THE REALITY OF PRECAUTION

COMPARING RISK REGULATION IN THE US AND EUROPE (ED. J. WIENER, M. ROGERS, J. HAMMITT AND P. SAND)

Elvire Fabry | *Senior research fellow at Notre Europe – Jacques Delors Institute*

Giorgio Garbasso | *Research assistant at Notre Europe – Jacques Delors Institute*

This Synthesis underlines the main arguments of the book *The reality of precaution. Comparing Risk Regulation in the United States and Europe*, which shed light over the claims of a more precautionary Europe. The book proves that these claims are largely based on stereotypes and generalisations. The reality of precaution is not one region being more precautionary than the other but a scenario of occasional and selective application of precaution to different risks in different places and time.

Is the EU more precautionary than the US?

The aim of the book *The reality of precaution. Comparing Risk Regulation in the United States and Europe*[1], a research study led by two Americans (Jonathan B. Wiener and James K. Hammitt) and two Europeans (Michael D. Rogers, and Peter H. Sand), is to **shed light over the claim of a more precautionary Europe**.

Is it true that the European Union is more precautionary than the United States? This question is at the centre of the debate surrounding the Transatlantic Trade and Investment Partnership negotiations. Claims of a more precautionary Europe revamp fears that a trade agreement with the United States, involving regulatory convergence, may imply deregulation of European norm protections.

There is a general perception in public opinions that "Europe is more precautionary, more regulatory, more environmentalist and more risk adverse than the United States". Americans are allegedly individualistic, risk-taking and confident that technology and the power of market will solve every problem. Europeans have an *ex ante* control culture, Americans an *ex post* one. The EU formally endorsing the precautionary principle would seek to proactively regulate risk while the US, opposing the precautionary principle would wait for evidence of actual harm before regulating.

The book proves that these claims are largely based on stereotypes and generalisations. The reality of precaution is not one region being more precautionary than the other but **a scenario of occasional and selective application of precaution to different risks in different places and time**.

1. The evolution of risk regulation in the EU and the US

Different accounts compete to determine the history of regulatory precaution in Europe and the United States. The c**onvergence scenario** is driven by globalisation and the pressure to harmonise standards. The **divergence scenario** advocates increasingly different regulatory cultures and regulatory competition between the two regions. The "**flip flop**" theory asserts a broad shift in internal politics and international rivalry. And finally the "**hybridisation**" theory suggests that the exchange of ideas, regulatory collaboration and borrowing of regulatory solutions to specific risks has led to the interweaving of diverse transatlantic regulatory systems.

The "flip-flop" leading theory in transatlantic relations has been put forward by David Vogel[2]. It posits that from the 1960s to the mid-1980s the regulation of health, safety and environmental risks were generally stricter in the United States. However since the 1990s the positions have been reversed. Europe has become more precautionary on specific risks such as genetically modified foods, chemicals, and climate change.

The position advocating for a more precautionary Europe is essentially based on this restricted list of examples and the formal adoption of the precautionary principle in the European Union treaties. In its landmark Maastricht Treaty of 1992, the EU expressly provided that its environmental policy "shall be based on the precautionary principle". Further treaties have expanded the scope of application of the precautionary principle to other policies than the environmental one. The European Union had also strongly promoted the adoption of the precautionary principle in multilateral agreements like the United Nations Conference on Environment and Development (UNCED) of 1992 (Rio Conference)[3].

Therefore claims of a more precautionary Europe, like in the flip-flop scenario, are based on few celebrated examples from a narrow and insufficiently representative selection. The extensive comparative work of the 27 European and American experts in *The reality of precaution*, is based on a new qualitative and quantitative methodology which leads to different conclusions.

The researchers have expanded the number and diversity of qualitative case studies to risk connected to food safety (genetically modified foods, beef hormones, mad cow disease), air pollution, climate change, nuclear power, tobacco, chemicals, marine and terrestrial biodiversity, medical safety, terrorism and precaution embodied in risk information disclosure and risk assessment systems. In addition to detailed case studies, they also presented a broad quantitative analysis of specific precaution based on a sample of 100 risks drawn from a dataset of nearly 3000 risks from the 1970s up to 2004 in both the United States and the EU.

Although the US does not formally endorse the precautionary principle, it has fully adopted precautionary approaches since the inception of the concept. Conversely, the EU does not always adopt a precautionary approach although it has adopted the principle in its treaty. The book proves that the application of precaution follows a much more complex pattern than one of convergence, divergence or flip-flop. **The hybridisation scenario takes better account of the reality of precaution**.

2. Quantitative analysis

To guard against the selection bias and its logical conclusions the researchers combined with the expanded qualitative case study a **broad quantitative analysis that is more representative of the full universe of risks**. The quantitative research project proceeds as follow: first a pool of researchers attempted at detecting the most exhaustive list of all possible risks in the EU and the US over the period ranging from 1970 to 2004. They draw a final list of 2878 risks.

The risks were selected mainly from the scientific literature on risk perceptions but also from risk regulation literature and selecting risks lists produced by scholars, governments, think-tanks and advocacy groups from both Europe and the US. To determine which polity, the EU or the US, is more precautionary they measured the level of precaution using the criteria of earliness and stringency. The closer the weighted score gets to +1 the more the European regulations are stringent, and the closer it gets to -1 the more the American regulations are stringent. Being the process of assessment of risk regulation to each perceived risk a daunting and time-consuming tasks, the researcher's chose a random selection of 100 risks out of the list of 2878 risks.

As the table below illustrates, the results suggest that the degree of precaution exhibited in European and American risk regulation is very similar. Averaging across the 100 risks sample in a 35 year period, there are 36 risks that show greater US precaution and 31 risks that show greater EU precaution. **In the quantitative analysis the authors find no difference in relative precaution**.

FOR 100 RISKS	WEIGHTED SCORE
Greater U.S Precaution (36 risks)	
Sake	-0.67
Vaccination – side effects	-0.57
Smoking regulations	-0.51
Pot smoking	-0.50
Carbon monoxide	-0.38
Snowboarding	-0.34
Burglary	-0.33
Disaster preparedness	-0.33
Dredging and dredge disposal	-0.33
Food coloring	-0.33
Genes – defects predisposing to illness	-0.33
Air pollution	-0.33
Smog	-0.33
Polyvinyl chloride – living nearby	-0.30
Charcoal-broiled steak	-0.29
Radiation therapy	-0.28
Roller coasters	-0.26
Amusement park rides	-0.26
Circuses and amusement and theme parks	-0.26
Sulfur dioxide	-0.22
Occupational carcinogens	-0.19
Snowmobiles	-0.18
Industrial chemical release	-0.16
Unsuitable eating habits	-0.14
Shortage of medicines	-0.14
Neurological malfunction	-0.13
Nitrocompounds – aromatic	-0.13
Woodworking	-0.12
West Nile virus	-0.11
Train accident	-0.10
Laboratory worker	-0.07
Work at high altitudes	-0.07
Caffeine – chronic effects	-0.06
Health care facilities and services – exposure to physical agents	-0.06
War and terrorism	-0.04
Aviation – commercial – noise	-0.01

FOR 100 RISKS	WEIGHTED SCORE
Greater European Precaution (31 risks)	
Liquid propane train	0.04
Workplace violence	0.04
Motor vehicle traffic	0.06
Mononucleosis	0.10
Hexachlorophene	0.11
Horse riding – falls, including racing	0.11
Forestry	0.14
Rubber manufacture – ergonomics	0.20
Jewelry	0.21
Biotechnology – ingredients in products	0.29
Genetic manipulation – animals	0.29
Deliberate release of genetic engineered organisms	0.29
Genetic engineering	0.29
Cognitive disorders	0.31
Stone quarries	0.33
Formaldehyde – workers	0.37
Nonpoint-source discharges to surface water	0.41
Flooding of dikes	0.50
Sea level rise	0.52
Timber preservatives	0.52
Nuclear weapons – test	0.61
Sleep	0.63
Ergonomics – sleep deprivation	0.63
Occupationally acquired infection of the lung	0.63
Ammonia	0.67
Childbearing	0.67
Anti-ballistic missile	0.67
Automobile – bicycle accident	0.67
Highway safety	0.67
Drinking and driving	0.83

Equal precaution (21 risks)	
Transportation noise	-0.00
Airport and flight control	-0.00
Aviation – commercial – crashes	-0.00
Submarine – accidents	-0.00
Bus - transit	-0.00
Aerospace manufacturing and maintenance – environmental and public health issues	-0.00
Television	-0.00
Carpet and rugs	-0.00
Metal manufacturing	-0.00
Hasardous response personnel	-0.00
Semiconductor manufacturing	-0.00
Hotels and restaurants – health effects and disease patterns	-0.00
Oil refineries	-0.00
Transport of oil – transcontinental pipelines	-0.00
Sabotage	-0.00

Unscoreable risks (12)	
CEO deaths	-0.00
Engineer deaths	-0.00
Safety and health training	-0.00
Safety culture and management	-0.00
Workplace – performance measures and compensation	-0.00
Rodeo performer	-0.00
Jogging	-0.00
Heat stroke	-0.00
Biological agents – pet hair, skin, and excreta	-0.00
Dieting	-0.00
Termites attacking food crops	-0.00
Social/ethical/cultural impacts of technology	-0.00

3. Qualitative analysis

The expanded qualitative analysis conducted by the research team shows there is no evidence in favour of the claim of a more precautionary Europe. Some risk regulations do indeed reflect greater European precaution since 1990, namely: genetically modified foods, hormones in beef, toxic chemicals and climate change.

However many of their qualitative findings call for greater relative USA precaution since 1990, namely in the sector of fine PM air pollution, smoking tobacco, mad cow disease (especially in blood donations), information disclosure systems, embryonic stem cell research, youth violence, as well as terrorism and weapons of mass destruction.

Hereafter we have summed-up the results of some case-studies that are the most explanatory at showing the pattern of complexity of different precautionary measures to different risks and within one same category of risk.

Beyond the book's qualitative analysis other sectors often mentioned in the TTIP debate would however request a comprehensive analysis of the level of protection. These may include shale gas extraction where the EU is generally endorsing a more precautionary approach than the US. Financial services and banking regulations where the US has largely being responsible for triggering the subprime mortgage crisis but has then adopted the Volcker legislation which is considered to be bolder than the European regulations. Data protection, where the Snowden revelation of the US intelligence-gathering resulted in a scandal but the question still remains open over who better shields personal data. Few countries provide the kind of framework of judicial authorisation and legislative oversight of national security investigation found in the US.

3.1. Beef, Hormones, and Mad Cows[4]

Policy decisions were diametrically opposed concerning the beef regulation over production and commercialisation. The beef case between the USA and the EU has been a major cause of transatlantic discord over the recent decades. It is widely recognised that the European Union, at the time of highly uncertain causes and scope have been more precautionary on the ban over growth hormones for beef. However, the United States hold a more precautionary approach concerning the mad cow disease and

especially the risk of transmitting the human form variant Creutzfeldt-Jakob Disease (CJD) via blood donations.

The United States have approved since 1954 several growth hormones for cattle: the Bovine Somatotropin (BST) which is a naturally produced hormone in cows and its synthesised version using DNA recombinant called rBST or artificial growth hormone. In the United States, the food and drugs administration (FDA) (as well as other international independent bodies like the World Health Organisation) has provided scientific evidence that diary product and meat from BST treated cows are safe for human consumption.

In 1985 the EU banned 6 hormones (three BST and three rBST) on the basis of the precautionary principle and plausible risks to animal health. It was also considered that the various effects of rBST and growth hormones were insufficiently clear so a precautionary period of time should be provided for in-depth studies. Another reason for banning hormones concerned the fear that a divergent position from member states on hormone ban would fragment and undermine the internal market.

This transatlantic divide led in 1996 to one of the most famous WTO dispute with the United States. The WTO Appellate Body ruled in favour of the United States considering the EU didn't provide sufficient scientific evidence to support its claim that hormones presented a health risk. The EU refused to comply with the WTO law and the United States where authorised to apply, as a compensation measure, tariffs on EU imported products equivalent to a maximum of approximately $ 100 million per year.

The Bovine spongiform encephalopathy (BSE), commonly known as "mad cow disease" presents a complete different scenario. The first case of BSE was identified in the United Kingdom in 1985; in 2003 about 178,000 total cases of BSE had been confirmed in the UK. At the time scientific analyses were not conclusive about a health concern for humans consuming BSE beef. The EU acted by banning all import on beef export from the UK in 1995 but within few months it lifted the ban. The USA adopted its ban on import beef earlier than did the EU and maintained it far longer. In the USA the early measures from early signs have been successful in keeping BSE nearly absent of the USA territory.

Moreover the USA were highly concerned about a possible human-to-human transmission of the Creutzfeldt-Jakob disease and rejected any blood from any donor who had spent more than three months cumulative in the UK during the years 1980 to 1996. The FDA acted despite the absence of studies showing human blood transmission of CJD, and interestingly titled its regulation a "precautionary measure".

3.2. Stratospheric Ozone Depletion and Global Climate Change[5]

Ozone depletion and climate change strike some similarities since they are both global externalities and are caused by the release of chemically stables gases into the atmosphere that persist for decades. However the precautionary measures differ. The USA acted earlier and more aggressively than the EU to reduce the stratospheric ozone depletion, while the EU took stronger action against climate change.

Ozone depletion was caused by the release in the atmosphere of chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODCs); the latter were widely used for a variety of industrial and consumer applications in building, home, automobile, air-conditioning and refrigeration systems, personal care and a wide array of different functions. The USA acted as early as in 1978 with the relevant consumer and environmental agencies banning use of CFCs like aerosol propellants which accounted about half of the consumption. In Europe, member states reacted differently. Sweden and Norway adopted aerosol ban together with the United States whereas there was little response in the UK, France and Italy.

Thanks to the USA precautionary action between 1974 and 1985, USA consumption of CFCs 11 and CFCs 12 declined about 45%. Whereas during the same period, the European consumption increased by 10%. The identification of the Antarctic "ozone hole" in 1985, which attracted a great deal of policy-makers' attention (the causal interrelation between CFCs and the Antarctic ozone hole was still speculative), has then led in 1987 to the ratification of the multilateral agreement known as the Montreal Protocol. Its implementation allowed to virtually eliminate by 1997 CFCs consumption in the USA as well as in the EU.

Climate change makes the case for a different scenario. When climate change reached the policy agenda in the mid- to late 1980s, the EU was leading the multilateral efforts for a global reduction of Greenhouse gases. The USA were reluctant signatory of the Framework Convention on Climate Change in 1992 in Rio de Janeiro and the Clinton administration lagged behind in the Kyoto Protocol. The Kyoto multilateral agreement requested the EU, the United States and other industrialised countries to hold their average greenhouse gas emissions in the 2008-2012 period to a level below their 1990 emissions. The agreed emissions target where set at 7% for the EU and 8% for the USA. While the EU successfully reached their target, the USA signed the protocol but never submitted it to the Senate for ratification. The subsequent Bush administration, even less supportive of the Kyoto Protocol, officially withdrew the USA from the protocol.

The EU plan to reach the Kyoto target was largely based on a marked-based instrument such as the European emission trading scheme. In 2007 the European Commission proposed the "20-20-20 by 2020" plan. It followed-up the Kyoto agreement by unilaterally committing the EU to impose even more ambitious target to greenhouse gas reductions: it calls for emissions cut of 20% below the 1990 levels, a 20% increase in energy efficiency over forecasted consumption, and 20% of energy to be produced as renewable energy by 2020. Overall the EU has played a much more important role in regulating greenhouse gas emissions than the USA.

3.3. Automobile emissions[6]

Similarly to the beef production, automobile emissions regulations in the USA and Europe follow a variable pattern. Automobile emissions make the case for precaution both in the EU and the USA but, interestingly enough, regarding conflicting risks. **The USA protects more on pollutants such as lead, PM and NOx**, as opposed to **the EU that has been more precautionary on the control of greenhouse gases**, as seen in the previous subsection.

The USA led by California (which has set the highest standards and had an attraction effect on other USA states, e.g. "the California effect"[7]) has been the leader in pushing the development and commercialisation of technologies for reducing emissions of lead, CO, HC, NOx, and lead from both gasoline and diesel fuelled vehicles. Europe has lagged behind the USA control programme as illustrated by its inability to mandate lead-free gasoline until 1989. Since 1990s Europe has moved aggressively toward clean vehicles and fuels and has narrowed the gap considerably from the US standards. However USA norms continue to be more precautionary than the EU regarding the public health risks of diesel emissions. While diesel car sales in the USA represents only 1% of new cars, in the EU from the years 2000 to 2010 sales have grown from 28% to over 52%.

The EU policy choice of tackling climate change is proven by its efforts at reducing CO_2 emissions from light-duty vehicles, much lower emissions rate per kilometre in the EU than the USA, and additional factors such as European high fuel prices. However in recent years the USA are also pushing for a reduction of emissions per kilometres with new regulations adopted under the Clean Air Act (which set in 1970 the national goal of clean and health air) and by commercialising new fuel efficient car models.

3.4. Nuclear Power[8]

The term precautionary principle in nuclear energy regulation is neither in the EU nor in the USA. However precaution is consistent with the different safety approaches towards civilian use of nuclear energy. **Overall the degree of regulatory precaution to the safety of nuclear power generation has been similar in the USA and the EU**. The EU approach is consistent with the USA principle of the application of a probabilistic risk analysis along with the principle of "defence in depth" and the most consistent approach with the precautionary principle, the so-called as low as reasonably achievable principle (ALARA).

However differences exist in the degree of nuclear dependency of each region and in the approach that has been adopted concerning safety standards beyond reactor security, on issues such as transportation of radioactive material and radiation protection. For instance the USA's Environmental Policy Agency (EPA) has been **extremely precautious concerning a regulation ban to the licensing of a nuclear waste deposit** in the Yucca Mountain, Nevada. In this case the EPA didn't take into consideration any cost-benefit analysis and prohibited the nuclear waste deposit on the base of drastic disposition: the radiation exposure of the people living

nearby the Yucca Mountain had to be equal of the natural exposure to any sort of natural radiation elsewhere in the country. Hence the administration decided to prohibit the licensing and explored alternatives for handling the waste. By contrast the EU requires explicitly in the nuclear safety regulation a mandatory cost-benefit analysis.

Furthermore, Europe has been building continuously over the last 40 years nuclear power stations, and some European countries are now building more reactors (although others are phasing out civilian nuclear energy following the Fukushima events). Conversely the USA stopped ordering any new civilian nuclear stations after 1980.

3.5. The Marine Environment[9]

It was in relation to the marine environmental regime that the precautionary principle first entered into the international policy discourse. It was formulated during the Second International London Conference on the Protection of the North Sea in 1987 and has been advocated by European countries like Germany, Denmark and the Netherlands. The EU and its member states, pushed in international fora for the use of the precautionary principle in relation to pollution control in waters, like dumping waste that could harm the marine environment. **The USA had initial reservation about the use of precaution** in pollution prevention but finally consented to it and followed the international norms.

However, strong disagreement arose between countries during a meeting organised by the Food and Agriculture Organisation (FAO) in 1992 to implement the UN Convention on the Law of Sea on straddling fish stocks and highly migratory fish. The USA openly advocated for a stronger precautionary approach in relation to capture fishery and marine biodiversity protection, while the EU had reservation about the extension of this approach.

Despite the fishery being an exclusive competence of the EU and the precautionary principle being a guiding principle of environmental issues, **the EU has not been *de facto* precautious in fishery conservation**. The Common Fishery Policy has largely failed at effectively addressing the ecological challenges of the fishery management. Overcapacity and failure to follow scientific advice resulted in overfishing and unsustainable bycatches and overall mismanagement.

The USA was less concerned by water pollution controls but **adopted a precautionary methodology for the management of capture fishery**. An example of a USA precautionary decision is the USA plan for the prohibition of commercial fishing in a huge swath of American waters in the Arctic that has never been fished. The precautionary aspect lies in the possibility that those waters could provide a new home for cold-water species that are already moving north as a result of global warming. The marine environment case study illustrates a different patchwork of level of protection in the USA and the EU.

4. Explaining the complex pattern of precaution

The question is therefore not who is more precautionary across the board but why different societies choose to worry more about a particular risk. The book assesses multiple hypotheses to explain this complex pattern, while concluding that none out of those have been highly probative.

4.1. Political and institutional factors

This hypothesis considers that the peculiar institutional architecture of the EU, different representation of power and political factors may explain the higher level of precaution of the EU. Concerning the structures of power, proportional representation in the European elections might favour green parties getting in a centre-left coalition. Conversely the USA majoritarian electoral system does not allow single-issue parties to take part in a government. Furthermore the specific European institutional design should account for a more precautionary Europe as the Council of ministers of the EU gathering around single issue coalitions provide stronger voice to certain themes. Despite the institutional trends that should favour a more precautionary Europe, quantitative analysis reinforces the view of no major change or reversal observed. **Political leadership doesn't explain either broad trend for more or less precaution**. Under the Reagan Republican administration the USA ratified in 1987 the important environmental Montreal Protocol, while in Europe at the same time conservative

leaders have been as likely to promote precaution as have left-leaning leaders.

4.2. The impact of the legal systems

Secondly, the legal system accounts. Bergkamp and Smith[10] carefully **analysed transatlantic differences in legal systems** – including administrative law, judicial review of agency action, and civil liability law – and find that these **factors do not predict the observed complex variety of risk policies**. Facing uncertain risks governments have two basic strategies: *ex post* remedies and *ex ante* precaution. Ex post remedies include clean-ups and civil liabilities administered by the courts. Ex-ante precaution includes preventive regulations administered by agencies. An hypothesis considers that since **the USA have a stronger ex-post tort liability tradition this could render precaution less needed**, whereas countries with weaker *ex post* liability tradition could see *ex ante* precaution as more desirable. However, stronger tort liability might motivate industry to seek uniform preemptive precautionary regulation from the legislature making. Therefore these hypotheses would predict an overall degree of precaution rather than the complex pattern of precaution applied to each specific risk.

4.3. The role of cost and benefit analysis

Some authors tie the degree of precaution inversely proportional to the use of a cost-benefit analysis (CBA) in regulatory decision-making; since the USA greatly relies on benefit-cost analysis they would be less precautious. However, the EU is also adopting CBA. The Maastricht Treaty mention of CBA comes right after the description of the Precautionary Principle and in 2000 a Communication from the European Commission belies the alleged conflict between precaution and cost benefit analysis. From 2005 the EC adopted some guidelines to oblige the regulatory authorities to systematically analyse the economic impact or cost of risk management measures. Sometime the USA does not use CBA whereas the EU does: Germany used CBA for air pollution control while the USA air quality standards do not. Here again, the economic analysis of regulation does not account for the observed complex pattern of precaution.

4.4. Explaining the patterns of relative precaution cognitive availability

Why then **the USA is more precautionary about one risk, while Europe is more precautionary about another**? The psychological **hypothesis of "heuristic availability"** drawn from behavioural economics[11] provides more important clues about the functioning of the precautionary principle and the cross-cultural differences in risk perception. The hypothesis is that people tend to heavily weigh their judgments toward information they can recall, what is "available". A person will have a different perception of risk related to house fires if they have recently seen on TV a news report about forest fires.

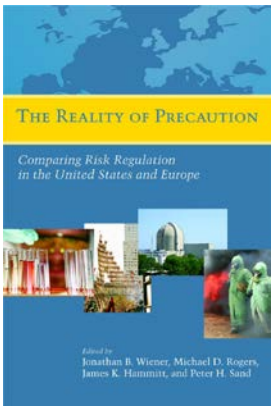
Moreover, once several people start to take an example they can recall as probative, many people may come to be influenced by their opinion, giving rise to cascade effects. Thus sporadic events can trigger outsize public concern, depending on media coverage and cultural predisposition, that call for political response. The severe acute respiratory syndrome (SARS) in Canada was perceived to be more of a risk than terrorism, while in the USA it was the opposite.

Conclusion

According to this study the **hybridisation of the regulatory systems is a conclusive factor explaining the application of precaution**. Hybridisation means that in a context of globalisation, interconnectedness and growth of transnational network we assist to a scenario of "exchange of ideas and interweaving of diverse regulatory systems, driven by learning from experience in response to particular risks". The SO2 allowance trading in the US was praised for its performance at reducing acid rain and was borrowed by the EU in its cap-and-trade system for Greenhouse gasses. **Precaution itself has been borrowed from the EU to the US**. "This path leads beyond traditional comparative law: not just two "legal systems" with discrete "national style of regulation", but an interwoven network of hybrid approach.

Over the broad array of risks, neither the USA nor the EU can claim to be "more precautionary". The reality of precaution has not been principle; it has been parity and particularity. **In the aggregate there is little overall transatlantic difference over the past several decades**.

The USA often takes a precautionary approach without formally endorsing the precautionary principle while Europe formally endorses precautionary principle without applying precaution to every risk. "Both the United States and Europe apply precaution in some but not all risk regulation". **Hence, precaution should not be seen directly as a dividing line for transatlantic discord**. The hybridisation in risk regulation across the Atlantic provides an interesting ground for potential regulatory convergence in the framework of the TTIP negotiations. Rather than fearing that the EU might trade away the principle of precaution, it can be seen as an opportunity to strengthen regulatory collaboration and to provide more transparency on the use of the **precautionary principle**.



1. Jonathan B. Wiener, Michael D. Rogers, James K. Hammitt and Peter H. Sand (ed.), *The Reality of Precaution : Comparing Risk Regulation in the United States and Europe*, RFF Press, Washington & London, 2011.
2. David Vogel, *The Politics of Precaution: Regulating Health, Safety, and Environmental Risks in Europe and the United States*, Princeton University Press, Princeton and Oxford, 2012.
3. The Rio Conference states as one of the several definitions of the precautionary principle that "where there are threats of serious or irreversible damages lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".
4. George Gray, Michael D. Rogers, and Jonathan B. Wiener, "Beef, Hormones, and Mad Cows" in Jonathan B. Wiener, *op. cit.,* pp. 65-90.
5. James K. Hammitt, "Stratospheric Ozone Depletion and Global Climate Change" in Jonathan B. Wiener, *op. cit.,* pp. 159-176.
6. Michael P. Wash, "Automobile Emissions" in Jonathan B. Wiener, *op. cit.,* pp. 142-158.
7. David Vogel, *Trading up: Consumer and environmental regulation in a global economy*, London: Harvard University Press.1995.
8. John F. Ahearne and Adolf Birkhofer "Nuclear Power" in Jonathan B. Wiener, *op. cit.,* pp. 121-141.
9. David Freestone, "The Marine Environment" in Jonathan B. Wiener, *op. cit.,* pp. 177-200.
10. Lucas Bergkamp and Turner T. Smith Jr. "Legal and Administrative Systems: Implications for Precautionary Regulation" in Jonathan B. Wiener, *op. cit.,* pp. 434-479.
11. This hypothesis is drawn from behavioral economists and Nobel Prize Daniel Kahneman and Amos Tversky "Judgment under Uncertainty: Heuristics and Biases", in Hal R. Arkes and Kenneth R. Hammond (ed.), *Judgment and Decision Making: An Interdisciplinary Reader*, New York: Cambridge University Press, 1986. Heuristics work through a process of "attribute substitution" in which people answer a hard question by substituting an easier one. Should we be scared of contaminated blood? The answer to the question is not a rational or statistical answer. If the person can easily think of example of blood contamination, she is far likely to be frightened than if she cannot.

On the same themes...

THE EU AND ITS LEGISLATION: PRISON OF PEOPLES OR CHICKEN COOPS?
Yves Bertoncini, *Policy Paper No. 112*, Notre Europe – Jacques Delors Institute, May 2014

THE TTIP AT THE FOREFRONT OF THE 21ST CENTURY INTERNATIONAL TRADE SYSTEM?
Elvire Fabry, *Tribune*, Notre Europe – Jacques Delors Institute, March 2014

THE TTIP NEGOTIATIONS: A PIRANDELLO PLAY
Elvire Fabry, Giorgio Garbasso and Romain Pardo, *Synthesis* of an expert seminar with EPC, Notre Europe – Jacques Delors Institute, January 2014

CHALLENGES AND PROSPECTS OF A TRANSATLANTIC FREE TRADE AREA
Bertrand de Largentaye, *Policy Paper No. 99*, Notre Europe – Jacques Delors Institute, October 2013

Managing Editor: Yves Bertoncini • The document may be reproduced in part or in full on the dual condition that its meaning is not distorted and that the source is mentioned • The views expressed are those of the author(s) and do not necessarily reflect those of the publisher • *Notre Europe – Jacques Delors Institute* cannot be held responsible for the use which any third party may make of the document • Original version • © *Notre Europe – Jacques Delors Institute*

Europe for Citizens
PREMIER MINISTRE
MACIF

NOTRE EUROPE JACQUES DELORS INSTITUTE

ISSN 2257-5510

19 rue de Milan, F – 75009 Paris
Pariser Platz 6, D – 10117 Berlin
info@notre-europe.eu
www.notre-europe.eu