Book Review

Miquel Martín-Casals/Diego M Papayannis (eds), *Uncertain Causation in Tort Law* (Cambridge University Press 2015). 344 pp. ISBN 978-1-107-12836–1. £ 79.99 (hardback).

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I Introduction

The volume under review – Uncertain Causation in Tort Law, edited by Miquel Martín-Casals and Diego M Papayannis – is a collection of ten papers presented at a workshop on the same topic organised in March 2012 by the Legal Philosophy Research Group and the Institute of European and Comparative Private Law of the University of Girona. In the words of the editors, the book aims 'to provide a general overview of the different strategies followed in each legal tradition, and to make explicit the philosophical and epistemological questions that are at stake in each case'.[1]

There are many reasons that render the book attractive to people interested in causation, mass torts, and comparative law in general. In the following pages, after a brief sketch of the contents of the volume (section II), we will explore what we believe are its main strengths and its greatest contributions to the debate[2] on the hot-topic of causal uncertainty (section III). We will, there-

1 *M Martín-Casals/DM Papayannis*, Introduction, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 1, 2.

2 There is little doubt that the topic is up-to-date in many jurisdictions. Suffice it to say that, in England alone, in the last two years three books were published on the same subject: cf *G Turton*, Evidential Uncertainty in Causation in Negligence (2016); *S Steel*, Proof of Causation in Tort Law (2015); *S Green*, Causation in Negligence (2015). Leaving aside the many articles investigating rules on uncertain causation in two or more jurisdictions, the main comparative books published on the same topic are *I Gilead/MD Green/BA Koch* (eds), Proportional Liability: Analytical and Comparative Perspectives (2013) (examining the conditions under which proportional liability can

Note: Sections I, II and IV of the review are co-authored. Lena Zervogianni is the author of section IVA Marta Infantino is the author of sections IVB and IVC.

fore, dwell upon (1) the comparative picture of rules on uncertain causation that the book draws, (2) the emphasis it places on the mass dimension of uncertain causation cases as well as on its procedural consequences, and (3) the analysis it undertakes of the many actors and factors affecting approaches to problems of uncertain causation in (mass) tort litigation. This analysis will then be followed by some final remarks on the book's features (section IV).

II An overview of the contents

As mentioned above, the volume has ten chapters, preceded by a short introduction by the two editors that provides a succinct presentation of the main questions the contributors deal with in their papers. An elaborate index at the end of the book makes it particularly reader friendly. For those who have not yet had the chance to go through the volume, we provide here a brief overview of its contents.

In chapter 1,[3] Jean-Sébastien Borghetti elaborates on the way French courts deal with causal uncertainty in the context of mass torts, drawing on the example of the hepatitis B litigation, where victims claimed that they suffered harmful consequences from the hepatitis B vaccination. What is particular in these cases is that the uncertainty relates not only to specific causation (that is, the causal link between the defendant's act and the particular plaintiff), but also to general causation (that is, the 'generic' causal link between the defendant's act and harmful outcomes such as those claimed by the plaintiff), since no scientific research has convincingly proved any causal connection between the vaccine and the disease. After a thorough critical analysis of the relevant case-law from both civil and administrative courts, Borghetti concludes that 'Hepatitis B litigation is a perfect illustration of the extent to which French lawyers…are willing to twist the rules of tort law in order to grant compensation to plaintiffs perceived as

be imposed through a common questionnaire and answers from national reporters); *L Khoury*, Uncertain Causation in Medical Liability (2006) (focusing on England, Australia, Canada, and France); *A Porat*/*A Stein*, Tort Liability under Uncertainty (2001) (investigating uncertain causation scenarios from a law and economics perspective and through the lens of American, English and Israeli case law); *R Goldberg*, Causation and Risk in the Law of Torts: Scientific Evidence and Medicinal Product Liability (1999) (providing a comparative account of issues relating to proof of causation in cases of alleged drug-induced injury in Europe and North America). One should also mention case 6 in *B Winiger*/*H Koziol*/*BA Koch*/*R Zimmermann* (eds), Digest of European Tort Law I, Essential Cases on Natural Causation (2007).

3 *J-S Borghetti*, Litigation on hepatitis B vaccination and demyelinating diseases in France. Breaking through scientific uncertainty? in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 11–42.

deserving'.[4] He therefore proposes, as an alternative more viable than tort litigation, the creation of a compensation fund that would provide redress to persons vaccinated against hepatitis B on the basis of criteria not including the proof of causation, which is anyway impossible.

The second chapter of the book,[5] written by Miquel Martín-Casals, is dedicated to proportional liability in Spain, focusing, like the previous chapter, on mass tort litigation. The author is sceptical as to the possibility of introducing a proportional liability rule in a continental jurisdiction like Spain, where, unlike in common law, a high standard of proof applies. He claims instead that the loss of a chance doctrine, which should be treated as an alternative approach to causation, rather than as a type of damage, is better fitted to address causal uncertainty. In order to keep the floodgates shut, Martín-Casals points out that the loss of a chance doctrine should apply only when uncertainty derives from 'indeterministic events' and not simply from the difficulty of proving events due to lack of knowledge.

Chapter 3[6] by Bernhard A Koch comes as an answer to the reservations expressed in the previous chapter as regards the application of proportional liability in continental jurisdictions. Koch elaborates on the foundation of proportional liability in Austria that is traced to the works of the prominent legal scholar Franz Bydlinski. As recalled by Koch, Bydlinski noted that, under certain provisions of the Austrian Civil Code on multiple tortfeasors,[7] the likelihood of causation is enough to establish liability. On this basis, Bydlinski developed a dogmatic approach to deal with cases of multiple potential (tortious and non-tortious) causes of damage. His theory has been further developed by Helmut Koziol, who expanded it in order to cover indeterminate plaintiffs, as well as the DES-daughters cases. Although the theory of proportional liability still faces criticism in Austrian legal literature, it has had a considerable influence on case law, and currently dominates the debate on the tort law reform.

Jane Stapleton, in the next chapter,[8] focuses on a related, but narrower topic, namely, uncertain causation in asbestos litigation in the UK. The analysis re-

4 *Borghetti* (fn 3) 41.

5 *M Martín-Casals*, Proportional liability in Spain. A bridge too far? in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 43–66.

6 *BA Koch*, Proportional liability for causal uncertainty. How it works on the basis of a 200-year-old code, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 67–86.

7 § 1301 f of the Allgemeines bürgerliches Gesetzbuch (ABGB).

8 *J Stapleton*, Uncertain causes. Asbestos in UK courts, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 87–113.

volves around mesothelioma cases, where, due to the indivisibility of the disease, traditional rules on proof cannot apply. Stapleton delves into the *Sienkiewicz* case,[9] in which the defendant argued that the 'material contribution to the risk' approach, established in *Fairchild v Glenhaven Funeral Services Ltd*[10] (leading to the joint and several liability of all defendants for the whole damage), should not apply when the victim has been exposed to a single identifiable source of risk. According to the defendant's thesis (which was rejected by the Supreme Court), the ruling in such cases should be based rather on preponderance of evidence, following the 'doubling of the risk' approach. Stapleton considers this approach as statistically invalid, since, in *Sienkiewicz*, potential causes of the plaintiff's disease were not mutually exclusive. Yet, Stapleton also criticises the Court's decision, not so much as to its outcome, but as to the solidity of its argumentation. Moreover, Stapleton expresses concerns about the applicability of the 'material contribution to the risk' approach when the contribution of a specific defendant to the plaintiff's damage, though not trivial, is small in comparison to the contribution of other potential causes. Drawing a parallel with supervening causation cases, she notes that if the same damage would have occurred anyway, due to other concurring causes, then there is actually no recoverable damage.

In chapter 5,[11] Tsachi Keren-Paz draws upon his previous research on sex trafficking[12] to propose an unconventional reading of causation rules that could be applied anywhere to allow sex trafficking victims to get compensation from whoever buys commercial sex. In particular, Keren-Paz argues that, since the demand for paid sex causally contributes to the recruitment of sex trafficking victims, the latter might have a claim in negligence against whoever participated in creating such a demand, notwithstanding that each commercial sex user can be said to be neither a necessary nor a sufficient condition for the victim's sexual exploitation. The proposal, largely inspired by English and US case-law, looks challenging and provocative, especially because, once accepted, it could work for a number of contributions to activities beyond sex trafficking alone.

9 *Sienkiewicz v Greif* [2011] United Kingdom Supreme Court (UKSC) 10.

10 [2002] United Kingdom House of Lords (UKHL) 22. This approach has also served as the basis of *Barker v Corus UK Ltd* [2006] UKHL 20, where one of the possible causes of mesothelioma was due to the victim's own activity. In the latter case though the court opted for several (instead of joint and several) liability of the defendants. This approach has subsequently been overturned by legislation (sec 3 of the Compensation Act 2006).

11 *T Keren-Paz*, Clients' demand-based contribution to trafficking. Overcoming causation and attribution difficulties, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 114–164.

12 *T Keren-Paz*, Sex Trafficking: A Private Law Response (2013).

This theoretical perspective is also the lens adopted by Michele Taruffo in the following chapter,[13] where he examines the main factors of complexity that affect the reconstruction and assessment of (what we consider to be) facts in mass tort cases. Taruffo dwells in detail upon two possible sources of that complexity: the number of claimants and their constituting a homogenous class, on the one hand and the uncommon or complicated factual patterns of the events alleged by the plaintiffs, on the other hand. Despite acknowledging that complexity in mass tort litigation cannot be reduced, Taruffo seems to suggest that a proper understanding of the problems at stake might help manage it and keep it under control.

Different is the focus of chapters 7 and 8, which are both centred around US law. Chapter 7[14] comments on the use of the so-called 'Bradford Hill criteria' by American courts as a legal standard for the admissibility of expert testimony. Susan Haack stresses that Hill's works focus on indicia, rather than criteria, of when correlation may indicate causation and criticises the US courts' tendency to consider these indicia as a sufficient, or even necessary, proof of causation. In addition, she points out that the field of application of the 'Hill criteria' is meant to be constrained to epidemiological data and not to be extended beyond the epidemiology domain.

The focus of chapter 8,[15] by Michael D Green and Joseph Sanders, is again on expert testimony, with particular regard to the admissibility test developed by the US Supreme Court for toxic tort cases in *Daubert v Merrell Dow Pharmaceuticals*[16] (according to which expert testimony can be admitted only if its underlying reasoning or methodology is scientifically valid and can properly be applied to the facts at issue). Green and Sanders show that post-*Daubert* judges have often applied the test not only to the admissibility of expert testimony, but also to the sufficiency of scientific evidence brought before the court. The survey demonstrates that variance in the US judicial responses to uncertain causation scenarios are closely linked to the ever-changing interpretations given by courts to the *Daubert* standards.

13 *M Taruffo*, Proving complex Facts. The case of mass torts, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 165–175.

14 *S Haack*, Correlation and causation. The 'Bradford Hill criteria' in epidemiological, legal and epistemological perspective, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 176–202.

15 *MD Green/J Sanders*, Admissibility versus sufficiency. Controlling the quality of expert witness testimony in the United States, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 203–239.

16 509 United States Supreme Court Reports (US) 579 (1993).

Chapter 9[17] by Andrea Giussani moves back to the theoretical level (although references are mostly rooted in the US and Italy), to explore the many functions that group litigation might play, and the consequences that these different functions might have on the quantity and quality of the evidence required to prove causation. More specifically, Giussani stresses that group litigation might, for instance, be used as a mechanism for aggregating individual homogeneous claims or as an instrument for the enforcement of collective rights. Since the problem of proving causation in mass cases articulates itself in different ways, depending on the function of group litigation under the circumstances, Giussani invites one to carefully identify that function in order to best assess which evidence might be needed.

Group litigation is the focus of chapter 10[18] as well. The study by SI Strong, however, relies on a mass international investment law case, *Abaclat v Argentine Republic*,[19] adjudicated under the International Centre for Settlement of Investment Disputes (ICSID) rules to explore the limits and potential of arbitration in transnational mass tort law disputes where uncertain causation is at stake. Strong, too, emphasises that not all kinds of transnational mass torts are akin, and that, therefore, not all of them are amenable to arbitration. On the basis of such an assumption, Strong examines under which conditions mass arbitration might be a good option, and illustrates advantages and shortcomings of arbitration vis-à-vis other (judicial) forms of collective relief in cross-border disputes.

III Three strengths in one book

As the above overview makes clear, the authors' contributions to the study of uncertain causation are diverse, touching upon a variety of significant issues of practical importance that arise in such cases. In the following pages, we identify and explore in more detail what we consider to be the three main strengths of the book: (1) the uniqueness of the comparative overview the book offers; (2) the emphasis it places on rules of evidence, expert testimony, and aggregation of

17 *A Giussani*, Proof of causation in group litigation, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 240–249.

18 *SI Strong*, Mass torts and arbitration. Lessons from Abaclat v. Argentine Republic, in: M Martín-Casals/DM Papayannis (eds), Uncertain Causation in Tort Law (2015) 250–333.

19 ICSID Case No ARB/07/5, Decision on Jurisdiction and Admissibility dated 4 August 2011, available at <italaw.com/documents/AbaclatDecisiononJurisdiction.pdf>. The case was the first mass arbitration in the ICSID context and involved a joint claim brought by 60,000 Italian bondholders against Argentina under various investment treaties.

claims; and (3) the plethora of insights it provides into the many actors and factors that, in every jurisdiction, affect theoretical frameworks and concrete outcomes.

A The comparative picture

The first and most evident value addition of the book lies in the comparative picture it sketches of the way given jurisdictions deal with uncertain causation, especially (but not only) in mass tort cases. This picture emerges essentially from chapters 1–4, and to a lesser extent, from chapters 7 and 8 of the book. Since the chapters focus on different questions,[20] they evidently do not follow the same structure. This notwithstanding, some recurring topics that refer to the core issues at stake can be clearly identified.

The first crucial problem when it comes to uncertain causation pertains to the procedural rules in place, which are often decisive as to the outcome of the case. It is, thus, no surprise that all aforementioned chapters refer to the standard of burden of proof. From the volume at hand, it becomes evident that in continental European countries, where the standard of proof is in principle high, close to (reasonable) certainty, discussions about the reversal of the burden of proof are more prominent than in common law jurisdictions, where the preponderance of evidence is enough to sustain the plaintiff's claim.[21] Similarly, it is only in continental Europe where proof by exclusion seems to be a viable alternative for the plaintiff.[22]

Nevertheless, dealing with uncertain causation solely through the lens of procedural rules is not enough to yield satisfactory results. The solution is, therefore, sought in many legal systems in substantial rules that introduce deviations from the *conditio sine qua non* test. In Austria, the probability of causation may be enough to establish the (proportional) liability of the defendant.[23] In France and

20 See above, under section II.

21 Especially *Borghetti* (fn 3) 23 and 26 and *Martín-Casals* (fn 5) 47f. On the rule of preponderance of evidence in common law see *Stapleton* (fn 8) 92. On this issue see in more detail *M Infantino/E Zervogianni* (eds), Causation in European Tort Law (forthcoming 2017), with further references.

22 *Martín-Casals* (fn 5) 52 mentions that the Spanish Supreme Court adopts this approach in cases of product liability, following the relevant German case-law. For proof by exclusion in France see, among many others, *C Quézel-Ambrunaz*, Essai sur la causalité (2010) 234f, and, in English, *C van Dam*, European Tort Law (2nd edn 2013) 325.

23 See *Koch* (fn 6) 71 ff, referring to Bydlinski's approach. It is worth noting that according to the prevailing opinion, the liability of multiple potential tortfeasors is joint and several. It is in cases where one potential cause lies within the victim's sphere that proportional liability applies.

Spain, the plaintiff may be granted (less than full) compensation in case of loss of a chance.[24] In England and Wales, the 'material contribution to the risk' rule has been adopted in the context of asbestos related injuries in order to establish the liability of all (potential) tortfeasors, even if one of the risk factors can be traced back to the behaviour of the victim himself.[25]

Although all the aforementioned rules have been developed as a reaction to the dead-end 'traditional' procedural rules in cases of alternative causation, the volume makes clear that each rule follows a different dynamic. This is particularly evident when one of the possible causes of damage falls within the victim's sphere. In these cases, the proportional liability rule and the loss of a chance doctrine make the (potential) tortfeasor(s) liable only for part of the harm.[26] In contrast, under the material contribution to the risk approach, as applied in mesothelioma cases,[27] all (potential) tortfeasors are jointly and severally liable for the whole damage, provided that their contribution to the damage has been more than trivial. More generally, the scope of application of the proportional liability rule and of the loss of a chance doctrine is undoubtedly broader as compared to that assigned to the material contribution to the risk approach.

Another significant value added of the book is the discussion of the issues raised in (mass tort) uncertain causation cases as regards the use of statistics as

24 For the loss of a chance in Spain see *Martín-Casals* (fn 5) 59ff. For the French origins of the doctrine, see in English, among many others *van Dam* (fn 22) 337.

25 *Barker v Corus UK Ltd* [2006] UKHL 20, and the relevant reference of *Stapleton* (fn 8) 91.

26 According to *Martín-Casals*, who pleads in favour of the loss of a chance doctrine, proportional liability is more compatible with legal systems following the rule of preponderance of evidence rather than a high standard of proof (*idem* (fn 5) especially at 44 and 49, where the author claims that the degree of conviction required in countries with a high standard of proof in order to rule for the plaintiff prevents the arbitrariness of the outcome; overcompensation of the plaintiff would be incurred in less cases than under a preponderance of evidence rule). This point is nevertheless prone to critique, insofar as the argument can be reversed: under-compensation of the plaintiff, in the sense of rejection of his claim although there is a significant probability that the damage has been caused by the defendant, will ensue in many more cases in a legal system with a high standard of proof than under a rule of preponderance of evidence. Proportional liability seems thus to balance the interest of the parties better than, and irrespective of, any particular liability threshold. See especially *S Shavell*, Uncertainty over Causation and the Determination of Civil Liability (1985) 28 Journal of Law & Economics (J L & Econ) 587, esp 588, and *M Faure/V Bruggeman*, Causal Uncertainty, in: L Tichý (ed), Causation in Law (2007) 105–122 at 112. See also *Koch* (fn 6) 81f, who convincingly confronts the criticism against proportional liability.

27 The aliquot liability established by *Barker v Corus* was overturned by sec 3 of the Compensation Act 2006, that establishes joint and several liability of all (potential) tortfeasors. However, this section applies only to mesothelioma claims, so it would seem that the ruling of *Barker v Corus* on proportional liability may be still applicable if the plaintiff suffered from another disease, such as cancer.

evidence, especially for proving general causation. That being said, the very distinction between general and specific causation is not always clear in courts' practice.[28] The use of statistics in itself as evidence is associated with significant difficulties as to the assessment of their validity and reliability,[29] difficulties which may be largely attributed to lawyers' and judges' (plus, in the US, juries') lack of scientific expertise. The problem is more acute in the United States, where, unlike most countries of continental Europe,[30] experts are commissioned by the parties to the trial and not by the court.[31] Since this may compromise the quality of the (allegedly) scientific data gathered, US courts have developed specific criteria for the admissibility of such evidence, which are, nevertheless, still rather ambiguous.[32]

Finally, a common concern, expressed in all chapters, is the need to constrain liability within reasonable limits. Borghetti notes that French lawyers are willing to 'twist the rules of tort law in order to grant compensation to victims perceived as deserving'.[33] As he perceptively puts it, the understanding of tort law by French case law and part of the legal literature resembles a Swiss army knife: tort law is considered to be useful for many purposes, but at the end of the day there is only one function – namely corrective justice – that it can properly fulfil.[34] Martín-Casals points out that Spanish courts have wide discretion in tort cases[35] and often use it in order to 'alleviate the plaintiff's need for social assistance'.[36] Such an effect may be detected in the US as well, especially in jury trials.[37] These concerns about overcompensation grow seemingly larger the more special rules are developed, deviating from the traditional approach to causation. This is one of the reasons why many contributors, while praising the role played by such

28 See *Borghetti* (fn 3) 29 ff; *Haack* (fn 14) 196 f; *Green*/*Sanders* (fn 15) 218. Cf also *Stapleton* (fn 8) 103.

29 *Stapleton* (fn 8) 93 ff; *Haack* (fn 14) esp 189 ff; *Green*/*Sanders* (fn 15) with extensive analysis of the relevant US case law.

30 See eg *Borghetti* (fn 3) 20, referring to French law.

31 *Green*/*Sanders* (fn 15) 204, refer in this context to 'junk science'.

32 See in detail *Haack* (fn 14); *Green*/*Sanders* (fn 15).

33 *Borghetti* (fn 3) 41

34 *Borghetti* (fn 3) 39 f.

35 *Martín-Casals* (fn 5) 45 f.

36 *Martín-Casals* (fn 5) 52.

37 See for instance *AJ Tomkins*/*A Applequist*, Constructs of Justice. Beyond Civil Litigation, in: BH Bornstein/LR Wiener/RF Schopp/SL Willborn (eds), Civil Juries and Civil Justice. Phychological and Legal Perspectives (2008) 257–272, at 260 and, in general about the issue in question, *T Keren-Paz*, Torts, Egalitarianism and Distributive Justice (2007). Cf also *Green*/*Sanders* (fn 15) 205 on the inability of juries to assess complex scientific arguments.

rules, are keen to introduce caveats and limitations to their application. The need to keep liability under control is, for instance, invoked by Martín-Casals in support of the loss of a chance doctrine, as compared to proportional liability.[38] Koch stresses Bydlinski's cautiousness when developing the proportional liability theory,[39] and specifically addresses the critique to proportional liability which is based on the floodgates argument.[40] Stapleton expresses her concerns as to the scope of application of the material contribution to the risk, as this could lead to huge litigation waves against the state, given that asbestos has been extensively used in hospital and school buildings.[41]

The creation of compensation schemes in cases of mass torts may be an effective way to address such concerns, although this has not been sufficiently tested in practice in a wide range of cases. The issue is briefly touched upon in two chapters,[42] but it is definitely worth exploring further. Drawing attention to this option is certainly another one of the book's merits.

B Uncertain causation on trial

Through the comparative overview sketched in chapters 1–4 and 7–8, and thanks to the two essays of Taruffo and Giussani, respectively in chapters 6 and 9, the book also offers a theoretical and practical analysis of the many links between rules on uncertain causation on the one hand, and rules on burden of proof, evidentiary standards, expert testimony and aggregation of claims on the other hand.

As becomes evident from the comparative picture sketched above, in many cases of uncertain causation, courts might resort to a variety of evidentiary and procedural techniques to bypass traditional tort law principles requiring the plaintiff to prove causation with certainty. When circumstances so mandate, judges might – depending on the technicalities available to them in their legal tradition – modify the standard of persuasion, relax evidentiary requirements,

38 *Martín-Casals* (fn 5) 63 and 65.
39 *Koch* (fn 6) 78 f.
40 *Koch* (fn 6) 80.
41 *Stapleton* (fn 8) 110 f.
42 See *Borghetti* (fn 3) 40, who refers to a French *de lega ferenda* proposal for the alleged victims of hepatitis B vaccination, and *Stapleton* (fn 8) 111, who mentions that a compensation scheme has been already established in the UK for mesothelioma victims, but there is not yet enough evidence as to its effectiveness.

reverse the burden of proof, give great weight to presumptions, or be satisfied with statistical and epidemiological evidence.[43]

This is well-known on both sides of the Atlantic. What is much less explored in Europe, as compared to the US (where, following the adversarial procedure, expert witnesses are generally appointed by the parties rather than by judges, and are therefore more exposed to the risk of manipulating science to support their clients' position[44])[45], is the role that scientific evidence plays in the adjudication of these claims. Indeed, the book provides telling examples of judicial struggles in trying to find a compromise between two conflicting needs: that of relying upon experts' knowledge, on the one hand, and that of maintaining autonomy in assessing facts and applying the law on the other.[46] Through the essays contained in the volume, readers get a clear and vivid picture of the varying intensity of those struggles, and of the many forms in which they take place, depending on the different legal and cultural constraints affecting judicial attitudes towards science.

The volume has the merit of underlining another related dimension of uncertain causation cases that is not always adequately stressed by specialised scholarship, especially the European one, on the issue. European scholars often approach problems of uncertain causation with little or no consideration for the

43 For an account of the different forms that such technicalities may take, as far as European jurisdictions are concerned, see *Infantino/Zervogianni* (fn 21).

44 See for instance *Green/Sanders* (fn 15) 204.

45 Literature in the US on this point is immense. Suffice it to mention *S Jasanoff*, Science at the Bar: Law, Science and Technology in America (1995); *MR Damaška*, Evidence Law Adrift (1997); *DL Faigman*, Legal Alchemy: The Use and Misuse of Science in the Law (1999). See also *D Faigman/J Blumenthal/E Cheng/J Mnookin/E Murphy/J Sanders*, Modern Scientific Evidence: The Law and Science of Expert Testimony (2013–14) vols I–V; *Federal Judicial Center/National Research Council*, Reference Manual on Scientific Evidence (3rd edn 2011). With specific regard to the proof of causation, see *J Macchiaroli Eggen*, Toxic Torts, Causation, and Scientific Evidence after Daubert (1994) 55 University of Pittsburgh Law Review (U Pittsburgh L Rev) 890; *MA Berger*, Eliminating General Causation: Notes Towards a New Theory of Justice and Toxic Torts (1997) 97 Columbia Law Review (Colum L Rev) 2117. In continental Europe the issue is dealt with, usually in brief, in general treatises and commentaries on civil procedure, while only a few works delving into the particular topic have been published recently. See *P Monaco*, La toxic tort litigation. Analisi e comparazione dell'esperienza statunitense (2016); *D Mayr*, Gestaltung von Sachverständigengutachten (2013) 5 Der Sachverständige 128–131; *È Truilhémarengo* (ed), Preuve scientifique, preuve juridique (2012); *G Bovey*, Le juge face à l'expert, in: C Chappuis/B Winiger (eds), La preuve en droit de la responsabilité civile. Journées de la responsabilité civile (2010); *M Taruffo*, Prova scientifica (dir. proc. civ.), in: Enciclopedia del diritto. Annali, II, 1 (2008) 965; *idem*, La prova scientifica nel processo civile (2005) Rivista Trimestrale di Diritto e Procedura Civile (Riv Trim Dir Proc Civ) 1079.

46 On this struggle, see *Borghetti* (fn 3) 30–36; *Stapleton* (fn 8) 102–104; *Green/Sanders* (fn 15).

individual/mass nature of the underlying tort – as is shown by the fact that the 'three hunters' case still dominates the debate on the point.[47] Against such a state of the art, the volume stands out because it stresses that, in practice, cases of uncertain causation – be they involving exposure to asbestos or toxic substances, harmful vaccination, environmental harm, discrimination at work, or stakeholders' financial loss – very often concern a large numbers of victims. Virtually all the contributors emphasise (in a way so pervasive that the volume could have well deserved the title of 'Uncertain Causation in Mass Tort Cases') the link that exists between collective harm on the one hand and the development of rules on uncertain causation on the other hand. This emphasis on the mass character of many 'uncertain causation' cases in the real world explains why the volume focuses much of its attention on the menu of arrangements for aggregate treatment of collective claims.[48] At least for European readers,[49] such attention is a praiseworthy exercise of realism, insofar as it sheds a much needed light on concrete scenarios in which uncertain causation problems commonly arise, and on the diverse ways in which, even in the absence of institutional mechanisms for collective redress, legal systems deal with resolution of mass 'uncertain causation' tort claims.

C The dynamics of rules on uncertain causation

From a similar search for realism comes a third great merit of the volume, that is, the emphasis it places on the many actors and factors that, within and outside tort adjudication, affect theoretical frameworks and concrete outcomes in (mass) cases of uncertain causation.

What emerges from the book is that legal systems' approaches to dilemmas of uncertain causation are not defined by tort statutes, judicial precedents, and/or scholarly writings only. Understanding approaches to uncertain causation cases actually requires taking into consideration, apart from the institutional arrangements on the aggregation of claims, the many interrelationships between tort law and other redress avenues, such as those provided by the criminal

47 Cf *Martín-Casals* (fn 5) 55; *Koch* (fn 6) 70f; but also *Stapleton* (fn 8) 89 and *Keren-Paz* (fn 11) 137f.

48 See esp *Taruffo* (fn 13); *Green/Sanders* (fn 15); *Giussani* (fn 17) and *Strong* (fn 18) esp 256–259.

49 The European contribution to the debate on mass tort justice is still minimal in comparison to the US. Among the few scholarly works, see *WH van Boom/G Wagner* (eds), Mass Torts in Europe: Cases and Reflections (2014); *J Steele/WH van Boom* (eds), Mass Justice. Challenges of Representation and Distribution (2011).

process,[50] alternative compensation schemes,[51] insurance practices,[52] and alternative dispute resolution mechanisms.[53] Equally important are elements living 'in the shadow' of the official system of tort law adjudication, such as general views about the role that the state and public regulatory agencies should play in controlling harmful activities,[54] and the amount of scientific and legal notions associated with mass injuries circulating in popular culture and public life.[55] Legal élites' openness to dialogue with other cultures might be leaving an imprint as well. Jane Stapleton, for instance, investigates how reliance upon US and Canadian precedents helped English courts to deal with uncertain causation problems in asbestos litigation.[56] Susan Haack shows how the transplant of the criteria set out by a British medical statistician allowed US causation experts to build their own approach to epidemiological evidence.[57] On the civil law side, the contributions of Taruffo and Giussani make clear the influence that US legal culture has on Italian scholarly debates,[58] while Martín-Casals explains how the emergence of new a generation of judges coincides with the import of Anglo-German notions in the Spanish approach to uncertain causation.[59]

50 See for instance *Martín-Casals*' reference to criminal litigation in the Spanish colza oil case: *idem* (fn 5) 51.

51 In cases of mass injuries, European states often establish by legislation publicly organised regimes that carve out of ordinary tort law any claim for compensation that would otherwise fall within its scope. See the references to the compulsory vaccination compensation scheme in France (*Borghetti* (fn 3) 15 f), to the payments made by Spanish social security to victims of toxic colza oil (*Martín-Casals* (fn 5) 51, fn 19), and to the creation of the extraordinary Diffuse Mesothelioma Scheme in the UK (*Stapleton* (fn 8) 111). Similar forms of intervention can also be found in the US: think for instance of the September 11th Victim Compensation Fund and of the Deepwater Horizon Oil Spill Trust. In general, on this issue, *D Jutras*, Alternative Compensation Schemes from a Comparative Perspective, in: M Bussani/AJ Sebok (eds), Comparative Tort Law. Global Perspectives (2015) 151; *WH van Boom*/*M Faure* (eds), Shifts in Compensation Between Private and Public Systems (2007).

52 See Stapleton's analysis of the links between insurance practices and the judicial approach to asbestos injuries in the UK and in the various US States: *Stapleton* (fn 8) 88f.

53 See esp *Strong* (fn 18) on arbitration.

54 See *Haack* (fn 14) 178.

55 See the contributions on France and Spain by *Borghetti* (fn 3) and *Martín-Casals* (fn 5).

56 *Stapleton* (fn 8) 89.

57 *Haack* (fn 14) 179–181.

58 *Taruffo* (fn 13); *Giussani* (fn 17).

59 *Martín-Casals* (fn 5) 46; see also the numerous references in his report to German law at 52 and 66.

IV Final remarks

At a first glance the book may to some extent puzzle its readers. Contributors' multifarious approaches[60] to the subject matter sometimes makes the connection between the chapters loose. The order of the chapters contributes to increase such loosening. The book interposes descriptive essays on specific jurisdictions (chapters 1, 2, 3, 4, 7 and 8), contributions adopting a theoretical perspective on mass tort litigation (chapters 6, 9 and 10), and more creative proposals that have so far been less explored in theory and practice (chapter 5 and again 10). Moreover, the selection of the jurisdictions examined leaves out of the picture not only Eastern and Northern Europe, but also Western European legal systems whose approach to uncertain causation might have been worthy of investigation. For instance, an analysis of the Dutch experience, courts of which notoriously adjudicated one of the first European cases of market share liability in the nineties[61] and have openly accepted proportional liability,[62] would have enriched the book's comparative overview. A chapter with some concluding remarks by the editors, or even a foreword, would maybe have e helped to summarise the volume's contribution to the debate.

All these points, however, are largely related to the readers' idiosyncrasies, publishing and space constraints, as well as to the very format of the book – that is, a collection of revised proceedings of a conference where scholars with different geographical, cultural and professional backgrounds presented their own variations on a common theme. Further, in many of the above sources of puzzlement lies the book's strength. For instance, the lack of an obligation of uniformity allowed contributors to take a variety of perspectives on the issue, thus enriching the comparative literature on the subject with a much-needed interdisciplinary inquiry, and opening up creative possibilities that have so far been underexplored in theory and practice. But the volume's merits go well beyond its inner multiplicity of voices. Its three strengths explored above (II) place it undisputedly among the most noteworthy recent contributions to the discussion on uncertain causation.

60 Chapters also diverge in style. Chapter 10, due to the citation style of literature and cases in the footnotes, provides a final bibliography with the books, articles and cases cited. A final bibliography is missing in all the other chapters.

61 Hoge Raad (Dutch Supreme Court, HR) 9 October 1992, Nederlandse Jurisprudentie (NJ) 1994, 535.

62 The Dutch Supreme Court accepted the theory of proportional liability in *Nefalit/Karamus*, HR 31 March 2006, NJ 2011, 250.