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SUMMARY OF REMARKS BY **JEAN TIROLE**

Presented by Antoine Chapsal (Analysis Group)

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Nobel Memorial Prize in Economic Sciences
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ANTOINE CHAPSAL

Allow me to interrupt your discussions for a moment to thank you once again for coming in such large numbers this evening. I would like to thank the Minister in particular for accepting our invitation and for placing the debate that preceded this dinner in a slightly broader and more political context as well. I would like to thank once again the Advocate General and the President of the Competition Authority.

Dear Jean, it so happens that it is up to me to present your immense career and your colossal work in five minutes, as I was asked. Having been in this business for fifteen years, I am of course used to short deadlines but even the Nobel Committee, which awarded you its prize in 2014, explained that it is "difficult to do justice to the immensity of Jean Tirole's work in a few paragraphs." You have written more than 200 articles in the most prestigious economic journals, and we are of course aware of your work on the regulation of natural monopolies in the presence of information asymmetries where companies must have the right incentives. We know about your work on two-sided markets, their functioning, their specificities and their implications for competition policy. We could also mention your work on intellectual property or on vertical restraints, and this is only a small part of your work. I had an economics professor in London who explained that if we had a problem in microeconomics, all we had to do was go to this thing that was a little new at the time called Google, type "Tirole" and that was that. He was not wrong. In fact, all your work truly provides fundamental tools to understand both the functioning of markets and the recurrent financial turmoil that is shaping our global economy.

You have also written – and I am an avid reader of them – dozens of books that immediately became references in game theory, incentive theory, industrial economics and finance, and I must say that these are much more than just textbooks that we consult because we forget the important results of economic theory. They are really books that have fundamentally structured our discipline by synthesizing in an admirable way a literature that was extremely vast and until then completely disorganized.

Finally, I must confess that you did something in your career that has always seemed extraordinary to me. In 1992 when you were already considered one of the most brilliant economists of your generation, you decided to leave the prestigious MIT Economics Department to go to Toulouse to develop, with Jean-Jacques Laffont, the Institut d'économie industrielle. Frankly, leaving MIT to develop a research institute in France–particularly the somewhat neurasthenic France of the early 1990s which was even more refractory to change and innovation than it is today–seems completely crazy. You have made Toulouse one of the best economics departments in the world. Not only have you created an exceptional department, but you have developed something completely novel in the French academic world, namely the use of private funds to finance scientific research of the highest caliber.

So I don't know if these few elements of such a dense biography will be enough to reflect your prestige, but it is with emotion, pride and profound thanks that we count you among us tonight.

Thank you very much, thank you all and have a very good evening.

JEAN TIROLE

Thank you, Antoine, for these very kind words. I would like to point out, however, that the history of the economics department of the University of Toulouse is a story of friends and entrepreneurs who have decided to change the French university institutions, albeit on our small scale. This is really a group effort. I am very happy that Christian Gollier, who is the director of TSE, is here this evening. I realize that I am the last obstacle between you and the main course, and I guess that is why Antoine Chapsal and Pierre-Yves Cremieux asked me to talk about industrial policy, to do a little bit of provocation before an audience of competition law experts.

I will talk about industrial policy and give you my opinion on it motivated by the commonplace observation that France and Europe are becoming digital colonies (we could also apply this to life sciences, unfortunately). This is despite a very important potential: we have the talent, so it is a pity that we are losing the war in essential fields such as the digital economy and life sciences. As [Fields medalist and MP] Cédric Villani stresses in his report on our digital future to the French government, the quality of research in France in maths and computer science is excellent. There is obviously the problem of the brain drain – the lack of attractiveness of the French university that makes people leave. This is a qualitative rather than a quantitative issue as it is often the best who leave, and it has two major impacts. The

brain drain sacrifices future generations of students who lose the potential for top-notch training, but we also lose excellent students who could build start-ups and create jobs in our country. There is also very little involvement of academics in the economics world in start-ups. This is all really harmful, and among the twenty largest technology companies in the world, eleven are American and nine Chinese. Not a single one is European.

Many people now argue that we need to engage in industrial policy, and I would like to talk to you about that. If we want to undertake industrial policy, the first thing to do is to ask ourselves the following question: what is the market failure, what are we trying to do, what problem are we trying to solve? And once it has been established that there is indeed a problem, what policy should be followed? Here I would like to distinguish between two types of policies. The first type is non-targeted policies: generalist measures in which you don't choose a winner or a loser. The second type is targeted policies: industrial policies targeted at certain sectors, certain technologies or even certain companies.

Non-targeted policies include R&D subsidies in general; the evidence is that there is too little R&D, even though not all R&D is necessarily good. Earlier in the panel we discussed the fact that innovators who produce imitative innovations and who then sell to the incumbent create little social surplus, so not all R&D is necessarily good. But having said that, all economists agree that there are technological externalities, i.e., the positive spillover effects on other companies. There are different estimates of these technological externalities that justify R&D subsidies – they are very difficult to estimate precisely. For those of you who like technical articles, there is an excellent article by N. Bloom, M. Schankerman and J. Van Reenen from 2013 in which they estimate these externalities of spillover quite cleverly; they find that the level of socially optimal R&D research is more than twice the private level. That of course does not mean that we should throw public money at R&D activities in arbitrary ways. Bloom et al. also have a surprising conclusion: small companies exert lower R&D externalities than large companies, because they are often in technological niches and their increased knowledge does not benefit everyone.

A second example of a non-targeted policy is the imposition of a carbon cost, whether it is a carbon tax or tradable emissions permits; this approach reflects the hostility of many economists to the so-called administrative / command-and-control approach, the vision according to which the state can choose which technologies will be the winners, which companies must reduce their pollution, etc. The view of the vast majority of economists – and Christian Gollier has worked in a very interesting way on this subject – is to note that command-and-control suffers from hubris – the state does not have the required information. Rather, the state should, by creating a carbon cost, let a hundred flowers bloom, let a hundred schools compete, and let the market decide on the most efficient way to achieve the environmental goal. The state should just put proper incentives in place. Finally, aid to SMEs is sometimes also a non-targeted policy.

Are targeted policies (industrial policy) desirable? The arguments in favor, based on network effects and cluster effects, are strong: the sharing of infrastructures; the exchange of information (some of you may have read Annalee Saxenian's book *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* – sorry for our friends in Boston and those who love Route 128, but Saxenian's book describes how Silicon Valley succeeded in part because of the exchange of information, creating a very open environment); a local labor market facilitating mobility. (In France, we often ignore that many start-ups are bound to fail, which creates a problem for the labor market since employees of failed start-ups will want to find work nearby.) These cluster and agglomeration externalities are important, but are not the only reason for industrial policy. For example, being from Toulouse I cannot fail to mention Airbus. There, the motivation for industrial policy was the reduction of Boeing's market power. If Airbus had not been built, Boeing could have exercised its full monopoly power and demanded exorbitant prices for its aircrafts. Airbus has allowed airlines worldwide to buy low-cost aircraft and air transport to expand. Indeed, Airbus is a global public good. In other words, it benefits not only Europeans but also all the countries in the world that can put Airbus and Boeing in competition. One of my colleagues from TSE, Paul Seabright, together with Damien Neven, showed this twenty years ago. This is another reason but a little different from the traditional reasons for clusters.

If the reasons for having an industrial policy are very strong, why is it that most economists are so unenthusiastic about it? A cliché is "the state picks the winners and the losers pick the state." Those who don't like industrial policy can give examples: Concorde, Thompson, the French industrial innovation agency... It's a little anecdotal and not very scientific, because one can also cite success stories.

There are two dangers with a choice by the state of targeted policies: first, it is the lack of information, since making the right choice requires being well-informed about which industries and which strategies will work. The second hazard is the capture of the state – think, for example, of the contaminated blood scandal. (There was a desire to protect French industrialists who were trying to catch up.) And often there is a little bit of both! I personally attended meetings of committees drawing industrial policies, and the pattern of involvement of the members of these committees can be frightening. That is, everyone, including myself, was pleading for their own chapel and had no idea what was going on outside their own field. We had little information, and certainly no evidence; it was like all the lobbies meeting to try to get their plan through.

That said, there are also successes and I will come back to these successes. But whether you want industrial policy or not, you will get some. The question is then: if you do have industrial policy, how do you do it? And I would like to give you eight tips for doing industrial policy in an intelligent way, whether you like [industrial policy] or not.

RECOMMENDATION 1:

Identify the failure of a market to better respond to it.

RECOMMENDATION 2:

Use independent and qualified expertise to select projects that receive public funds. That is, use indisputable experts who are as independent as possible. DARPA, which was the US agency working with the Department of Defense, did some absolutely remarkable things. Most of the technologies Apple uses today come from the 1960s, 1970s, research work done at DARPA. The Internet and many other things also come in part from DARPA. DARPA has used very high-level managers with a lot of autonomy and short contracts of four to six years.

Other examples of successful industrial policy are research funding agencies when they use the best practices: the European Research Council in Europe, the National Science Foundation and the National Institute for Health in the United States. Expert panels decide on the research grants. The system works very well.

RECOMMENDATION 3:

Pay attention to supply and not just demand. In France everyone wants their own cluster, to work on the energy transition, nanotechnologies, etc. There is a demand, and this demand is not illegitimate. The question we rarely ask ourselves is whether there is the supply, the complementary skills that will make it happen. For example, you need talent; if the cluster does not have top-level scientists who will get things started and attract

the high-level students who will build start-ups, it will be very hard for it to succeed. I call it the "field of dreams mentality." For those who have seen this film, *Field of Dreams*, the main character, played by Kevin Costner, builds a baseball field in the middle of nowhere and imagines that the great players will come. We are building large buildings and we hope that the great scientists will arrive. That's not how it works in reality.

RECOMMENDATION 4:

Adopt an industrial policy that is neutral in terms of competition. Industrial policy must not distort competition among companies. For example, one of the usual fears is that the industrial process will be captured by large companies, while innovations often occur in small companies which are not afraid of cannibalizing their own products. Industrial policy, if captured by big companies, will not work.

RECOMMENDATION 5:

Do not prejudge the solution. Again, the example of DARPA is telling: DARPA decided to mix funding to industry and to universities. (For example, DARPA funded the development of computer science departments in the United States, so all these major departments of computer science and information science actually come from funding from the Department of Defense.) DARPA gave clear objectives for research and development, but it did not impose any straitjacket. It set objectives but did not prejudge the solution. DARPA also did not make artificial distinctions between basic and applied research.

RECOMMENDATION 6:

Evaluate ex post and disseminate the results of this evaluation. In particular, give yourself the ability to close the program through a sunset clause. There is a difference between the public and private sectors: The public sector often does not know how to stop projects that do not work. And it is very important to free up funding for new projects when a project does not work.

RECOMMENDATION 7:

Involve the private sector in risk-taking whenever possible. This helps to avoid white elephants.

RECOMMENDATION 8:

Strengthen our universities, but not in just any way. It is true that French universities have too little money, but it is not only a question of money. We must stop sprinkling funding around; there can be no extra money without meritocratic governance. Otherwise, the extra money given to universities will be wasted.

Again, I'm quoting the American model – it's quite strange to find the United States as a model of industrial policy – but the NIH inventions are used by big pharmaceutical companies; similar things can be said about the NSF (Google has used the inventions of the NSF) or NASA (Elon Musk's SpaceX and Jeff Bezos's Blue Origin are using NASA's inventions); we already mentioned DARPA and all its inventions. It is really important to understand that behind these achievements, a good governance has enabled these organizations to deliver good research.

CONCLUSION:

Industrial policy, if we do it well, can be useful. As I have discussed, political will to enforce best practices is essential to its success, though. And of course there are complements to industrial policy. We discussed today what to do with GAFA, so instead of saying we're going to build a new Google – which is impossible – perhaps we should start with competition law. We need to think about data ownership a little more seriously. There are many other subjects – such as the protection of the citizen and privacy – which often collide with competition law. The Minister also mentioned taxation. There is also a need to improve the quality of higher education and research, to promote entrepreneurship within the university, and to simplify the legal framework for innovation. I was reading an article that talked about sixty grant offices for R&D subsidies in France, which does not even include European or local subsidies; regardless of the exact number, it's clear that there are too many of them. Like with researchers in the academic world, we transform companies into grant hunters to assemble small budgets. As usual, the quality of governance is paramount.

Thank you very much for your attention. ■