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THE TRANSATLANTIC RIFT IN GENETICALLY MODIFIED FOOD POLICY

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ABSTRACT. The regulatory structures underlying United States and European Union policies regarding genetically modified (GM) food and crops are fundamentally different. The US regulates GM foods and crops as end products, applying roughly the same regulatory framework that it does to non GM foods or crops. The EU, on the other hand, regulates products of agricultural biotechnology as the result of a specific production process. Accordingly, it has developed a network of rules that regulate GM foods and crops specifically. As a result, US regulation of GM foods and crops is relatively permissive, whereas EU regulation is relatively restrictive. Why are genetically modified food policies in the United States and the European Union so strikingly different? In the light of the recent World Trade Organization dispute on agricultural biotechnology, it may seem that economic interests are the driving force behind policies. While they are certainly part of the picture, the issue is far more complex. This paper argues that three different elements help explain differences between US and EU GM food policies. First, an investigation of US and European policies of the 1970s and 1980s on recombinant DNA research and of events leading up to early GM food and crop regulation allows a deeper understanding of current policy. Second, scrutinizing underlying values and norms can uncover the beliefs that condition current GM food and crop policy. Third, an analysis of involved actors' views and levels of success in influencing policy is essential to understanding US and EU policies.

KEY WORDS: agricultural biotechnology, comparative public policy, genetically modified crops, genetically modified food, public policy, regulation

1. INTRODUCTION

Genetically modified (GM) crops are produced by genetic transfers between different species, whereas traditional crossbreeding is possible only within the same species. GM foods and crops are types of genetically modified organisms (GMOs). GM crops can mimic aspects of the metabolisms of

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unrelated species.¹ Common GM crops are herbicide tolerant and/or insect resistant soy, corn, cotton, and oilseed rape. These crops are used in animal feed and processed foods. Main GM crop producers are the United States (US), Argentina, Canada, and Brazil (James, 2006). In 2006, the US produced about 54% of all GM crops worldwide, while European Union (EU) countries taken together produce less than 1% of all GM crops (*ibid.*).

First GM products came onto the US market in the early 1990s and first GM grain shipments arrived in Europe in the mid-1990s. This led to first protests and a heated debate, in Europe and progressively worldwide. A decade later, GM food is still very controversial, as exemplified by the recent World Trade Organization (WTO) dispute over the EU's 1999–2004 *de facto* moratorium on new GM product authorizations. The WTO ruled against the EU in 2006, but the deeper roots of the dispute remain unaddressed and the conflict unresolved.

Central to the WTO-dispute was the question of how to regulate GM foods and crops. US and EU policies address the same types of products, and yet they are strikingly different. US policy is relatively permissive, while EU policy is relatively restrictive. The US regulates GM foods roughly as it would any other food, while the EU has developed regulations specifically for GM foods and crops. More GM crops and foods are approved more quickly in the US than in the EU.

In the light of these regulatory differences and the resulting transatlantic dispute, this paper addresses the following question: What explains the differences between GM food policies in the United States and in the European Union?² It first presents the phenomenon to be explained by giving a comparative overview of the differences between GM food and crop policy in the US and the EU. It then offers an answer to the research question in three parts. First, it investigates how US and European policies of the 1970s and 1980s on recombinant DNA research and events leading up to early GM food and crop regulation can help explain current policy. Second, it scrutinizes the values and norms or “paradigms” underlying

¹ On the science of genetic engineering, see, for example, Watson et al. (1992).

² It is often pointed out that US–EU comparisons are problematic from a methodological point of view because the US and the EU are too different to be compared successfully. In full knowledge of the problem of extraneous variance associated with this type of small-N comparison, I sustain that a transatlantic comparison of GM food policy is worthwhile and relevant. In the US, the Congress and Federal Government have the power to regulate the areas of agriculture and food safety. In the European Union, GM food and crop policy falls within the area of the internal market and is thus shaped at the EU level. US states and EU Member States also have an important role to play as implementers of what is decided at US federal and EU level, but their activity is not the focus of this article. By comparing GM food policy in the EU and the US, I also compare what is interesting to compare in the light of the recent transatlantic clash at the WTO-level.

current policies. Third, it analyzes involved actors' views and their levels of success in influencing policy.

2. US AND EU GM FOOD AND CROP POLICY

2.1. *Regulatory Frameworks*

US policy is based on the premise that GM foods and crops should be regulated like any other food and regardless of their method of production. This is often referred to as a “product-based approach.” In contrast, EU policy takes a “process-based approach,” which posits that the process of production is what should trigger a specific kind of regulation. Accordingly, the US does not have a regulatory regime specific to agricultural biotechnology, while the EU does.

This “product versus process” distinction is connected with dissimilar perceptions of modern biotechnology. US policy documents convey the notion that genetic engineering is nothing radically new, but merely a natural extension of traditional agricultural breeding (Office of Science and Technology Policy, 1984: 50856). US policy documents frequently call attention to the fact that plant biotechnology has been used for a long time in less sophisticated ways than are possible with genetic modification, i.e., recombinant deoxyribonucleic acid (rDNA) techniques:

the recently developed methods [i.e., rDNA techniques] are an extension of traditional manipulations that can produce similar or identical products [and] enable more precise genetic modifications (Office of Science and Technology Policy, 1986: 23302).

The EU, on the other hand, views genetic engineering as a stark departure from conventional technologies. Its definition of GMO illustrates this point:

GMO “means an organism [...] in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination” (European Parliament and Council of the European Union, 2001). This definition contains the notion that genetic engineering is something fundamentally new and different. This is why, “unlike any other genetic improvement methods, the application of this technology is strictly regulated” (European Commission, 2005: 3).

In the US, three agencies and three statutes make up the regulatory framework for GM foods and crops. The US Department of Agriculture (USDA) is responsible for protecting agriculture from pests and diseases under the Plant Protection Act. The Food and Drug Administration (FDA) ensures that food, feed, and food additives are properly labeled and safe to eat for humans and animals under the Federal Food, Drug, and Cosmetic Act. The Environmental Protection Agency (EPA) ensures that pesticides

used in plants are safe for the environment under the Federal Insecticide, Fungicide, and Rodenticide Act. Following the product-based logic, US agencies have interpreted these existing statutes to accommodate GM foods and crops. In 1992, FDA established that it would treat GM foods like non-GM foods. USDA has made oversight of GM crops possible by defining GM plants as potential plant pests. EPA fulfills its mandate by regulating the insecticidal substances produced by certain GM crops as pesticides.

The EU's regulation of GMOs is divided into horizontal legislation, which covers GMOs in general, and vertical or sector-related regulations, which deal with specific types of GMOs (e.g., food, feed, seed) and individual GMO-related issues (labeling, traceability). EU rules cover two main types of authorizations: the deliberate release of GMOs into the environment, and the authorization of GM food and feed. Directive 2001/18/EC is a horizontal piece of legislation covering deliberate release into the environment for experimental purposes and for placing on the market. Main vertical instruments within the EU are Regulation 1829/2003 on genetically modified food and feed, and Regulation 1830/2003 on traceability and labeling.

2.2. *Regulating Field Tests*

In the US, the field testing of GM plants is subject to USDA oversight. USDA issues "permits" under the Code of Federal Regulation, part 7, article 340.3 (7 CFR 340.4) or acknowledges "notifications" under 7 CFR 340.3. Permits and notifications can be for release into the environment (field tests), import from abroad, and/or interstate movement. Getting a "permit" to conduct field tests, a procedure introduced in 1987, is the more demanding of the two possible procedures. A "notification" is a streamlined version of the permit-granting procedure, and was introduced in 1993 for plant pests with a low risk potential. It was extended to most GM crops in 1997, and is now the most common way for applicants to obtain field test approval. Notification does not foresee a formal review.

The European Union regulates field testing under Directive 2001/18's Part B entitled "Deliberate Release of GMOs for any other purpose than for placing on the market." The "standard authorisation procedure" described in art. 6 of this Directive is a complex and potentially lengthy procedure involving the Member States.

Overall, the regulation of GM plant field tests is more permissive in the US than it is in the EU. The US notification system is flexible, fast, and almost "automated" in comparison with the EU's Part B procedure. The US notification procedure is a response to, but also an encouragement for, continuing high numbers of applications to conduct field tests with GM plants.

2.3. *Regulating Commercialization*

In the United States, FDA is the key agency for the commercialization phase of a GM product, but USDA also plays an important role. USDA grants “nonregulated status” for crops that are ready for commercialization, meaning that regulatory oversight is no longer needed. FDA has put in place a voluntary consultation process for companies that are ready to commercialize their product. In the case of the EU, commercialization is governed by EP and Council Directive 2001/18’s Part C regulating the “placing on the market of GMOs” and by EP and Council Regulation 1829/2003 on food and feed. The procedures foreseen in these texts are potentially complex and lengthy, and they involve the Member States.

Data on GM food and crop commercialization³ confirms the impression given by rules and regulations: the US receives more applications, grants more authorizations, and boasts fewer non-authorized products than the EU. In addition, on average, a GM product commercialization takes significantly longer in the EU than it does in the US. Between 1992 and 2006, about 65 different GM products have been authorized for commercialization in the US, whereas around 18 different products are currently approved in the EU. A notable difference can also be found between the average number of days that elapse between application and authorization in the EU and the US. USDA petitions for nonregulated status are dealt with within an average of 221 days, and FDA consultations take an average of 252 days. This makes for a combined average of 237 days. In contrast, EU approvals for commercialization take an average of 794 days or 2.2 years. This is partially explained by the very long authorization times during the de facto embargo by certain EU Member States on new GM products.

With regard to labeling, in the US, FDA has a mandate to prohibit the entry of foods bearing a false or misleading label. Labeling to provide information on a food’s method of production is not foreseen unless there is something tangibly different about a food, such that the common name can no longer be used. In practice, GM foods and foods containing GM food ingredients are not labeled in the US. In contrast, in accordance with the process-based principle, European consumers are viewed as having a right to know how food is produced and whether it contains GM ingredients. Regulation 258/97 on novel foods first made the labeling of GM foods mandatory in 1997. Under Regulation 1829/2003, in force since 18 April 2004, GM food labeling is required above a threshold of 0.9% of GM content per ingredient. Moreover, Regulation 1830/2003 introduced the

³ The numbers given in this section are based on information contained in the databases provided by US and EU agencies. More details can be found in Ramjoué (2006).

concept of traceability which says that all GM foods must be traceable along the entire food chain.

2.4. *Drifting Apart or Moving Together?*

Despite the forces of globalization at work since the 1990s, GM food policies have not converged significantly. In the US, although regulating agencies have experimented with policy instruments including voluntary labeling and pre-market consultations, the regulatory environment remains essentially “GM food friendly,” and the few new rules and regulations that have been applied to GM foods and crops since the mid-1980s are consistent with the relatively permissive original regulatory framework. In the EU, a wave of public protest against food biotechnology from the late 1990s onwards led to new and stricter regulations in the 2004. At the same time, however, GM product approvals became more regular and predictable with the lifting of the de facto moratorium. Current developments in the EU are mixed. While the European Commission is putting pressure on Member States to open up their markets to GM crops and foods and thus comply with EU rules, national views vary considerably across the European Union. Some countries, such as Finland, the Czech Republic, or Slovakia, are relatively open to agricultural biotechnology. Others, like Austria, Cyprus, or Poland, are very reluctant to embrace this technology, often in connection with critical national public opinion. Other countries still, for example Germany, have recently shifted their positions somewhat in connection with national political changes. It is apparent that the debate on GMO crops and foods is not over.

3. EXPLAINING THE TRANSATLANTIC RIFT IN GM FOOD AND CROP POLICY

Why are GM food policies so different? In order to answer this question, this paper derives three explanatory elements – “preceding policies,” “paradigms,” and “actors and actor coalitions” – from theories coming from the wider fields of policy process theory (e.g., Sabatier, 1999), comparative historical analysis (e.g., Mahoney and Rueschemeyer, 2003) and science and technology studies (STS) (e.g., Jasanoff et al., 1995). Policy process theory deals specifically with explaining policy outcomes, which is precisely the focus of this investigation. Comparative historical analysis is designed to elucidate broad social phenomena through comparison. Comparing regulation, especially in a controversial area, falls exactly into this category. STS is a broad approach that aims to understand science and technology issues and developments within their social contexts. GM food policy is a product

of science and technology interacting with society, and is therefore the type of empirical field addressed by STS. While policy process theory and comparative historical analysis constitute the basic toolkit relied on in order to explain why GM food policies differ, STS serves as a constant reminder of the complexity of GM food policy.

3.1. *Preceding Policies: Building on rDNA Research Policy in the 1970s and 1980s*

“Preceding policies” are defined as earlier policy or policies relevant for and/or leading to a current policy area. The policy preceding GM food regulation is recombinant deoxyribonucleic acid (rDNA) research policy. Gaining an understanding of the paths that led from rDNA research policy to the regulation of its applications through the investigation of “preceding policies” is to gain a historical appreciation and partial explanation of present GM food policies.

In 1953, work by Francis Crick, Rosalind Franklin, and James Watson led to the discovery of the double helix structure of deoxyribonucleic acid (DNA) and in 1973, Herbert Boyer and Stanley Cohen conducted the first experiments using recombinant DNA as a technique and thus making genetic manipulation possible. Scientists around the world were thrilled by the new research possibilities, but also apprehensive as they reflected on the possible negative consequences of rDNA experiments. In the US, this resulted in a Committee on Recombinant DNA Molecules, chaired by Paul Berg. In 1974, this committee published the so-called “Berg letter,” declaring a moratorium on certain types of rDNA experiments.

The famous Asilomar conference held in 1975 had the objective of finding a compromise that would make it possible to lift this moratorium. The conference produced a document that served as a provisional set of rules by the Recombinant DNA Molecule Program Advisory Committee of the US National Institutes of Health (NIH), newly created in 1974. This body quickly set about drafting guidelines regulating rDNA research. Its first guidelines, issued in 1976, applied to federally funded research and prohibited the deliberate release of rDNA molecules into the environment except for small controlled field trials. Many US and European scientists judged these Guidelines to be very stringent (Watson and Tooze, 1981: 65). US scientists’ and regulators’ initial cautious reactions to rDNA research must be understood within the US social and political context of the 1970s. When US scientists first developed rDNA techniques in 1973, US society was in a period of profound social and political upheaval. Among other changes, this period brought with it greater distrust of science and the beginning of the US environmental movement. This was an important

change from post-World War II era in which the science enjoyed a high level of trust and government spending on science and technology were at a peak.

By the late 1970s, a growing scientific consensus had been reached on rDNA. Scientists in the US and abroad by now had tested the use of rDNA techniques for several years and had become increasingly convinced that the US's initial caution had been overdone. As of 1978, the rules for rDNA research became less stringent. In the early 1980s, these scientific developments gave the US federal government the necessary basis to declare genetic engineering to be safe, and to announce that comprehensive regulation on rDNA applications would not be necessary. The US government could build on previous regulatory experience with restrictive rDNA research policy in developing a permissive regulatory framework for rDNA applications.

The development of permissive policies in the field of biotechnology applications was part and parcel of a larger political vision introduced by Ronald Reagan, elected US President in 1980. Reagan's primary goals were to strengthen US defense and to boost the US economy by increasing international competitiveness. In this context, the Reagan administration was particularly supportive of the emerging biotechnology industry and avoided new laws and regulations as far as possible. Funding opportunities for research in the area of biotechnology increased. At the same time, by the 1980s, US civil society had already fought its "DNA wars" and had seen scientists and regulators come to the conclusion that the risks of rDNA research had been overestimated. Society was ready to accept the product-based policies that the US announced in 1986 with the Coordinated Framework.

A comparable experience did not exist at the European level when it came time to regulate first biotechnology applications, and this can be seen as having provided the necessary space for the development of a restrictive GM food and crop policy in the late 1980s and early 1990s. The 1973 news that research with recombinant DNA techniques was possible triggered the same mixture of excitement and apprehension in Europe that it did in the US. In part because the relevant discoveries had not taken place in Europe, however, concerns with rDNA methods were less widespread and feelings of responsibility less pronounced. Overall, European scientists were less cautious and more reassuring about rDNA research than their US colleagues. The voluntary moratorium recommended by the 1974 Berg letter drew mixed reactions by European scientists. While some welcomed the approach, many felt that it was too restrictive, especially since there was no actual evidence of risks connected with rDNA research.

Oversight activity at the European Community level was relatively modest and took shape late in comparison with the United States and individual European countries. This was primarily because the idea of harmonizing European national research policies and pooling of resources to finance research at the European level was still in its infancy during the 1970s. Research and technology funding was not yet developed at a European level; the first Framework Programme for research and development was not launched before 1984. Nevertheless, the European Commission's Directorate-General for Science, Research, and Development took on the issue. In December 1978, a "Proposal for a Council Directive establishing safety measures against the conjectural risks associated with recombinant DNA work" was presented (Cantley, 1995; Fredrickson, 2001). It emphasized the potential benefits of rDNA research, as well as the fact that possible risks were conjectural. In the meantime, however, US experiences with rDNA research had accumulated and slowly led to the conclusion that the new technology harbored fewer unknown hazards than previously feared. In 1980, the suggested Directive was substituted with a non-binding recommendation, approved in 1982 (Council of the European Union, 1982).

It was not only the lack of a strong institutional mandate that determined the low level of European Community activity in the area of rDNA research. The 1970s and early 1980s were characterized by a focus on "catching up" with the US in terms of science and technology (Nollert, 2000). In comparison to the US situation, the European debate on rDNA research was, therefore, limited both in tone and in terms of actors involved. Individuals and groups actively involved in the debate were scientists directly concerned by the developments in the field of rDNA research, and scientists' professional associations. The European media was less attentive to the issue of rDNA research than the US media, and the European public was therefore less informed and involved (Watson and Tooze, 1981). In contrast to the United States, therefore, a full-blown debate on the role and control of science within a democratic society did not take place in Europe in the 1970s and early 1980s. As it turned out, however, the debate was only being postponed to the late 1980s.

By the mid-1980s, when the European Community faced the need to regulate first applications of rDNA technology, the environmental movement had become quite influential. The connection between the rise of environmentalism and both rDNA research and GM food policy as political issues was that European environmentalists and green parties strongly questioned the need for research using rDNA, and for its use in applications. Non-governmental organizations and green parties forcefully turned against genetic engineering. In short, "environmentalists succeeded in stigmatizing GMOs as an abnormal danger" (Levidow et al., 1997: 478; see also

Gottweis, 1998) and “[b]y the late 1980s, the new biotechnology faced a legitimacy problem” (Levidow et al., 1996: 136).

It was within this increasingly environmentally conscious and GMO-hostile context that the issue of rDNA research and its pending applications came to be regarded and dealt with by policy-makers as an environmental issue to be addressed in a precautionary manner. Directive 90/220 was relatively restrictive in that it was process-based and foresaw a complex authorization process for field trials and for the commercialization of GMOs. These basic principles of EU GMO policy are still in place today.

3.2. *Paradigms: The Importance of Underlying Beliefs*

A second explanatory element is based on the assumption that policy makers’ collective ideas, norms, and beliefs, or “paradigms,” influence and condition policy outcomes. For the purposes of this article, “paradigm” is defined as an overarching framework of fundamental beliefs about a specific policy area.⁴ Empirical study indicates that US and EU GM food policies differ because they are guided by different underlying paradigms.

A first difference in paradigms can be summarized as “competitiveness versus environmental and health protection.” US policy on GM food and other applications of biotechnology has been devised against the backdrop of the larger goal of achieving and maintaining economic growth and international competitiveness. Industry in general and the biotechnology industry in particular are seen as motors of the US economy, and the role of policy is hence to create a secure and predictable regulatory environment that will make it possible for industry to operate efficiently and productively. In contrast, although EU policy emphasizes the need to strike a balance between competitiveness *through* and protection *from* biotechnology, the latter goal prevails in the case of GM food. The EU’s policy in this area is guided by the paradigm that consumer health and the environment should be protected from any potential harm from GM foods. As a result, EU policies are relatively restrictive, imposing regulations on the biotechnology industry that may hinder economic competitiveness for the sake of upholding strong environmental and health protective measures.

It is crucial to emphasize that the described “competitiveness” and “environmental and health protection” paradigms are an expression of US and EU priorities, not an exclusive focus. Both the EU and the US view biotechnology as contributing to economic competitiveness, and both aim to protect their citizens’ health and the environment. However, the EU and

⁴ This definition is developed on the basis of related concepts used by Fleck (1979 [1935]), Hall (1993), Jasanoff (1995, 2005), Jobert and Muller 1987, and Kuhn (1996 [1962]).

US set different priorities and give these elements varying degrees of importance.

The described paradigms appear in early GM food policy documents. In its 1984 “Proposal for a Coordinated Framework,” the US Office of Science and Technology Policy (OSTP) underlined a finding that “[a]lthough the United States is currently the world leader in [...] commercial development of new biotechnology, continuation of the initial preeminence of American companies [...] is not assured” (Office of Science and Technology Policy, 1984: 50857). Confirming the goals of the 1984 Proposal, the 1986 Coordinated Framework sought “to achieve a balance between regulation adequate to ensure health and environmental safety while maintaining sufficient regulatory flexibility to avoid impeding the growth of an infant industry” (Office of Science and Technology Policy, 1986: 23302–3).

A detailed look at EU GM food policy reveals a serious attempt to achieve a balance between the goals of competitiveness *through* biotechnology and protection *from* biotechnology. Despite this search for balance, EU policy documents put a decidedly stronger emphasis on the need to protect health and the environment than on economic competitiveness. Council Directive 90/220 (Council of the European Union, 1990), negotiated during the mid to late 1980s and adopted in 1990, was the first comprehensive EU directive on the deliberate release of GMOs into the environment. Its first article states two policy goals. The first is to harmonize legislation, which is explained by the EU’s more general objective of integration and contains a commitment to economic competitiveness by furthering the EU’s internal market. The second goal is “to protect human health and the environment” (art. 1.1). These two goals are unchanged in European Parliament and Council Directive 2001/18 (European Parliament/Council, 2001). Furthermore, both directives must ensure “that all appropriate measures are taken to avoid adverse effects on human health and the environment [...]” (art. 4.1 in both Directives). The repeated use of this type of language is indicative of an underlying environmental protection paradigm.

Moreover, the US’s emphasis on economic competitiveness and the EU’s focus on environmental and public health protection are to some extent reflected in different US and EU models of agricultural growth and “agri-environmental” reform trends. The dominant US agricultural model, often referred to as “agribusiness,” privileges agricultural industrialization, standardization, and cost reduction in order to increase profits from agriculture. Within this model, GM crops can represent a useful technological innovation tool for agribusiness, and this helps explain why US policy encourages their use through relatively permissive policies.

The EU, which like the US has used intensive or “agribusiness” farming methods for many decades, has recently attempted to move away from this

model of agricultural growth in a more decided way than the US. At least at the level of political rhetoric, it currently emphasizes the ideal of sustainable agricultural growth, and suggests goals such as taking intensively cultivated farmland out of production and focusing on maintaining or reestablishing biodiversity. In the context of this new trend, the EU has less of an incentive than the US to embrace GM crops and foods.

A second fundamental paradigm difference lies in US and EU perceptions of the capacity of science to deal with uncertainty, and, by extension, in how potential risks connected with GM foods are defined and addressed. The United States bases its GM food policy on the so-called “sound science principle” or “science-based approach,” a strong and unwavering faith in science’s capacity to furnish unequivocal information and establish clear answers. This in turn supposes that science and scientific expertise can and do deliver the uncontested evidence necessary to make sound policy decisions. In the case of agricultural biotechnology, this principle has led to regulators’ perceived certainty that GM foods do not pose significant risks, and that a narrow definition of risks connected to GM foods is acceptable. It is supposed that GM foods pose no significant risk until proven otherwise, for example by consumers or by a demonstrated impact on the environment. This approach makes a relatively permissive GM food policy possible.

The European Union also abides by the sound science principle, but introduces an important caveat by also basing its GM food policy on the precautionary principle. The idea behind this is that sound science as a principle alone may not always suffice, and that scientific certainty may not always be achievable. The precautionary principle states that lack of scientific information and certainty shall not stop measures from being taken to prevent potential hazards. The EU views the area of GM foods as one of scientific uncertainty, and therefore assumes that GM products may be hazardous until proven safe.

As in the case of the “competitiveness” and “environmental and health protection” paradigms, empirical evidence suggests that the “sound science” and “precautionary principle” paradigms are not mutually exclusive. Indeed, in the case of GM food, both the US and the EU believe in the power of science to furnish a sound basis for policy-making, and both also emphasize the need for precaution where appropriate. The US, however, shows a strong tendency to accept the current level of information on potential risks as adequate, while the EU is not satisfied by the available body of knowledge and thus mandates a precautionary approach until further scientific information becomes available.

The sound science and precautionary principle paradigms described are found in key policy documents on GM foods. In the 1986 Coordinated Framework, OSTP ruled out process-based regulation, affirming that “there

is no scientific basis for specific legislation for the implementation of rDNA technology and applications” (Office of Science and Technology Policy, 1986: 23308). This kind of language reveals the perception that “best science” and “scientific facts” are indeed available to furnish necessary information and answers to policy-makers. Turning to the EU, EP and Council Directive 2001/18 recalls that under the Treaty on the European Union, “action by the Community relating to the environment should be based on the principle that preventive action should be taken” (preamble 6). Moreover, one of the general obligations of Directive 2001/18 is that “Member States shall, in accordance with the precautionary principle, ensure that all appropriate measures are taken to avoid adverse effects on human health and the environment which might arise from the deliberate release or the placing on the market of GMOs” (art. 4.1).

The sound science and precautionary principle paradigms in turn are intimately connected with different definitions of potential risks attributed to GM foods. Indeed, the US and the EU define the potential risks attached to GM foods and crops in very different ways. In the US, the potential risks posed by GM foods are precisely defined in terms of their specific characteristics and immediate impacts on human health and the environment. The definition of risk used by US agencies is relatively narrow, specific, direct, and short-term. In contrast, the EU defines potential risks as including “indirect” and “delayed” effects in addition to “direct” and “immediate” effects on health and the environment, e.g., the impact on biodiversity (European Parliament/Council of the European Union, 2001). The European debate on GM foods and crops also considers social and ethical issues, such as the impact of GMOs on culture and the understanding of food, as well as the question whether it is ethical to genetically modify plants, and whether multinationals should be allowed to charge large fees for each bag of GM seed sold. There is a crucial difference between the ways in which the topic is debated by the public, the media, and politicians in the EU and the US: in the EU, the regulation of GMOs includes ethical questions. In the United States, this is not the case.

3.3. *Actors and Actor Coalitions: Different Levels of Influence*

A third explanation of the transatlantic rift in GM food and crop policy consists of the different levels of success that US and EU actors and actor coalitions supporting and criticizing GM food have been able to achieve. In this context, “success” and “successful” are defined by the different goals that actors and coalitions pursue. In the case of actors and coalitions favoring GM crops and foods, success means maintaining relatively permissive regulation (in the US) or obtaining less restrictive regulation (in the

EU). In the case of the actors and coalitions critical of GM products, success means achieving less permissive regulation (in the US) or maintaining restrictive regulation and rendering it more restrictive still (in the EU).

In the US, actors supporting GM foods and crops have succeeded in maintaining a permissive policy regarding agricultural biotechnology, while critical actors have found it very difficult to render existing policy more restrictive. The US pro-GM food coalition is composed of the biotechnology industry, large and mainstream farmers, food producers, and retailers. Further supportive actors are a majority of US states and the US federal government, in particular the White House and the State Department, as well as regulatory agencies. As GM food regulators, these governmental actors are not part of the more formal activities of GM food proponents, but their informal collaboration with pro GM food actors is indicative of their support and crucial to understanding why GM food policy is relatively permissive in the US.

Critical actors of GM foods in the US are small-scale, family, and organic farmers, consumers, and environmental and public interest groups. In the US, GM food critics are fewer and less cohesive than in the EU. Environmentalists and some consumer groups pursue the goal of a more restrictive policy, although they have different end goals in mind. While environmental organizations would ideally like to achieve a process-based and restrictive regulation of GM foods, more moderate groups primarily aim for a more consistent, inclusive, and transparent decision-making process. Moreover, food processors, producers, or retailers may be only reserved supporters of agricultural biotechnology, but they are not prepared to be part of a coalition against GM foods.

Pro-GMO actors form a strong and successful coalition in the US. Their activity is coordinated around the goal of maintaining a relatively permissive regulation. Indeed, a key reason for the success of GM supporters in the US is that GM foods are supported throughout the food chain. In particular, the fact that mainstream US farmers, the main users of agricultural biotechnology, are a crucial part of the pro-GM food coalition is fundamental for its success in the US. Equally important is the observation that food producers and retailers did not reject GM foods after consumers started to question the presence of GM ingredients in their food, but merely became more cautious supporters. Moreover, pro-GM food actors in the US are bound by a powerful common vision of genetic engineering as a crucial and promising new tool in the agricultural toolbox. Within this discourse, GM technology is an environmentally friendly technology that can substitute pesticides and that may help feed the world's poor.

Also, in comparison with their European counterparts, GM food proponents in the US have faced relatively mild external events and a fairly

disengaged public. The US's experience with GM foods and crops is marked by three main "shock" events: the monarch butterfly case (1999), the StarLink affair (2000), and the ProdiGene incident (2002). Because these three events led to only limited public reactions and because they were dealt with quickly and efficiently by US regulators, these incidents did not significantly set back the work of US actors and actor coalitions favoring relatively permissive GM food policies, and did not significantly help coalitions favoring restrictive regulation.

In the EU, actors against genetic engineering have been able to maintain a restrictive regulation of GM foods and crops and to render it more restrictive over the years. Accordingly, supporters have been unable to render the EU's relatively restrictive policy more permissive.

Critics of GM foods and crops in the EU are small-scale and organic farmers, consumers, and environmentalists. These actors have successfully joined forces around the policy goal of rendering GM food policy as restrictive as possible. They have organized informational resources and events, as well as protest campaigns. They are also bound by a discourse about genetic engineering as a profit-oriented, unnatural, and potentially dangerous technology. Consumers add to this the request for the right to choose between GM foods and non GM foods through labeling. In the EU, this anti-GM food discourse has gained mainstream acceptance and support. Extremely important for the EU anti-GM food coalition's success are a series of food and health-related shock events that coincided with the development and marketing of biotechnology and that fomented great public distrust of European regulatory institutions. The shock event with the most profound repercussions was Bovine Spongiform Encephalopathy (BSE) or "Mad Cow Disease," although the probable causes of BSE are completely unrelated to genetic engineering and GM food. The anti-GM food coalition was able to effectively utilize this mood to push for increasingly restrictive GM food policies.

Support for GM food is less consolidated in the EU than is the case in the US. The only consistent supporter of GM food is the biotechnology industry. Mainstream European farmers stand to gain less from agricultural biotechnology than US farmers, and are therefore not strong supporters. Food producers and retailers were supportive when first GM crops came out in the mid-1990s, but the fierce consumer backlash of the late 1990s made them revise their positions. Many supermarket chains went "GM free" during this time, thus exerting backwards pressure on food chain actors supporting GM food. The European Commission and some Member States are very cautious supporters. Moreover, EU actors wanting to promote GM foods have been confronted with hostile public opinion and a low level of

trust in institutions in Europe, a result of several important shock events related to food safety described above.

4. CONCLUSION

This paper has compared US and EU GM food and crop policy and found the former to be relatively permissive, and the latter relatively restrictive. It has argued that this phenomenon can be explained by three main elements: “policy precedents” (different experiences with rDNA research regulation), “policy paradigms” (dissimilar fundamental beliefs and underlying values regarding GM crops and food), and “actors and actor coalitions” (disparate levels of success and cohesion of relevant actors and actor coalitions). In terms of policy precedents, it has been shown that a “policy switch” has taken place between the regulation of rDNA technology and the regulation of its applications (e.g., GM food and crops). This switch from relatively restrictive to relatively permissive in the case of US, and vice versa in Europe forms the basis for understanding current policies. With regard to paradigms, two pairs of paradigms are described: “Economic competitiveness versus environmental and health protection” and “sound science versus precautionary principle.” These paradigms determine and condition GM food and crop policy. Finally, the actors and actor coalitions that had developed around the issue of GM food are an important factor in explaining the content of policy. While in the US, coalitions in favor of permissive policy were more successful, actors supporting restrictive policy were able to influence policy more effectively in the EU.

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