be perceived as interchangeable in a controlled ‘frictionless’ environment. For a large majority of subjects, a greater asset-debt ratio implies greater perceived wealth. The predominance of this bias is explained by low cognitive sophistication and inattention. Biased subjects are found to be less patient, less debt averse, and more likely to spend. This research appears to be the first experimental evidence that ties cognitive sophistication and attention capacity to the perception of wealth and, consequently, individual decisions to consume and borrow.

“Leverage bias can be hazardous to our financial health. Subjects liable to wealth misperception are more comfortable with the use of credit to finance consumption and to deal with financial emergencies. They are also more likely to borrow and spend.”

Find out more

Read *‘Perceived wealth, cognitive sophistication and behavioral inattention’* by Tiziana Assenza at: www.tse-fr.eu/people/tiziana-assenza

For a range of different perspectives on wealth misperception, see:

- *‘Money Illusion’* by E. Shafir (1997),
- *‘Better Off Than We Know’* by J. Chambers (2014), and
- *‘(Mis)perceptions of Inequality’* by O. Hauser (2017).

Did the banks get fixed?

Fabrice Collard

The combined economic impact of banking reforms that followed the 2008 financial crisis remains largely unknown. In a new paper, TSE researcher Fabrice Collard and his co author Frédéric Boissay use a simple model to analyze the interaction of liquidity and capital regulations, revealing powerful feedback effects and synergies.



Fabrice Collard

In the wake of the Great Financial Crisis (GFC), the Basel Committee on Banking Supervision agreed on a new regulatory framework ("Basel III") that features both capital and liquidity requirements for banks. The overall economic effect of those reforms has since been debated, with long-run estimates of their impact on GDP varying widely. This variation reflects the difficulty of assessing the net effect of multifaceted reforms that operate through complex transmission channels.

It is generally agreed that capital and liquidity requirements can force an individual bank to internalize the adverse consequences of its excess leverage or a maturity mismatch. But the overall benefit for the economy can be reduced if the requirements interact in unexpected ways; or if their combined effects are more stringent than intended. So far, economic research has remained silent about these issues, mostly focusing on the effects of capital regulation alone.

The aim of Frédéric and Fabrice's paper is to study the transmission channels of multiple banking regulations, and to offer some guidance for the design and coordination of such regulations. To do so, they develop a general equilibrium model, in which minimum capital and liquidity requirements alleviate frictions in interbank funding markets. They use the model to study the transmission channels and interactions of these two regulatory requirements, and to devise the optimal regulatory mix.

Skin in the game

In the researchers' model, households lend to firms indirectly through banks. Firms differ in their productivity levels, and banks can only access specific and distinct pools of firms. Interbank funding markets facilitate the migration of funds from banks with low-productivity firms to banks with high-productivity firms, and therefore risk-sharing among banks. There exists an agency problem in these funding markets, though, as contracts are not enforceable and borrowers can abscond and default strategically. This agency problem hampers the good functioning of interbank markets, which sometimes freeze.

Bank capital and liquid assets play their usual role as "skin in the game", meaning that banks have fewer incentives to default when they are less leveraged and more liquid. Liquid assets take the form of loan-backed securities that banks create endogenously. Those securities bear a relatively low return, but can be pledged as collateral for borrowing. Bank equity is held by the households. Neither banks nor households fully internalize the effects of their funding and investment decisions on the functioning of interbank markets. Banks create too few liquid assets. And households purchase too little bank equity.

Financial stability vs economic activity

To address these externalities, minimum capital and liquidity regulatory requirements are warranted. By requiring banks to reduce their leverage and hold more liquid assets than is privately optimal, regulations support interbank activity and foster risk-sharing among banks. This insulates banks from idiosyncratic shocks, and makes the overall banking sector more resilient to aggregate shocks. When

banks are regulated, interbank market runs ("crises" in the researchers' model) are less frequent. As banks raise more equity, however, their cost of equity goes up, and lending recedes. The regulator must therefore trade off financial stability against economic activity.

With their general equilibrium approach, the researchers' general equilibrium approach unveils powerful macroeconomic feedback effects of regulations. Following a tightening in minimum capital requirements, banks are more willing to lend to each other on wholesale funding markets, and banks' funding constraints relax. As banks do not need as much collateral to raise the same amount of funding, the shadow (collateral) value of liquid — but low-return — assets decreases. Put differently, the opportunity cost of those assets goes up. As a consequence, banks shed liquid assets.

In the model, capital and liquidity have similar effects on banks' incentives and access to wholesale funding. So, although privately optimal, the fall in banks' liquid assets holding reduces the initial benefit of the tightening. This implies that capital regulation is more effective when it is associated with liquidity regulation. Vice versa, liquidity regulation is more effective when it is accompanied by capital regulation. The researchers parameterize their model to match the observed bank capital and liquidity ratios, key interest rates, and frequency and size of banking crises. They then use the model to derive the mix of capital and regulatory requirements that maximizes welfare.

Research implications

This research is connected with several other recent attempts to incorporate banking regulation into general equilibrium models. Of the few papers to study the effects of multiple regulations, only Kashyap et al (2014) analyze how those requirements interact. But in Kashyap's model, crises materialize as traditional deposit-based bank runs. In contrast, Frédéric and Fabrice's model uses interbank market runs, which were a key feature of the GFC.

A central element of the analysis featured here is that banks create liquid assets, by pooling information-sensitive loans into information-insensitive securities. As concluded by studies elsewhere, Frédéric and Fabrice find that it can be privately optimal for banks to engineer such securities. But they also show that banks do not do this enough, and that imposing minimum liquidity requirements is socially optimal. If capital and liquidity regulations are substitutes, then it is clear that banks can get around one of the two regulations. But the result is not symmetric: banks can fully undo capital, but they cannot undo liquidity.

Summing up

Frédéric and Fabrice's paper aims to analyze the combined economic impact of two of the Basel III banking reforms: liquidity and capital regulations. They propose a simple model with standard financial frictions, in order to derive insights that are as general as possible.

This model sheds light on the combined transmission channels of bank capital and regulatory requirements, allowing for discussion of general equilibrium effects, regulatory design issues, how regulations address distinct externalities, and how they should be coordinated.

The general message is that multiple regulations are needed because of (I) different cost; (II) general equilibrium effects (which regulation cannot be perfectly designed to mitigate); and (III) multiple externalities.

Capital regulation is more effective when it is associated with liquidity regulation. Vice versa, liquidity regulation is more effective when it is accompanied by capital regulation.

Find out more

'Banking Regulations: Gaps, Spillovers, Coordination' by Frédéric and Fabrice is due to be published later this year. For more research by these authors, see: www.bis.org/author/frederic_boissay.htm and www.tse-fr.eu/fr/people/fabrice-collard

For other attempts to incorporate banking regulation into general equilibrium models, see **'Capital Requirements, Risk Choice, and Liquidity Provision in a Business Cycle Model'** by J Begenau (2020). For studies of the welfare costs of liquidity and capital requirements, see **'The Macroeconomic Impact of Adding Liquidity Regulations to Bank Capital Regulations'** by F Covas and J Driscoll (2014), **'The Welfare Effects of Bank Liquidity and Capital Requirements'** by S Van den Heuvel (2016) and **'How does macroprudential regulation change bank credit supply?'** by A Kashyap et al (2014).



Outreach

Conferences

A new era: Climate change and finance

Paris, December 13, 2019

Together with Banque de France, ACPR and EconomiX, TSE organized an interdisciplinary conference gathering people from civil society and the business community with academics and central bankers to discuss the challenges that climate change implies for the economy and for central banks.

In the presence of **François Villeroy de Galhau**, Governor of Banque de France, and **Nicolas Hulot**, former French Environment Minister, this event shed light on current policy issues and launched new avenues for future research.



François Villeroy de Galhau



Nicolas Hulot

Christian Gollier addressed key issues at a panel discussion dedicated to the impact of Climate Change.

"How can we adapt our society to meet this unique challenge in the history of humanity? Many of us have not yet understood the need for a cost-benefit analysis of all possible actions. Let's look at the investment in solar panels, and in gas versus coal. We must try to achieve the energy transition with the least sacrifice for the current generation. In Europe, we are not taking the least expensive action, which is to remove coal from the energy mix. We invest in solar panels which cost 50 times more per ton of carbon emissions saved."



De gauche à droite : Claude Henry (IDDRI, Sciences Po), Christian Gollier (Toulouse School of Economics), Alain Grandjean (FNH, Haut Conseil pour le Climat), Emily Schuckburgh (Cambridge), Gilbert Cette (Banque de France) - Modérateur

The TSE Center's inaugural event brought together renowned academics from some of the world's leading universities to interact with high-profile international partners. Over two days, stimulating exchanges and panel discussions were held on topics including the green-energy transition, digital currencies, financial intermediaries and regulation, and the inefficiencies of financial markets.

Green investments

How can we encourage private investment in green energy? What are the challenges for asset managers who want to invest in clean-energy production? These questions were the focus of the conference's first round table involving Diana Philip (*Baillie Gifford*), Frédéric Samama (*Amundi*), and Laurent Clerc (*Banque de France*). The discussion was hosted by TSE vice-president Ulrich Hege.

To ensure large equity investments in green-energy enterprises, investment funds should guarantee good returns for clients and make it clear which companies to invest in, said Diana Philip, Client Service Director at investment management firm Baillie Gifford. At the same time, the government should provide a stable and predictable regulatory regime for investment activities. This will help to convert investors who are focused on "buying and selling pieces of paper" into informed and responsible investors who care about which companies they invest in. But investors must be courageous and able to ignore the short-term noise of the market.

Investments in climate-friendly energy producers have increased significantly during the past three to five years. Frédéric Samama, Deputy Global Head of Institutional and Sovereign Clients at Amundi, Europe's largest asset management company, gave several reasons to explain the growing interest of the private investors. First, the cost of renewable energy used to be quite high, reducing demand and investment. Second, the relationship between climate change and investments has only recently moved beyond the academic world to gain broader public awareness. Last but not least, rising global pollution has increased recognition of the urgent need for green solutions.

New tools for socially responsible investment have been created, such as the Low Carbon Index (LCI) designed by Amundi and based on the MSCI World index. By excluding 20% of stocks from the high-carbon firms, and the largest holders of fossil-fuel reserves, the LCI can reduce carbon intensity by at least 50%, while respecting the sector and geographical profile and minimizing the tracking error compared to its parent index. Today, the value of this technology is estimated at \$15bn.

Central banks and regulators play a crucial role in providing incentives for socially responsible investment. They provide the framework and the rules of the "game", and can use various levers for boosting socially responsible investment. Until recently, climate change was not a key issue for Banque de France, admitted Laurent Clerc, the bank's Director for Research and Risk Analysis, leading to the misallocation of capital as a result of misunderstood risks. This is why, in his opinion, it is essential to improve the governance of risk within



Diana Philip
(Baillie Gifford)

financial institutions and ensure that regulators provide sufficient incentives for green investment.

The European Commission has tried to introduce a notion of a 'green supporting factor' to promote investment. However, as debates continue over whether green investments can be as profitable as non-green ones, the authorities have struggled to explicitly formulate the meaning of the green supporting factor and to introduce it into policy. Moreover, it is still not clear if the central bank should consider green investments when evaluating efficiency of management.

In response to a question from the audience, Laurent Clerc suggested that the transition to greener energies will cost €1.5 trillion per year, mainly devoted to developing different "green supporting" policies, even though the money already circulating in this sphere is immense. However, it is still not clear how the costs will be shared between private investors and the central bank.

Frédéric Samama also discussed how risk sharing could boost green investment in emerging markets. Investors from developed countries are often reluctant to invest in green projects in developing countries, due to fears of greater risks and lack of knowledge about local infrastructure systems. In cooperation with the International Finance Corporation, Amundi hopes to alleviate the risk by using local banks as an intermediate connection point of investment flows between two groups of countries and to buy labelled green bonds issued by those banks. For investors, the bank unit is less risky than lending directly to companies. Due to the investment inflow, the local bank can lend money to climate-friendly companies with lower interest rates, thus providing more possibilities for growth and development. This program, launched in 2018 under the name of "Amundi Planet Emerging Green One", won the Environmental Finance Bond Awards in 2019.

Digital currencies

Should cryptocurrencies and blockchains play an important role in financial markets? Yesha Yadav, a lawyer and law professor (*University of Vanderbilt*), and Rod Garratt, an economics professor (*University of California, Santa Barbara*) were invited to discuss the development and regulation of digital currencies for the conference's second round table. Bruno Biais, professor of finance (*HEC Paris*) and an associate member of the TSE Sustainable Finance Center, served as moderator.

The banking sector has seen a massive structural shift during the past 10 years, transforming personal and local operations to a highly digitized banking system. Risks can be extremely damaging in this innovative system, said Yesha Yadav, pointing to how the recent failure of NatWest Bank's smartphone application panicked its customers into a rush to get their money out. A specialist in financial and security regulation, she underlined that regulation has been key to designing the architecture of the banking system, and it is still badly needed today. The challenge for regulatory authorities is to anticipate the changes that are coming, especially as digital currencies become the norm. Will we be able to run to our bank to get our money in a cash format if a problem occurs?

Yesha Yadav
(Vanderbilt University)



There is room for optimism that bank runs will become less frequent, as coding will be able to store data in a more distributive fashion and allow one's assets to be traced more precisely. On the other hand, banks might still suffer from a liquidity crunch, as customers will easily be able to transfer money from one bank to another bank or cryptosystem. The biggest risk, though, is an operational one. In a digital landscape where currency is code, we are incredibly susceptible to a failure in code. A major challenge for central banks is to know how to deal with this kind of operational risk and protect the code that governs the monetary system.

The role of private industry is another interesting point. To what extent can banks spread digital currencies across our national financial systems? If 40% of the US population today does not have a bank account, the vast majority of them have a Facebook account. And like other private firms, Facebook is about to issue a cryptocurrency: Libra. Should private enterprises such as Google, WeChat, Amazon, or Alipay, whose vast networks are key to connecting their business to the public, should play a role in insuring the velocity of digital currencies? How should regulators respond?

Rod Garratt has done prominent work on digital currencies, technologies and settlements. As a former vice-president at the Federal Reserve Bank of New York, he brought an insider's view of the role of central banks in the digital era. Should central banks issue their own digital currencies?

Central banks' money is already digitized, even though it is only accessible to financial institutions. Making the distinction

between wholesale Central Bank Digital Currency (CBDC) for retail purposes and digital currency for technical or regulatory purposes, one might wonder whether central banks' mandate would allow the issue of a digital currency for general use.

The Federal Reserve, like most other central banks, was originally created to ensure good currency management and a healthy economy. However, major financial crises have shown the impossibility of respecting such mandate. Over time, the role of central banks has expanded, and now includes securing the payment system, in addition to insuring solvency of the banking system and responsibility for some economic dimensions such as growth. Safety, efficiency and access are central to the role of central banks.

Should central banks issue digital currencies, or should they support commercial banks and private sector's digitization process, limiting their own role to that of a regulatory authority? Privacy concerns are among the many challenges and the debate is still ongoing.

The participants emphasized the importance of trust in the banking system. Central banks cannot always be trusted. Mistrust in "traditional" institutions has been a plausible cause of recent financial disasters in countries like Zimbabwe, where the independence of the central bank is in doubt.

But problems of trust are particularly acute for digital currencies. Doubts remain over security strategies such as the distributive ledger for Bitcoin. Will financial actors sign up for a decentralized system where there is "no one behind" to check for proper risk management? The alternative option of the permission blockchain system, where only pre-authorized people are able to operate, has not yet been realized. It faces problems of latency and may only be available at a small scale, violating the basic principle of the network effect of a currency.

However, even though digitization seems to suffer from trust issues, it is not clear that customers and financial actors will return to old-fashioned ways and stick to traditional banking institutions. New generations are now accustomed to innovative financial systems, and are increasingly willing to manage their expenses online. In some emerging countries like China, whose financial system evolved incredibly fast, traditional alternatives are not always easily available.

Digitization does not prevent the need for a regulated, reliable system in the interests of the public and financial actors. Central banks continue to have a responsibility to anticipate and shape the future of finance.

New risks, new challenges

Sustainable finance has to deal with uncertainty about the impact of global warming as well as the transition risk in developing a green economy. How can we build an environmentally friendly financial system? For the final round table, Kheira Benhami, a member of the French stock-market regulator (AMF), Guillaume Levannier (SCOR), and TSE director Christian Gollier were invited to discuss the evolution of risk management in the context of climate change. TSE's Marianne Andries served as moderator.

Sustainable finance can help society meet the pressing challenges of ecological transition. A specialist in market microstructure, Kheira Benhami emphasized the need to encourage green investments by those who are already sympathetic to this issue, and to promote awareness among other investors. Her role as an AMF regulator is to guide the shareholders toward sustainable assets, helping firms to adopt better practices and to improve the quality of investments. The goal is to bring consistency and to ensure viability for investors. This role can help to counter the impact of 'greenwashing', by which companies can give misleading information about their pro-environment credentials.

Benhami's task is complicated, however, by a disparate regulatory framework which makes it hard to evaluate key issues such as reporting standards and to find relevant data. This framework is shaped by three main texts. First, the benchmark regulation which created two new categories of low-carbon standards, following the Paris agreement. Second, the disclosure regulation, which helps by encouraging the systematic evaluation of the potential negative impact of investment. There are currently two levels of disclosure: one at the entity level and one at the product level. Finally, the taxonomy regulation proposes general criteria to evaluate whether or not actions are sustainable.

The whole insurance system is based upon risk evaluation and the level of uncertainty that can be evaluated. Sustainable Investment Officer at SCOR, one of the world's largest reinsurers, Guillaume Levannier identified the main impacts of climate change on risk evaluation. Physical risks include economic losses caused by natural catastrophes. Transition risks are associated with economic dislocation and financial loss due to the process of adjustment toward a low-carbon global economy. There seems to be a decreasing relationship between those two risks. If there is a huge physical risk, companies facing catastrophe due to climate change will benefit by changing to a more environmentally friendly model. This new green model will reduce its impact on the environment and avoid losses in the long run. Thus, the transition risk will become lower than the physical risk.

Christian Gollier is an expert on the economics of climate change and long-term investment. Although he is impressed by the public and political pressure on the financial system to find solutions to the climate change issue, he does not think that sustainable finance is the best answer. As he explained in his book *Le climat après la fin du mois*, governments must implement an accurate carbon price. Pricing externalities accurately will allow the market to reach the optimal solution. By establishing a Pigouvian tax on outputs causing CO2 emissions, the problem would be solved just by letting people maximize their utility. The main problem of sustainable finance is the extreme mobility of investments. If one country creates regulation to promote green investments, it is easy for some



Guillaume Levannier (SCOR)

investors to move their investment from this country to another. This carbon leakage is already a big problem in the carbon tax system, but it is more complicated for a company to move its entire production system than for an investor to move his investment funds.

Financial capital might be too volatile to consider sustainable finance as the best answer. In the tobacco industry, divestment did not reduce consumption as much as the increase in the price of cigarettes. According to the TSE director, if a coalition with enough influence established a €40 carbon tax, the coal industry would be replaced by the natural gas industry. However, to make solar and wind energy more competitive and eliminate fossil fuels altogether, the carbon tax should be around €300 to €400. Taxonomy regulation is too radical, he believes, and cannot reflect the complexity of nuclear and other energy sources. The debate around nuclear energy in Europe will be conducted by France and Germany, which have opposing positions on that topic.

Total and Microsoft are already using an implicit carbon price when they take strategic decisions. What if bankers directly compute carbon prices and environmental impacts for companies they work with? The investor would have all available information on companies, especially in terms of the environmental footprint given directly by the bank or investment group. However, Benhami pointed out the difficulty of computing this price, and doubts the bankers could do it. For her, providing good information is still the most important action for improving sustainable investment.

This debate demonstrated the challenges of finding solutions to climate change. Is sustainable finance enough? Are its effects significant? Will we achieve the necessary levels of international coordination? Over the global warming tipping point of 4°C, the world appears to be uninsurable because of almost certain physical damages; risk pooling would no longer be possible. How can we regulate markets in such an environment? Such questions are the main focus of the new TSE Sustainable Finance Center. It shows the willingness of the university to confront climate change with multidisciplinary research.

Seminars

The Center organizes weekly academic seminars allowing the faculty and members to meet with and exchange ideas with fellow financial experts, often from renowned universities like Boston, Duke, LSE, and Oxford.

Seminars are also an opportunity for PhD researchers to get insightful information on various topics such as:

- Bitcoin
- Venture capital
- Crypto economics
- Banking crisis
- Liquidity management

List of speakers

- William Cong (*Cornell University*)
- Michaela Pagel (*Columbia University*)
- Boris Vallee (*Harvard University*)
- Vladimir Vladimirov (*University of Amsterdam*)
- Ming Yang (*Duke University*)



Media



Interviews

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Marie-Françoise Calmette
Challenges, April 30, 2020
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Jean Tirole, Paris Match, April 18, 2020
- *Les pays de l'UE ne sont pas assez unis pour faire face à une attaque de la zone euro*
Jean Tirole, Paris Match, April 16, 2020
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Jean Tirole, CNBC, April 3, 2020
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Christian Gollier, France 3, March 19, 2020
- *Macron met la France en état de guerre*
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- *Pourquoi le gouvernement repousse la privatisation d'Aéroports de Paris*
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- *Les jobs de demain - Analyste extra-financier*
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Jean Tirole, Sohu, December 13, 2019
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TSE Debate, March 22, 2020
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