Conclusions

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Chapter 17
Conclusions

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17.1 The Current World Risk Society

At the beginning of this book we set out the "why" and "what" questions associated with global risks and regulation. The book addresses these two ambitious questions in a number of different ways.

17.1.1 The "Why" of Business Risk Regulation

The various contributions discussed the rationales justifying regulatory action and illustrated how different these may be in today's economically challenged and geo-politically changing world. A mix of economic, legal, sociological, political and public administration perspectives shapes the reasons triggering regulator action about food, drugs, climate change and financial markets.

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Even within the framework of these disciplines, no absolute statements can be made with regard to macro relations between risks, costs, and regulation. This is because it all depends on the way examples are derived from distinct sectors of the economy at discrete time periods. On the one hand, according to public economic theory, more regulation can cause higher costs. For instance, the Laffer curve illustrates how regulation can be welfare enhancing up to a certain point but also—once it reveals excessive costs—how it may become harmful to society (Chaps. 6, 8 and 15).

Similarly, transaction costs (in terms of monitoring costs of the regulator, bonding costs by the regulated private economic entities and the costs of residual loss for non-compliance) can be seen as objective burdens of regulation, which call to be compared to the economic benefits of regulation (Chap. 7). On the other hand, however, evidence from recent climate, food and (more recent) financial crises shows that less regulation has not been automatically beneficial for economic development. This explains the ongoing regulatory activism on both sides of the Atlantic on the regulation of financial services. However, in Chap. 6 it is argued that the new Basel III supervisory measures for the financial sector may be very costly, even taking into account the societal damage the insufficient regulation leading to the credit crisis has brought about. They may bring regulation beyond the top of the regulatory Laffer curve. On the other hand, according to Chap. 8, regulation so far has not hindered economic growth so that the top of the Laffer curve has not yet been reached.

Any reform of the regulatory risk framework presents policymakers with challenging legal issues. For example, legal barriers to the competitiveness of the European food industry need to be fully understood before suggesting ways to improve the legal system (Chap. 5). Common rules governing international transactions are perceived as the indispensable starting point of international trade (Chap. 12). At the same time, the legal framework carries the potential to facilitate the way risks are assessed and managed. Under this perspective the idea of "cross-border consistency" in the assessment phase of legislative proposals represents an exciting prospective development in EU risk frameworks (Chap. 11).

In turn, the incorporation of sociological perspectives requires integrated approaches to risk assessment, management and communication, such as those proposed by the International Risk Governance Council (Chap. 2). Yet current political constructions often fail to reflect the risk preferences of the wider public. This has been demonstrated in the financial crisis, which emphasised how financial regulation is not aligned with social preferences (Chap. 6). What is more, the political account of the public indignation over the responsibilities of financial institutions in relation to the global financial crisis (e.g. higher consumer protection and lower tax payer exposure) does not always reflect the needs of the global market.

In this space, the public administrative perspective offers solutions that are aimed at keeping public administration, regulatory intervention and the interaction between economic actors and regulators up to speed with an increasingly dynamic set of risks. Instruments which focus on reducing the administrative costs of regulation are destined to play a vital role in this domain. They are likely to succeed only when applied systematically and are fully understood by those vulnerable economic and non-economic actors who are affected the most by excessive regulation (Chap. 9).

The Standard Cost Model is one example of such instruments. Yet future applications of this tool face today new challenges with regard to compliance and benefit accounting (Chap. 14).

17.1.2 The "What" of Business Risk Regulation

Several policy areas were covered in this volume in order to address the question of what the object of regulation is. These include financial, fiscal, competition, social, trade and environmental policies. The book responds to current policymakers' interests in the role of business regulation in today's world risk society. In particular, by looking at the costs of State intervention in the financial sector, it discusses the possible responses to the current economic crisis and addresses the broader conceptual discussion about more or less regulation in the financial sector (Chap. 6). The fiscal burdens of regulation are typically examined through Laffer curves (Chap. 15). The most recent developments of the proposed Tobin Tax for financial transactions and with the new Basel III rules for macroprudential supervision provide further examples of mechanisms aimed at the repair of the failure of financial markets. Competition issues are addressed in terms of cross-border consistency of regulation (Chap. 11) and competitiveness of the European food industry (Chap. 5). Competition for scarce natural resources between countries will arguably involve higher levels of risk to the market than commercial risks (Chap. 12).

In addressing the question of what is regulated in a world risk society, some contributions touched upon concepts, conditions and phenomena that inevitably determine the ontology of global risk regulation. The concept of trust shapes not only the relationship between regulators and regulated (e.g. pharmaceutical industry), but also the very object (i.e. the "what" question) of policies (Chap. 10). Similarly, though for different reasons, the scientifically institutionalized condition of climate change is a common driver in determining world governments' environmental policies for the forthcoming decades (Chap. 4). The upsurge of a risk society can be seen as the phenomenon which fosters European regulation in areas such as food safety, chemicals, pharmaceuticals, medical devices, crop protection and GMOs and in the near future nanotechnologies, food from cloned animals and human enhancement applications (Chap. 3).

The perspective of public sector economics teaches that answers to the "why" and "what" questions are related to the question why the government or some other authorities are bound to intervene in the market process anyhow. The answer is that the visible hand of state intervention is needed whenever the invisible hand of the market mechanism does not lead to as much welfare as possible. This is the case when the outcome of the economic process evokes social preferences for redistribution, when there is a need for provision of public goods, and, from the viewpoint of regulation most importantly, when there is market failure (Chap. 7). Examples of market failure are negative externalities, such as those emerging from systemic crisis of the financial markets (Chap. 6), from environmental damage (Chap. 4), from

risks associated with the use of drugs from the pharmaceutical industry (Chap. 10), from risks from long and complex food supply chains (Chap. 5) as well as those stemming from protectionist trade policies (Chap. 11).

Once a more or less satisfactory answer is given to the "why" and "what" questions, next comes the question on how the regulation can be designed at lowest possible costs and with highest societal benefits. Indeed, according to economic theory, the best design of the regulation is the one that brings about the highest welfare gains as compared to a situation without regulation. Yet in practice the net benefits from regulation, as a result of gross benefits minus costs, are difficult to establish, especially when regulation concerns externalities with a high risk component. Costs can be quantified using methods like the SCM (Chap. 14) or implementation costs based on agency theory (Chap. 7), but the uncertainty margins of the results are large. That is even more true for the calculation of the benefits of regulation. These benefits are equal to the opportunity costs of not regulating, but obviously in case of risks these costs are hard to calculate as they often relate to the costs of disasters with low probabilities but high and hopefully unknown costs when the risks materialize. A common and, maybe, the best available solution for the how question is to institutionalize regulation. The theory of new institutional economics provides ample evidence that institutions may reduce transaction costs, and more specifically in the case of regulation, the implementation costs of regulation (see e.g. Ménard and Shirley 2005). This edited volume provides ample examples of such institutionalizing of regulation in formal or informal organizations (Chaps. 3–6, 9–12 and 16). A major advantage of institutionalization of risks assessment and risk regulation is that it may enhance trust, so as to reduce the implementation costs of regulation (Chaps. 7 and 10).

17.2 The Features of Global Risk Regulation

At the end of this journey through the world risk society three dominant features seem to dominate and, consequently, govern the relationship between risk and regulation in the global economy.

First, the identification of those who make critical decisions on significant global risk issues appears clear-cut in some cases (e.g. financial sector, pharmaceutical industry), but rather blurry in other cases (e.g. food industry, climate change, and infectious diseases). Indeed, risk decision makers are not always as few as one might think (Jasanoff 2005). This makes the risk analyst's work, or that of any other observer, increasingly more complicated. The cross-border nature increasingly characterizes global risks. Moreover, the high level of interconnectivity existing between them questions the very taxonomy of risk decision makers, i.e. who they are and how they can be classified. This outcome calls for the adoption of multiple disciplinary lenses and approaches that go beyond traditional divisions between developing and developed countries, private and public sector, service and manufacturing industries. It is against this backdrop that the multi-voice narrative of

this edited volume has facilitated the reconstruction of some of the interactions between risk assessors (e.g. the climate scientists) and risk managers (e.g. the decision makers who sat at the Copenhagen Conference). However, the different institutional settings and risk cultures suggest that the link between risk assessors and risk managers cannot always be unambiguously disentangled. In particular in the absence of sentiment of belonging to a common epistemic framework, their uneasy relationship often fails to effectively integrate scientific expertise into regulatory action.

Second, if the identification of risk decision makers is characterized by uncertainty, the identification of the actors affected by global risks is at times equally problematic. For instance, in order to prevent systemic failures it might be considered necessary to intervene in financial markets by regulating financial institutions with instruments that in turn affect consumer protection and investors' exposure to risk. Common global objectives for mitigating climate change imply that the non-implementation of, for instance, energy efficiency policies in developed countries might have a negative impact on the cost-effectiveness of renewable sources of energy for global investors in developing countries. However, all contributions in this book imply that the final recipient of societal risks is ultimately a broadly defined public—exposure to societal risk reduces social welfare, even more so when the public is risk averse. The technical and scientific features of global risks mean that in several instances the public is detached from risk decisions. Although risk regulation emerges as one way to ensure specialized decisions on risk, several examples discussed in this book highlight that often third actors act on behalf of the public. Examples from the pharmaceutical and food industry show that the media typically cover multiple roles while informing the public; they shape its risk perception and summarize available research knowledge on global risks which are both inherent to and distant from common people's everyday life. This in turn affects the role of trust in risk–benefit analysis and risk decision-making.

Third, the fact that risk recipients are moving targets means that the assessment of global risks cannot rely on deterministic baselines. Two examples can be drawn from financial and climate risks.

The non-deterministic basis for assessment is the problem faced in the global financial market where the oversimplification of existing risk assessment practices can be singled out as the most significant reason for the non-identification of the key factors that could have prevented the most recent financial crisis. The non-linear relationship between risk and hazard implies that simplistic and linear models negatively impact on any accurate depiction of the risks in financial markets. Unsuspectingly, the uncertainty on non-linear errors produced by each financial transaction leads to higher uncertainty about aggregate levels of transactions. In other words, a mistake is just a mistake. A mistake multiplied by thousands is a disaster. In economic terminology this phenomenon is labelled the "fallacy of composition" where the effect at the macro-level is more than the sum of the effects at the micro-level. Neglecting the fallacy of composition may have been one of the major failures incurred by the financial regulators, thus causing the credit and debts crises of 2007–2012 (and beyond?) (Den Butter 2011).

In climate change risks, the unit of analysis moves from single financial transactions to the weight of carbon emissions, but the mechanism remains similar. Climate science agrees that co-ordinated action is necessary when tackling climate change. Carbon emission reduction targets can be met through either carbon taxes or emission trading schemes, such as the ETS in Europe. The latter has been implemented for over 10 years across several European industries and now extended to the airline sector (Alemanno 2011). However, discrepancies between assessments of the allocation of allowances and actual performances (in terms of actual carbon emissions) have increased investment risks in allowances and caused significant reductions in carbon prices.

17.3 Complexity and Contagion

It has already been mentioned that the negligence of the financial regulators has been a major cause of the recent financial and debt crises. Banking regulation was mainly concerned with individual banks, the so-called micro-prudential regulation, and the risks for a systemic crisis were disregarded. Now that the crisis has caused great societal damage, more understanding has been attained for the mechanisms at work. It is realized that much more attention should have been paid to macro-prudential regulation which considers the financial system as a whole. Here financial innovations, such as securitization, introduced complexities in the system which enhanced the risk of contagion. The supervisors of the financial system were unaware, or too little aware, of the externalities that these complexities bring about. The externalities were not adequately internalized, so that contagion was not avoided. Moreover globalization caused the financial industry to be so much connected and entangled on a worldwide scale that banks and countries were soon "too big to fail" or to formulate it better, "too connected to fail". The bailouts of governments further strengthened this connectivity and the moral hazard associated with it. As the chapters of this book, apart from Chap. 6, do not explicitly consider the regulatory shortcomings that the financial crisis revealed, some attention is given here to recent literature which zooms in on the economic mechanisms at work. The literature also suggests how targeted regulation may prevent future risks of contagion.

Gallegati et al. (2008) provide an interesting model-based analysis of the implosion of the financial system. These authors, including Nobel laureate Stiglitz, show that securitization has led during the good times of rising housing prices to a strong interdependence of financial institutions. In the downturn of the economic tide, when housing prices began to fall, this interdependence proved through contagion to result in a negative externality, not foreseen by the supervisors. The externality is that the initial shock of falling house prices, which reduced the value of the packages of mortgages held by banks, evoked a global distrust between the banks on the value of their mutual debts. The analysis thus shows why the strong interdependence of financial institutions caused an amplification of the initial shock rather than absorption of the shock due to the risk diversification. The analysis also

provides a lesson on how a different and better supervision may in the future prevent such crises. The remedy is to stop the further entanglement of the financial markets and avoid contagion but permit risk diversification. Decoupling of different parts of the banking system and a greater diversity in the business form part of the solution. In other words, when the dominoes of the financial markets are set further apart, the chance that all of them fall down at the same shock becomes smaller.

Caballero and Simsek (2009) also focus on the mechanisms which were the driving forces in the credit crisis. They distinguish three externalities. Besides the "network externality" and the "fire sales" externality, which were already described by others, these authors add a "complexity externality". This externality takes account of the fact that the financial system has become so complex, for example because of cascades of sales of various types of securitized assets, so that the judgment of the risks gets blurred. If the banks are risk-averse the increased uncertainty about the risks in the network leads to a reduction of welfare of the banks. The result is a negative spiral which is sizeable because a problem in the financial world does not only have an effect on the institutions which therefore also get into trouble (the network externality), but also on all other institutions that lose sight of the events. This provides a good description of how a lack of trust resulted in a rapid stop of trade in liquid assets between banks. The notion of a complexity externality informs the discussion on what and how to regulate in the modern complex risk society.

Gai et al. (2011) show how systemic liquidity crises of the kind associated with the interbank market collapse of 2007–2008 can arise in a framework with contagion spreading widely through the web of interlinkages. They illustrate how greater complexity and concentration in the financial network may amplify this fragility. The analysis suggests how a range of policy measures, including tougher liquidity regulation, macro-prudential policy, and surcharges for systemically important financial institutions, could make the financial system more resilient.

These suggestions for regulatory measures to reduce the risk of contagion, relate to the broader context of enhanced complexity in the risk society. An example of a small future shock that may propagate through contagion to cause large societal damage is that of a solar storm. It may be that within a couple of years a solar storm hits the earth with the same intensity of that of 1859. In its new solar cycle prediction of 29 May 2009, NASA now forecasts the peak of the sunspot activity of "solar cycle 24" for May 2013. Although the activity of solar cycle 24 is predicted to be rather mild as compared to other periods of high solar activity, it may not prevent the new solar storm to be the beginning of a new crisis. The top of the solar cycle in 1859 was also below average. Its intensity was the result of a coincidence of circumstances where the magnetic field of the electrified gas that took off from the sun interfered with the magnetic field of the earth and hence disturbed its protection. Such a geomagnetic storm will cause much damage to the electricity distribution as it will expose many transformers in the system to permanent damage. It will also disturb all kinds of wireless communication. In 1859, the societal impact of the storm was not yet large because the uses of electricity and radio communication were in its infancies. Nowadays it is very different: transmission and distribution networks for electricity are so interconnected that the storm

may cause a large scale blackout of supply. Moreover, electric power is modern societies' cornerstone technology, the technology on which virtually all other infrastructures and services depend. So, apart from the electricity supply, a severe solar storm will cause an enormous collateral damage. In 2008 a Committee on the Societal and Economic Impacts of Severe Space Weather Events made, under the auspices of the National Research Council in the US, a scenario for a "severe geomagnetic storm". The scenario estimates the economic and societal costs to be $1 to $2 trillion during the first year alone, with recovery times of 4–10 years. So the overall economic and societal costs of the storm may even exceed that of the recent financial crisis.

This example of the solar storm as initial shock to the economic system should by no means be considered as a prediction of what is actually going to happen. It is only intended to show how regulation in the global economy should focus on the risks of contagion that the complexities of the risk society have brought about. The fundamental nature of crisis prevention is that initial shocks are unpredictable and that therefore regulation should focus on the propagation mechanisms.

The complexity of the risk society, which goes hand in hand with enhanced danger for contagion and the consequently enhanced amplification of adverse shocks, has consequences on several areas of risk regulation. Complexity and contagion are crucial to the risks of modern society where supply chains become more and more long and complicated, and where networks gain more and more importance. This has important consequences for regulation, where there is an increased need for coordination on a global scale. An additional problem is that risks from various sources become correlated so that forthcoming regulation has to take into account multiple risks. On the other hand, empirical research on measuring complexity shows that these measures of complexity are correlated with a country's level of income, so that more complexity is associated with economic welfare (Hidalgo and Hausmann 2009). This implies a huge trade-off between complexity and the need for more costly regulation in a risk society.

17.4 Learning from Multiple World Risk Stories

The contributions in this book provided a multitude of stories around global risks. They offered a multi-facet and multi-colour picture of several heterogeneous aspects of the world society. Any attempt to portray global risks is faced with institutional, sectoral and cultural challenges. When addressing the complexities associated with global risks, this book followed the numerous paths traced by different disciplines. The reason why the literature in this area is so vast is partly because the theoretical and conceptual nuances are almost as abundant as the experiences stemming out of practice. In this sense the practitioners' task of foreseeing the effects of emerging risks in the market, the environment and society equals the researchers' effort to analyse such multiple layers through disciplinary lenses.

Despite the wealth of institutions, sectors and risk cultures, all contributions share in common the attempt to provide critical narratives of topics which are current to the production of this book and pertinent to the literature on the world risk society. For this reason, issues related to the financial crisis and climate change play a central role in this work. Such contributions can provide additional information on current discussions on, for example, the proposed Tobin Tax for "rich" financial transactions in Europe and the policy discussion on levels of incentives for renewable sources of energy. Although some contributions involve theoretical discussions, the nature of most chapters is predominantly empirical. Coming back to the research questions set out in the introduction, how can these experiences contribute to a univocal general account for the risk literature? The book makes tangible contributions to this vast risk literature with regard to (1) the generalizability of different policies thanks to regulatory instruments (standard cost model, regulatory impact analysis and cost–benefit analysis); (2) the likelihood of cost-effective regulatory intervention preserving public and private interests; and (3) the consequences of applying synthetic approaches to policymaking for the existing proceedings of law producing.

Whilst it is acknowledged here that each project and each regulation entails a distinct story (Heritier 2001; Majone 2003), instruments like the Standard Cost Model, regulatory impact analysis and cost–benefit analysis make single policy stories comparable and bring them under the same heading.

The integration of benefit accounting in new versions of the standard cost model might represent one of the most significant developments in the measurement of regulatory costs for businesses and non-economic actors from a public administration perspective. It might cover the gap between cost accounting and welfare gains. In Chap. 14 the book pays attention to the Standard Cost Model as a practical policy tool to overcome some of the obstacles of better business regulation. It is believed that particularly in countries like Greece, Italy, Portugal and Ireland, where major deletion of existing regulation is expected to take place over the forthcoming years, easy understandable and manageable instruments which enable measurements of the administrative costs of regulation in order to facilitate the process of making better business regulation will be a very frequently applied remedy.

In the same countries, but also for other troubled economies in the aftermath of the most recent economic crisis, regulatory reform is likely to find its technical/analytical counterpart in regulatory impact assessment, to date the main aid to regulatory policy proposals. The contributions in this book are not aimed at simply demonstrating that this instrument is diversely applied by different governments (a notion already exemplified by other works). They capture something different and yet consistent with the empirical literature on regulatory impact assessment, i.e. the awareness that this instrument has not yet achieved its climax. A pessimistic interpretation of this is that regulatory impact assessments do not match the expectations set out either in theoretical work (Torriti 2011) or institutional guidelines (European Commission 2009). These authors argue that a stronger focus on the risk economics aspects of regulatory impact assessment would imply more attention to issues such as the quality of data, methods to estimate the price of carbon and the

integration of macroeconomic modelling techniques. These also believe that there is no "one size fits all solution" regarding the policy instruments—SCM, RIA or C/B-analysis—to be chosen. This depends on the questions to be answered as well as the context within which those questions are raised.

With regard to cost–benefit analysis, one of the most controversial issues of its application in policy areas like drugs, food and the environment is its rather inflexible nature in relation to risk. The way reductions in risks are accounted as benefits is still subject to scientific and political controversy. This is the case, for instance, in the relationship between industry and regulator in the pharmaceutical sector, where the approval of a drug is often conditional to a shared understanding of the ratio between benefits and risks. Ultimately, uncertainty around the measurement and application of the value of statistical life, i.e. the analytical instruments responsible for monetizing reductions in risks to human life, might be pointed out as one explanation for the obstacles encountered by practitioners in implementing risk-based cost–benefit analysis.

With regard to the second point, the line for allowing for regulatory intervention while preserving public and private interests in cost-effective ways is extremely thin. Instances where distortions from regulation can be minimized and the benefits from regulations could be maximized can be counted on one hand and are faced with several constraints and asymmetries of information. Several contributions cover different aspects of cost–benefit measurements in public administration as well as private industry. In an attempt to classify these different experiences in two borderline cases, the book describes examples where the regulatory framework allows businesses to compete on a cost basis and examples where this is not the case. The former borderline case implies that the related public goals are less likely to be endangered, transaction costs are minimized, trust is high and so are compliance levels. The latter borderline case is associated with the absence of risk-based regulation due to the complexities of the risk society. In these cases the relationship between businesses and policymakers is permeated by low trust and high transaction costs. The contributions in this book illustrate a wealth of examples from different geographies and sectors which can often be positioned somewhere in between the two borderline cases.

One of the most interesting findings is that the gap between conceptual theory and empirical studies is significantly large. Some of the chapters in this book show how most of the theoretical expectations have been partly invalidated by international experiences. Perhaps this imbalance is also a consequence of the different assumptions, methods and modelling techniques stemming out of very dissimilar disciplines. For instance, economists model economic regulatory tools in terms of price shocks and monetization of non-market values while political scientists look at them in terms of their functions and processes.

Finally, a further interesting learning point is the necessity of promoting new approaches to legal theory and policymaking in order to tackle the major externalities of the risk society.

Society has never been healthier, wealthier and smarter, yet we are increasingly risk averse. The most recent findings of behavioural research suggest a credible answer to this apparent paradox: humans deviate in predictable ways from neoclassical

assumptions of rationality (Tversky and Kahneman 1974). After having regulated risk in terms of probabilities and costs, policymakers are becoming more aware of the need to incorporate these insights into regulatory analysis to not only reduce the economic cost but also to increase the effectiveness of risk regulation, such as climate change or chemical legislation (Kahneman 2011). At a time in which regulation enters the behavioural era, the challenge is to integrate into the regulatory process also the extra-rational factor (Vandenbergh et al. 2011). It is indeed becoming increasingly clear that regulation cannot work effectively if it does not consider how targeted populations respond.

Any regulatory model failing to do that is likely to be flawed and not deliver its expected results. In Chap. 14 some attention has been drawn to this issue. An important element of the solution is repressing as much as possible the political rationality in the policy process by allowing a preferential treatment of the public goal by reconciling the four rationalities: the political, legal, economic and scientific rationalities. The scientific rationality mostly refers to the goal variable (public goal). It is obvious that in a risk society, the goal variable should be to protect against the major risks like climate warming, financial crisis etc. as they are perceived from citizens. The other variables are just boundary conditions (Snellen 2002). An important question is how to reconcile these rationalities? This is what we have learned from Simon who argued that it would be more adequate to say that a policy has to satisfy a set of requirements rather than to satisfy just one goal. Goals, motives and boundary conditions are crucial concepts in this context. From this perspective, the means to protect against the major risks are the boundary conditions which set in motion a process of generation of alternatives (Simon 1964). Involving professions to make sure that professional and not merely political norms prevail in the practice of ex ante evaluation of legislation would be desirable. A professional of ex ante evaluation requires a balanced mix of three professions: economic, legal and social science methodological expertise (Hoppe 2009). The advice is to integrate this way of thinking about law making in the curriculum of both public policy and law schools.

17.5 Policy Relevance, Limits and Directions for Further Research

The very nature of this book, which consists of a collection of explanatory case studies, should facilitate the understanding of different applications of global risk concepts in regulatory decision-making at practitioner's level. All contributors are sympathetic to the difficulties faced by business actors in forecasting emerging global risks as part of investment appraisal processes. Correspondingly, it is acknowledged throughout the book that policy-makers and non-economic actors are confronted with similar challenges at the time of assessing, quantifying and monetising the impacts of reductions in, for example, environmental and health risks for new projects and regulatory proposals.

As mentioned above, these authors believe that one solution for an effective integration of the global risk dimension rests in the systematic and meaningful deployment of regulatory reform tools in risk decision-making. This is not to say that such tools, in the shape of standard cost model, regulatory impact assessment and cost–benefit analysis are a panacea solution to all risk problems. Quite the opposite, from different perspectives, it has been pointed out that the current application of these tools not only treats global risks in a far too rigid manner but also operates in a world of "bounded rationality". In order to overcome the problematic relationship between risk and regulatory reform instruments, the following recommendations are put forward:

1. Incorporating benefits in forthcoming versions of the standard cost model.
2. Integrating risk economics modelling in regulatory impact assessments, (e.g. methods to estimate the value of the environmental capital and the price of greenhouse gas emissions, modelling of the global risks of contagion and complexity, risk vs. risk trade-offs, risks related uncertainties in internalizing externalities, etc.).
3. Increasing research on and application of techniques to monetize reductions in risks, particularly for financial, environmental and health risks in European risk regulatory decision-making.
4. Incorporating behavioural science insights into regulatory analysis in order to not only reduce the economic and political cost of regulation but also increase its effectiveness. Lower regulatory costs and greater effectiveness may enable policymakers to achieve a more ambitious goal while saving resources for pursuing other legitimate social objectives.

Throughout the book it has been acknowledged that the existing literature in the area of global risks and the world risk society is extremely vast, yet fragmented. In particular, it was observed that the theoretical literature is large arguably due to the abundance of both empirical experiences and disciplines related to risk. The perspectives from economics, law, sociology, political science and public administration dominate this book as these are frequently used as lenses for the examination of world risk phenomena.

The common driver is the empirical nature of all the stories collected in this volume. This means that this work does not mechanically fall within any of these disciplinary strands or related sub-disciplinary braches, e.g. risk economics and risk governance. Issues of generalizability were addressed in the previous sections. It is worth adding that generalizability is affected by the time dimension (i.e. the period our contributions refer to) and space (i.e. the geographies our contributions are based on). With regard to time, a conscious effort has been made to deal with topics that are of current relevance to regulators and policymakers, hence the focus on the financial regulation, climate change, food, drugs, fiscal policies and regulatory costs. As to space, the reader will have observed that there is a prevalence of contributions focusing on developed economies and specifically European ones. On the one hand, such focus limits the illustration of global risks and delineates rather narrow borders for the world risk society. On the other hand, recent developments, with

discussions on regulatory intervention and complexity in financial markets, levels of incentives for renewable sources of energy, measures for keeping the costs of contagion to the minimum with respect to Greece and Italy, make Europe very relevant for any debate on societal risk. The EU is indeed increasingly emerging as de facto global regulator of all kind of rules concerning the environment, human health and safety (Chap. 3). What is more, the high level of integration of European countries, compared with other macro regions, means that this remains an extremely interesting investigation space for regulating cross-boundary risks like climate change, financial markets and food trade (Löfstedt and Vogel 2001).

In an attempt to offer a nuanced picture of global risks and the world risk society, this book identifies areas that might be of interest for further research. It has been emphasized that the study of economic assessment tools for regulatory decision-making in relation to risk has been ongoing for over 20 years. The different disciplines covered in this volume and elsewhere provide a wealth of angles for analysing the relationship between risks, benefits and costs of regulatory decisions. However, what is missing is a structured research approach for studying, examining and (eventually) evaluating global risk tools for regulatory decision-making. Without such structured approach the risk is that additional research might be lost in the wide seas of policy analysis, public administration and administrative law. Whilst a code for classifying risk research would probably not find many proselytes, spelling out whether the research focuses on input, throughput or output would certainly not harm the research (and practitioner) community. Input risk research would be based on analysing the content of risk tools compared with some type of benchmark (e.g. institutional guidelines or comparative analysis with another country or sector). Indicatively research methods in this area would include descriptive statistics, case studies and archival data. For instance, input research on risk–benefit analysis would look at the data employed, compare them with a checklist derived from guidelines and practice, etc. Throughput risk research would focus on processes and the role of global risk tools in decision-making. Typically this type of research would make use of methods for understanding causal relations, including interviews and questionnaires. Following the example of risk–benefit analysis, throughput research would seek to understand what role this tool has within the company called to implement it, in the sector where the company operates, and in the relationship between different stakeholders. Output risk research would finally consist of analysis of the impacts the risk decision had on several levels (e.g. the economy, the environment, social conditions). The methods in this area could span from econometrics to threshold analysis. The need for further research on how to regulate risks is also driven by the fact that world risk society has become more and more complex so that risks of contagion are paramount. It is illustrated by the recent credit and debt crises, but also by accidents of contagion in complex food supply chains. Now that regulating risk, due to this enhanced complexity and transboundary character, is an increasingly complicated business, policymakers and industry representatives have the imperative to take up this challenge and deliver better business regulation in a risk society.

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