Europe in a Climate of Risk: Three Paradigms at Play

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Abstract: This paper explores the suitability of risk regulation, and particularly the EU approach to risk regulation, as a conceptual and organisational framework for the EU's battle against climate change. It argues that such exploration, in the first place, requires a thorough understanding of the discourses, agenda, and strategies that constitute, respectively, the risk regulation paradigm, the EU risk regulation paradigm, and the climate risk paradigm. The analysis of the three paradigms reveals not only points of overlap, but also substantial divergences between the three paradigms, with the most pronounced tensions occurring between the EU risk regulation and climate risk paradigms. The paper therefore reinforces concerns over a possible colonisation of climate change policy by EU risk regulation and argues that climate change regulation has a better chance of effectiveness if it develops alongside but separately from EU risk regulation ('co-existence'). The latter scenario also offers prospects for comparison and exchange between regulatory regimes ('cross-regime learning'), which could help both regimes to face, and possibly overcome, their specific weaknesses.

INTRODUCTION: THE EU AT THE CROSSROADS OF RISK, REGULATION, AND CLIMATE CHANGE

This paper examines the regulatory response to climate change in the European Union. Copenhagen notwithstanding, the EU has been making rapid progress in

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developing an arsenal of Directives, Regulations, and Decisions to slow down the pace of global warming, and this raises important questions about the ideas, objectives, and approaches that inform the EU's actions as a climate change regulator.[1]

Climate change is understood as a major global environmental risk, and climate change regulation can be seen as a variant of risk regulation. The appropriateness of risk-based approaches to combat climate change cannot, however, be taken for granted, and has been challenged explicitly in recent scholarship.[2] Questions can also be asked about the variety of risk-based approaches that it is appropriate to apply in this context. This paper aims to contribute to the debate by tracing the salient features of three regulatory paradigms: the risk regulation paradigm, the EU risk regulation paradigm, and the (nascent) climate change risks paradigm within the EU. It will be argued that an understanding of regulation, and regulatory challenges, in this area cannot be fully achieved without an appreciation of the roles of, and interplay between, these paradigms. The paper will show that even a preliminary foray into the discourse, agenda, and strategies of climate change regulation uncovers points of divergence as well as overlap between the climate change risk paradigm on the one hand, and the risk regulation and, particularly, EU risk regulation paradigms on the other. Bearing in mind paradigmatic overlaps and divergences, the paper explores the desirability of three potential development trajectories for climate change regulation, starting with colonisation, which would entail the EU risk regulation paradigm subsuming climate change regulation.[3] A second potential trajectory, co-existence, would see climate change regulation developing and maturing separately from EU risk regulation. Finally, the paper moots the possibility of regulatory development through cross-regime learning, which would arise out of the potential of different regulatory regimes to learn through interaction and comparison. The latter scenario is one that may yield the most promising results, but it is also the most demanding as it assumes both an advanced understanding of the dynamics that imbue different paradigms and a willingness to revisit and challenge some well-established notions about health and environmental risk governance in the European Union. The battle against climate change is, therefore, not only a regulatory challenge of unprecedented scale and urgency; it also throws down the gauntlet to risk regulation scholarship to rethink and reposition itself for a new era.

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[1] cf I. Bartle, 'A Strategy for Better Climate Change Regulation: Towards a Public Interest Orientated Regulatory Regime' (2009)18 *European Politics* 689.

[2] N. Pidgeon and C. Butler, 'Risk Analysis and Climate Change' (2009) 18(5) *Environmental Politics* 670.

[3] This development is related to but distinct from the phenomenon of 'risk colonisation', as used by Rothstein, Huber, and Gaskell to describe the growing centrality of risk in regulation, which they explain as caused by the growth of regulatory frameworks to regulate societal risk (rather than the growth of societal risk itself) and the increasing need to manage the associated institutional risks of risk regulation. See H. Rothstein, M. Huber, and G. Gaskell, 'A Theory of Risk Colonization: the Spiralling Regulatory Logics of Societal and Institutional Risk' (2006) 35(1) *Economy and Society* 91, 99.

Before reviewing the three risk paradigms, the article gives a very brief overview of the current state of EU climate change regulation. This is intended to offer readers more familiar with risk regulation than climate change a secure enough footing for the ensuing analysis. The article then charts the emergence of 'risk' as a conceptual framework for climate change, and registers the concerns voiced in response to this evolution. The following sections trace the contours of the aforementioned three risk paradigms. Finally, and most appropriately for an inquiry into the nature of risk and regulation, the article concludes with a range of forecasts, or scenarios, on the evolution of climate change regulation, and the related development of risk regulation, in the European Union.

CLIMATE CHANGE REGULATION IN THE EU

The European Union is developing an impressive and exponentially growing arsenal in the battle against climate change. In very broad lines, the EU approach to climate change aims to respond to the need for both mitigation and adaptation, and emphasises the importance of integrating climate change considerations into other EU law and policy areas.[4] Under the Kyoto Protocol,[5] the EU committed to an overall reduction of eight per cent of greenhouse gases (GHG) compared to emission levels in 1990.[6] For the period of 2012 to 2020, the EU has set a target of a 20 per cent reduction against the 1990 reference level, with an option to increase to 30 per cent if its efforts are matched by comparable emissions reduction commitments from other developed nations, and by adequate contributions from economically more advanced developing nations, 'according to their responsibilities and respective capabilities'.[7]

In terms of instruments to achieve emission reduction, the jewel in the EU crown is undoubtedly the emissions trading regime, [8] as laid down in the 2003

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[4] Integration of environmental policy concerns is required pursuant to Article 11 TFEU (formerly Article 6 EC). For a detailed treatment of the integration principle, see N. Dhondt, *Integration of Environmental Protection into Other EC Policies* (The Netherlands: Europa Law Publishing, 2003; and A. Lenshow (ed), *Environmental Policy Integration: Greening Sectoral Policies in Europe* (London: Earthscan, 2002).

[5] Kyoto (Japan), 10 December 1997 (entered into force 16 February 2005) (1998) *International Legal Materials* 22.

[6] Council Decision 2002/358/EC Concerning the Approval, on Behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the Joint Fulfilment of Commitments Thereunder [2002] OJ L130/1.

[7] European Parliament and Council Decision 406/2009/EC on the Effort of Member States to Reduce their Greenhouse Gas Emissions to Meet the Community's Greenhouse Gas Reduction Commitments up to 2020 [2009] OJ L140/136. See also *20 20 by 2020. Europe's Climate Change Opportunity*, Commission Communication of 23 January 2008, Com(2008)30 final. At the point of writing, the prospects for this option being taken up are glum: the largely failed Copenhagen negotiations signalled loud and clear that many key players, such as the US, Russia, and China remain exceedingly reluctant to concretise mitigation commitments.

[8] Whether we are talking about diamonds or cubic zirconia is disputed. A full discussion of the legitimacy and effectiveness of emissions trading as a climate change mitigation instrument exceeds the ambitions of this article, but see, eg, R. Baldwin 'Regulation Lite: the Rise of Emissions Trading' (2008) 2 *Regulation and*

Emissions Trading Directive and ensuing amendments.[9] The trading aspect may be the most visible, but it is by no means the sole feature of what amounts to a highly orchestrated regulatory programme to determine, allocate, and enforce maximum emission levels (caps) from the European, national, and down to sectoral and installation level, and to create a sufficient degree of transactional transparency, verifiability, and reliability to facilitate cost-optimising trade in emission allowances.[10] To achieve the EU's current eight per cent reduction target, its Member States have committed to differentiated overall reduction targets.[11] Following allocation criteria laid down in the Directive, and taking into account public opinion, the Member States were required to draw up National Allocation Plans (NAPs) commensurate with their emission reduction targets for the first two trading periods (2005-2008 and 2008-2012).[12] These NAPs were subject to review and approval by the European Commission. A Member State's NAP sets out the total quantity of allowances that it plans to allocate, as well as the allocation proportion per industrial sector covered by the ETD. Unsurprisingly, the adoption of national emission quota, the determination of sectoral allocation, and the Commission's role in approving NAPs proved highly controversial, causing tempers to flare between the different Member States critical of each other's allocation methodologies, between the latter and the Commission, between the private sector, national governments, and the Commission, etc.[13] From 2013 onwards, sectoral allocation will be centralised and harmonised, obviating the need for new NAPs.[14] Whether this will free the allocation process from controversy remains to be seen. The Member States allocate emission allowances to individual installations covered under the ETD, again respecting general criteria laid down therein. The lion's share of allowances is grandfathered, but over time a growing proportion will be auctioned.[15] At the end of each trading year, installations must surrender allowances to cover their emissions. Excess allowances can be traded for

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Governance 193; R. Stewart, 'Economic Incentives for Environmental Protection: Opportunities and Obstacles' in R. Stewart, P. Sands, and R. Revesz (eds), *Environmental Law, the Economy and Sustainable Development* (Cambridge: CUP, 2000); D. Ellerman and B. Buchner, 'The European Union Emissions Trading Scheme: Origins, Allocation and Early Results' (2007) 1 *Review of Environmental Economics and Policy* 66; A.D. Ellerman, F. Convery, and C. de Perthuis, *Pricing Carbon* (Cambridge: CUP, 2010).

[9] Directive 2003/87/EC Establishing a Scheme for Greenhouse Gas Emission Allowance Trading Within the Community and Amending Council Directive 96/61/EC [2003] OJ L275/32, as amended by Directive 2009/29/EC [2009] OJ L140/63.

[10] See, inter alia, J.B. Skjaerseth, *EU Emissions Trading: Initiation, Decision-Making and Implementation* (Farnham: Ashgate, 2008); M. Faure and M. Peeters (eds), *Climate Change and European Emissions Trading: Lessons for Theory and Practice* (UK: Edward Elgar, 2008); M. Wråke, *Emissions Trading: The Ugly Duckling in European Climate Policy* (Sweden: Swedish Environmental Research Institute, July 2009). See also the recent literature review by Frank J. Convery, 'Reflections – The Emerging Literature on Emissions Trading in Europe' (2009) 3 *Review of Environmental Economics and Policy* 121.

[11] nn 5 and 6 above.

[12] We are currently in Phase II, 2008-2012.

[13] See M. Mehling, 'Emission Trading and National Allocation in the Member States: An Achilles Heel of European Climate Policy?' (2005) 5 *Yearbook of European Environmental Law* 113.

[14] ETD Article 9, as amended by Dir. 2009/29/EC, n 7 above.

[15] ibid, Arts 10, 10a-c.

profit. Furthermore, the ETD, together with the so-called Linking Directive,[16] lay down conditions for the acquisition of emission credits through Joint Implementation and Clean Development Mechanisms.[17]

The emissions trading regime was bound to capture the public's imagination, as it is both the most tangible expression of the EU's commitment to cut back on its GHG emissions, and of its faith in economic incentives as drivers of industrial and social change. It entails momentous efforts to create a global market through artificially engineered scarcity, the introduction of a new genus of financial commodity in the form of emission allowances and credits, and the near insurmountable task of contemplating countless scenarios, possible responses, and interventions to strive to ensure that the regime delivers on economic, environmental, and financial fronts in a legitimate fashion. It is, however, by no means the only EU instrument for climate change mitigation: GHG emission reduction is equally at the core of a sprawling set of new measures addressing, *inter alia*, tighter CO2 emission limits for vehicles,[18] promotion of renewable energy,[19] increased energy efficiency for industrial and domestic buildings, appliances and services,[20] eco-design and labelling,[21] carbon capture and storage (CCS),[22] etc. Moreover, in observance of the integration principle, the climate change regulatory agenda is partly one of amendment to existing legislation, as areas such as EU waste management, air pollution control, water management, and the regulation of industrial activity must be made responsive to climate change concerns.

The EU climate change strategy aims to curb temperature rises, not to stop global warming in its tracks altogether. This is partly because an even more ambitious emissions reduction programme is considered beyond the realm of the politically, economically, and technologically feasible, but also because, strictly speaking, the horse has bolted: the existing build-up of GHG in the atmosphere will cause global temperatures to rise in the coming decades, regardless of our present and future actions. Hence, the climate change challenge is one of

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[16] Directive 2004/101/EC Amending Directive 2003/87/EC Establishing a Scheme for Greenhouse Gas Emission Allowance Trading within the Community, in Respect of the Kyoto Protocol's Project Mechanisms [2004] OJ L338/18.

[17] D. Bodansky, 'The United Nations Framework Convention on Climate Change: A Commentary' (1993) 18 *Yale Journal of International Law* 451; F. Lecocq and P. Ambrosi, 'The Clean Development Mechanism: History, Status and Prospects' (2007) 1 *Review of Environmental Economics and Policy* 143; D. Pearce, *Joint Implementation: A General Overview* (CSEGRE Working Paper, GEC 94-19).

[18] Regulation (EC) 443/2009 Setting Emission Performance Standards for New Passenger Cars as Part of the Community's Integrated Approach to Reduce CO_2 Emissions from Light-Duty Vehicles [2009] OJL 140/1.

[19] Directive 2009/28/EC on the Promotion of the Use of Energy from Renewable Sources [2009] OJL 140/16.

[20] Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the Energy Performance of Buildings [2003] OJL 1/65 and Proposal for a Directive of the European Parliament and of the Council on the Energy Performance of Buildings COM(2008)780 final; Directive 2005/32/EC Establishing a Framework for the Setting of Ecodesign Requirements for Energy-Using Products [2005] OJL 191/29; Directive 2006/32/EC on Energy End-Use Efficiency and Energy Services [2006] OJL 114/64.

[21] Directive 2009/125/EC Establishing a Framework for the Setting of Ecodesign Requirements for Energy-Related Products [2009] OJL 285/10; Regulation 66/2010 on the EU Ecolabel [2010] OJL 27/1.

[22] Directive 2009/31/EC on the Geological Storage of Carbon Dioxide [2009] OJL 140/114.

adaptation as well as mitigation. The EU's climate change adaptation strategy is at a relatively early stage of development,[23] and poses a number of particular challenges. The efforts of predicting overall rises in temperature under business-as-usual scenarios are enormous, but they pale in comparison to the challenges of forecasting actual localised impacts of climate change, taking into account a range of different global, European, and domestic mitigation scenarios, formulating reasonable adaptation responses, estimating costs and benefits of alternative approaches, planning for contingencies and side-effects, etc.[24] Moreover, the generally localised impact of adaptation policies raises difficult questions of both EU competency and of shared responsibility. To contend with these challenges, EU environment ministers have recently agreed that initial EU adaptation action should in the first instance concentrate on the colossal task of data production, gathering, and exchange, on climate-proofing existing EU policies, and coordinating cross-border responses.[25] However, if the history of EU environmental law serves as any indication, it is to be expected that over time the EU's involvement in adaptation policies, and the corresponding development of implementing regulatory strategies, will deepen.

THE RISE OF RISK IN CLIMATE CHANGE

In social science 'risk' has become a loaded notion entailing an extensive set of assumptions on how societies are governed, how change is experienced, and how responses are formulated.[26] Thus, when talking about the rise of risk in climate change, we refer to more than just increased use of the term, and include a growing tendency to see climate change as appropriately responded to with governance strategies built around risk analysis and management. This is exemplified by, for instance, the treatment of scientific research as evidence, the growing emphasis on calculation and the ascendance of cost-benefit and risk-benefit analyses in deliberation and decision-making on climate change.[27] The publication of the Stern Review[28] is often seen as a watershed moment in forging the connection between risk and climate change as this presented climate change as a serious and pressing but still manageable problem to which society could respond rationally by comparing the predicted global costs of action to those of inaction.[29] Recent EU statements, too, borrow heavily from the risk discourse,

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[23] *Commission White Paper, Adapting to climate change: Towards a European framework for action*, COM(2009)147 final.
[24] See Bartle, n 1 above, 698.
[25] 'Leaders Focus on How to Share Climate Aid Burden' (29 October 2009) *ENDS Europe Daily*.
[26] J. Adams, *Risk* (London: UCL Press, 1995).
[27] cf B. Hutter, *The Attractions of Risk-based Regulation: Accounting for the Emergence of Risk Ideas in Regulation* (CARR Discussion Paper 33, LSE), 3-4.
[28] N. Stern, *The Economics of Climate Change, the Stern Review* (Cambridge: CUP, 2007).
[29] n 2 above, 674.

expressing the predicted impacts of climate change, and of climate change policy, in terms of costs, benefits, trade offs, and opportunity. The subtitle of the "20 20 by 2020" Commission Communication, after all, reads: 'Europe's Climate Change *Opportunity*' (emphasis added).[30]

First and foremost among the governance strategies within a risk-based approach, is risk regulation. The growing connection between risk regulation and climate change has not gone unobserved, with authors such as Mark Stallworthy commenting that law-makers address new problems, including those posed by climate change, against a broader picture of regulatory evolution. He continues that this evolution 'has seen a developing emphasis on risk-based management. This can be characterised by features that include *ex ante* setting of clear objectives, across identified timelines, supported by transparent and participatory processes.'[31] In assessing the impact of the risk discourse on climate change, Stallworthy's analysis is rather friendly to the risk focus – alluding to risk regulation's well-documented strengths in structuring and rationalising decision-making processes. Others, however, are less sanguine about the conceptualisation of the climate change challenge as a risk regulation enterprise. In a 2009 article on 'Risk Analysis and Climate Change', Pidgeon and Butler argue that conventional risk-based approaches are ill-suited to respond to the challenges of climate change, and incapable of delivering the scale and intensity of change required.[32] In light of the incontrovertible truth that, to date, climate change strategies have failed to deliver significant cuts or successful adaptation,[33] these are concerns that cannot be discounted peremptorily.

As climate change and risk regulation grow closer in the EU and beyond, the question whether this is a match made in heaven, or a recipe for disaster, poses itself with growing urgency. The analysis below aims to enlighten this debate by deepening our understanding about the relation between risk, regulation, climate change, and EU governance. It will be contended here that it is essential to understand these developments with reference to the interplay of the three risk regulation paradigms referred to above.

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[30] EU Commission, '20 20 by 2020. Europe's Climate Change Opportunity' COM(2008)30 final.
[31] M. Stallworthy, 'Legislating Against Climate Change: A UK Perspective on a Sisyphean Challenge' (2009) 72(3) *MLR* 412, 418.
[32] n 2 above. cf M. Granger Morgan, M. Kandlikar, J. Risbey, and H. Dowlatabadi, 'Why Conventional Tools for Policy Analysis are Often Inadequate for Problems of Global Change' (1999) 41 *Climatic Change* 270; H. Bulkeley, 'Governing Climate Change: the Politics of Risk Society?' (2001) 26(4) *Transactions of the Institute of British Geographers* 442, 442-444; Rothstein, Huber, and Gaskell, n 3 above, 91; and H. Rothstein, P. Irving, T. Walden, and R. Yearsley, 'The Risks of Risk-Based Regulation: Insights from the Environmental Policy Domain' (2006) 32 *Environment International* 1065.
[33] n 2 above, 682.

THE RISK REGULATION PARADIGM

Risk regulation has become such a staple of contemporary law and policy that it barely needs an introduction. In order to discern the distinctive features of EU risk regulation, however, as well as the particularities of risk within the climate change field, it is useful first to contemplate, in general terms, what we mean when we talk about 'risk' as a catalyst for regulation, what the agenda is of risk regulation, and how regulation seeks to achieve its targets.

In common parlance, we qualify a particular situation or activity as a risk when we are aware of the possibility of undesirable consequences. To gauge the seriousness of the risk, we in the first place take into account the likelihood of negative impacts and the anticipated magnitude of impacts.[34] Risk regulation, then, becomes the exercise of public authority (however broadly construed) with intent to affect the likelihood and/or magnitude of socially undesirable events ('social bads').[35]

As an expression of likelihood, or probability, risk is inherently future-oriented. In German jurisprudence of the 1980s to early 1990s, risk was often defined by reference to the concept of 'danger'.[36] Following a 'danger-based' approach, we acquire experience about the negative impacts of certain goods or activities and modulate our behaviour on the basis of that experience. [37] To give a comfortingly domestic example, if I scald my fingers by grabbing the steel handle of a frying pan on the stove, and particularly if this happens more than once, I will respond by using oven mitts in the future, or will adopt another remedy such as replacing my frying pan with a new model equipped with better insulated handles. A risk-based approach, by comparison, engages not only with experienced social bads, but also with future ones. Frying pans are tested for safety before being released onto the market. Safe handling and care instructions are drawn up and passed on to the users. Product standards prescribe the use of heat-resistant substances in the manufacture of pan handles.

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[34] n 3 above, 92.

[35] cf C. Hood, H. Rothstein, and R. Baldwin, *The Government of Risk. Understanding Risk Regulation Regimes* (Oxford: OUP, 2004) 3. It should be noted that the definition of regulation generally, and risk regulation in particular, is both evolving and contested. For a critical and more comprehensive discussion of both terms, see J. Black, 'Decentring Regulation: Understanding the Role of Regulation and Self-regulation in a "Post-regulatory" World' (2002) 54 *Current Legal Problems* 103; and 'Risk Regulation' in R. Baldwin and M. Lodge, *Oxford Handbook on Regulation* (Oxford: OUP, 2010 *forthcoming*). The less challenging mainstream definition deployed here is, however, adequate to the purposes of the article.

[36] D. Cansier, 'Gefahrenabwehr und Risikoforsorge im Umweltschutz und der Spielraum für Ökonomische Instrumente' (1994) 7 *Neue Zeitschrift für Verwaltungsrecht* 643; K.-H. Ladeur, 'Von der Gefahrenabwehr zum Risikomanagement im Stoffbezogenen Umweltrecht' in G. Winter (ed), *Risikoanalyse und Risikoabwehr im Chemikalienrecht* (Germany: Umweltrechtliche Studien, 1994) 241-263.

[37] C. Joerges, 'Law, Science and the Management of Risks to Health at the National, European and International Level – Stories on Baby Dummies, Mad Cows and Hormones in Beef' (2001) 7 *Colum J Eur L* 2; K.-H. Ladeur, 'Deregulating Environmental Law in a Perspective of Stimulating Knowledge Generation' in U. Collier (ed), *Deregulation in the European Union: Environmental Perspectives* (UK: Routledge, 1998) 43.

Presenting future negative occurrences as potential adverse *effects*, or impacts, implies that we operate on a premise of causation – an assumption that the negative consequence, whatever it may be, happens *because* we engage or omit to engage in a certain activity. I risk getting wet because I go for a walk under a threatening sky; polar bears are at risk of extinction because we are not doing enough to mitigate climate change. The theoretical possibility of a solution is what separates a problem from a calamity. Similarly, the theoretical possibility of choice distinguishes risk from the fickleness of fate. Risk, therefore, implies some degree of free will and ability to act; if harm is absolutely certain and inevitable, whatever we do or wherever we go, the risk evaporates. By extension, risk regulation assumes the possibility of at least some degree of influence, with at least some degree of predictability.

Of equal relevance is that risk does not have a wholly negative connotation; it is perceived against a backdrop of opportunity. There are, first, the benefits to be enjoyed if potential adverse effects do not materialise, such as the joys of a brisk walk in dry weather, or the professed value added of a more abundant and reliable food supply after switching to genetically modified crops.[38] Second, responding to risk creates opportunity costs: we forego the option of exploiting the resources put towards risk mitigation in an alternative way.[39] There is broad scientific consensus that, following a business-as-usual scenario, global temperatures will indeed rise;[40] the likelihood of this not happening is now considered so remote that even staunch sceptics would think twice before making the argument.[41] However, the complete failure of the recent Copenhagen negotiations to produce anything approximating firm commitments to cut back CO2 emissions suggests that many third country governments still doubt whether the benefits of mitigation outweigh the required investment at this point in time.

Finally, within this conceptual framework, any quest to 'eliminate risk', whether through regulation or other means, becomes illusory. Not only does society willingly tolerate and even encourage a certain amount of risk-taking, but any attempt to cut out risk altogether is doomed to failure, as risk responses themselves create countervailing risks.[42] By not going for a walk, I might put my health and fitness levels at risk, whatever the weather. Evidently, risks differ in likelihood and magnitude, but the altogether absence of risk remains a theoretical impossibility. All risk issues become risk choices and risk trade-offs.

Our understanding of risk as future-oriented, impressionable, and double-edged informs the agenda and strategies of risk regulation. Risk regulation does not aspire to eliminate risk but to substitute acceptable for unacceptable risk. To

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[38] M. Quaim and D. Zilberman, 'Yield Effects of Genetically Modified Crops in Developing Countries' (2003) 299 *Science* 900.
[39] See, eg, C. Sunstein, *Free Markets and Social Justice* (Oxford: OUP, 1997) 298-317.
[40] 'Top Scientists Affirm Consensus on Global Warming' (20 February 2010) *Environment News Service.*
[41] cf W. McKibbin and P. Wilcoxen, 'Climate Change after Kyoto. A Blueprint for a Realistic Approach' (2002) *The Brookings Review* 8.
[42] J. Graham and J. Wiener, 'Confronting Risk Tradeoffs' in Graham and Wiener (eds), *Risk vs. Risk* (Cambridge, Mass.: Harvard University Press, 1995).

accomplish this, risk regulation carves up the amorphous totality of risks we are exposed to into discrete, manageable segments, and it engages with these segments to the exclusion of others.[43] If not, the task of weighing risks against opportunities, which enables the determinations of acceptable/unacceptable risk that drive risk regulatory decision-making, would become unending and futile. Risk regulation, therefore, is as much about risk construction as it is about risk control.

The construction of risk within the regulatory process requires considerable efforts in information production, selection, and collection, in order both to delineate the categories of risk that the regulation recognises, and to weigh and ultimately determine the acceptability of identified risks. To this end, risk regulation deploys techniques of information gathering, classification, and risk assessment, and maps out decision-making procedures that link assessments to control options.[44] The atomisation of risk into an extensive but discrete range of selected harms, caused by specific forms of action or omission, fosters the individualisation of risk governance responsibility: it enables the identification of causal agents that become the target audience of risk regulation, and furthers the establishment of risk regulatory authorities working with a circumscribed mandate and interacting primarily with well-defined social groups (hazardous waste transporters, hedge fund managers, dangerous dog owners, consumers, nuclear facilities, etc). The communication tools vary, ranging from commands to incentives to ethics-based encouragements. Control options, in turn, run the gamut from decisions to 'wait and see', requests for further data production and/or advanced assessment, to information disclosure requirements, monitoring provisions, standard-setting, and mandatory restrictions.

In the context of information production and processing, it is important to contemplate the relation between risk and uncertainty. Often, and particularly since the ascent of the precautionary principle, risk and uncertainty are treated as qualitatively different, even juxtaposed notions. Risk, it is said, qualifies situations where sufficient information exists to make a probabilistic assessment of likelihood and magnitude of harm.[45] Uncertainty, in contrast, occurs where indications of harm exist, but there is insufficient data to conduct a 'proper' risk assessment.[46] This distinction may serve as a rough and ready delineator of the remit of certain regulatory regimes, but it is essentially flawed. For one, it ignores that the information required to conduct a risk assessment does not exist 'out there', but is at least partially generated within the very context of regulation. Secondly, as defined above, the distinction is entirely subservient to the mode of conceiving of risk assessment. However, it is extremely valuable as a reminder that

[43] n 2 above, 673.
[44] n 35 above.
[45] Commission Communication on the Precautionary Principle COM(2000)1 final; V. Heyvaert, 'Facing the Consequences of the Precautionary Principle in European Community Law' (2006) *European Law Review* 185.
[46] cf P. O'Malley, 'Uncertain Subjects: Risk, Liberalism and Contract,' (2001) 29(4) *Economy and Society* 462.

risk regulation involves the creation of fictional certainty; unknown future events are translated into known probabilities and thereby become actionable.[47] The regulatory response, too, implies the acceptance of a fictional or at the very least unexamined certainty, namely that rules can have a pre-determined impact on risk. Risk regulation does, however, tend to recognise the fragility of its belief system, and correspondingly creates opportunities for the integration of new information, for review and adaptation within regulation.

Before moving on the distinctive profile of EU risk regulation, it should be acknowledged that this rather bloodless portrayal of the key features and dynamics of risk regulation masks a reality riddled by controversy. Longstanding disagreements over the quality of the information on which risk assessment and management should be based, over the dividing line between acceptable versus unacceptable risks, and over the choice of regulatory control techniques, have turned the field of risk regulation into an ideological battleground. Risk, as apparent from the preceding discussion, is a product of perception. Whose perception matters, or matters most, therefore becomes a crucial issue for regulators to wrestle with. Countries with advanced risk regulatory regimes tend heavily to favour expert-based identifications and assessments of risk, giving rise to critiques that alternative, 'lay' perceptions are overlooked to the detriment of regulatory quality and legitimacy.[48] The tensions caused by the construction and integration of risk information into regulation run deeper and wider, however, than the familiar 'science v public' dilemma. Wider, because risks never affect all segments of the population and the natural world in the same way. The process of risk identification is therefore simultaneously one of selection, involving controversial normative judgement. Deeper, for even if roaring agreement existed about what kind of information should inform risk assessment and, consequently, management, this does not preclude debates about how this information should be generated, or about the regulator's role in gathering, processing, and acting upon this information.[49]

THE EU RISK REGULATION PARADIGM

The bulk of EU regulation, including effectively all of EU environmental and health regulation, qualifies as risk regulation within the parameters set out above.

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[47] cf N. Luhmann, *Risk: A Sociological Theory* (Berlin: De Gruyter, 1993).

[48] M. Everson and E. Vos, 'European Risk Governance in a Global Context', in E. Vos (ed), *European Risk Governance. Its Science, its Inclusiveness and its Effectiveness* (Connex Report Series Nr 6, 2008) 10-15; S. Rayner, 'Democracy in the Age of Assessment: Reflections on the Roles of Expertise and Democracy in Public Sector Decision-Making' (2003) 30 *Science and Public Policy* 163; J. Applegate, 'A Beginning Not and End In Itself: The Role of Risk Assessment in Environmental Decision-Making' (1995) *University of Cincinnati Law Review* 1643; S. Jasanoff, *Designs on Nature: Science and Democracy in Europe and the United States* (Princeton: Princeton University Press, 2005).

[49] See E. Fisher, *Risk Regulation and Administrative Constitutionalism* (Oxford: Hart Publishing, 2007).

Yet when policy makers, academics, or reporters speak of 'EU risk regulation', they usually have something rather more specific in mind. Within the EU, risk regulation has become intimately associated with market regulation, and more precisely with regimes governing the production, commercialisation, and subsequent use of goods that either pose health and/or environmental risks of themselves (such as pesticides) or that incorporate risky technology (eg, goods containing nano-particles).[50] In contrast, waste, air, water, and nature conservation regulation, although certainly risk-oriented, are more commonly labelled 'environmental regulation'. This divide is not cast in stone, and a typifying of, say, rules governing waste disposal as risk regulation would not be dismissed as mistaken. But undeniably, when discussing EU risk regulation, the examples that spring to mind will overwhelmingly come from the domains of product and technology regulation.

The precise causes of the close association between EU risk and market regulation are open to debate, but we can readily discern some pertinent factors. The establishment of a common market was a foundational EU mission, making market regulation one of the first areas in which the EU got to flex its regulatory muscle. As early as 1967, the EU promulgated harmonised standards for the classification, packaging, and labelling of dangerous substances.[51] This was a thoroughly market-facilitating endeavour, but one that nonetheless set the frame within which chemical risk discourses would later unfold.[52] Trade conflicts over the compatibility of national risk regulation with the dictates of Articles 34 and 36 TFEU also supplied the backdrop for the European Court of Justice's first musings on the nature of risk and its role in regulation.[53] Conflict is in many ways disruptive, but it is grist to the mill of academic scholarship. Trade and marketing disputes, revolving around goods ranging from beef to beer to slimming pills, have fuelled academic, regulatory, and even civil society's interest in risk regulation in no small measure.[54] We need only consider the avalanche of studies on risk regulation in the wake of the tuna/dolphin, beef hormones, shrimp/turtle, asbestos, and GMO trade disputes within the WTO to appreciate that this is not a

[50] A search on 'risk regulation' in the European Union's ECLAS database overwhelmingly generates references to writings on the regulation of genetically modified organisms, nanotechnology, and chemicals. cf n 35 above, 44.
[51] Directive 67/548/EEC on the Approximation of Laws, Regulations and Administrative Provisions of the Member States Relating to the Classification, Packaging and Labelling of Dangerous Substances [1967] OJ Nr. 196/1.
[52] cf V. Heyvaert, *Coping With Uncertainty. The Regulation of Chemicals in the European Union* (PhD dissertation, Florence, Italy: European University Institute, 1999).
[53] A. Alemanno, 'EU Risk Regulation and Science: The Role of Experts in Decision-Making and Judicial Review' in Vos, n 47 above, 38-39.
[54] Case C-180/96, *UK* v *Commission* [1999] ECR I-2265; Case 178/84, *Comission* v *Germany* [1987] ECR 1227; Joined cases T-74/00, T-76/00, T-83/00, T-84/00, T-85/00, T-132/00, T-137/00 and T-141/00, *Artegodan* v *Commission* [2002] ECR II-4945.

purely EU-internal phenomenon, but is arguably even more pronounced at the international level.[55]

The argument here is that risk discourses are shaped, in the EU context, by a number of factors: the context of trade and economic competitiveness within which the EU's understanding of risk regulation (and of its role as a risk regulator) matured; the agenda of EU risk regulation; and the strategies adopted in order to achieve EU regulatory goals. Again, it is not claimed that each and every single piece of EU risk regulation fully accords with this particular discourse, agenda, and approach. Many of the 'high profile' regulatory regimes, including those governing GMOs, chemicals and pharmaceuticals, are, however, quintessential representatives of the 'EU version of risk regulation'. Even, moreover, where it is not fully determinative, the dominant profile of EU risk regulation exercises considerable influence on how risks are operationalised in EU regulation generally.

What, then, are the key features of the EU version of risk regulation (hereafter: 'EU risk regulation')? A first point of note is that EU regulation is intensely engaged in the aforementioned practice of carving risk up into discrete, manageable segments. The concept of risk in EU risk regulation is, as a result, narrowly construed. As a rule, risks are understood as the physical negative side-effects of entrepreneurship. This approach is tellingly exemplified in GMO regulation, which interprets risk as the likelihood of adverse health or environmental effects, and staunchly abstains from engaging with broader debates on, for instance, the likely cultural impact of GMO farming, the consequences of a permissive or restrictive GMO policy on the global political economy, or the morality of genetic engineering.[56] For the purposes of EU regulation, risk is inconceivable outside the European economic context. Differently put, risk becomes the concern of EU regulation as a consequence of there being economic activity with a cross-boundary impact. This is most apparent in the case of EU product regulation, which lays down health, safety, and environmental standards in a context of intra-EU trade facilitation. It also resonates in EU environmental policy, which governs the environmentally adverse consequences of economic and industrial activity *if* they are potentially transboundary, and *if* differences in

[55]To name but a few, G. Shaffer and M. Pollack, *When Cooperation Fails. The International Law and Politics of Genetically Modified Food* (Oxford: OUP, 2009); A. Lang and R. Cooney, 'Taking Uncertainty Seriously: Adaptive Governance, Alien Invasive Species and the WTO' (2007) 18(3) *European Journal of International Law* 523; J. Scott, 'The European Regulation of GMOs and the WTO' (2003) *Columbia Journal of European Law* 213; I. Cheyne, 'Risk and Precaution in World Trade Organization Law' (2006) 40(5) *Journal of World Trade* 837, and 'The Precautionary Principle in EC and WTO Law: Searching for a Common Understanding' (2006) 8(4) *Environmental Law Review* 257; M.C. Cordonnier Segger and M. Gehring, 'The WTO and Precaution: Sustainable Development Implications of the WTO Asbestos Dispute' (2003) 15(3) *Journal of Environmental Law* 289; J. Brunnee and E. Hey (eds), 'Symposium: The United States Import Prohibition of Certain Shrimp and Shrimp Products Case' (1998) 9 *Yearbook of International Environmental Law* 3.

[56] See Regulation (EC) No 1829/2003 on Genetically Modified Food and Feed [2003] OJL 268/1; Directive 2001/18/EC on the Deliberate Release into the Environment of Genetically Modified Organisms and Repealing Council Directive 90/220/EEC [2001] OJL 106/1.

domestic environmental risk regulation could upset the level playing field for competition.[57]

A connected point relates to the concept of foregone opportunities in EU risk regulation. These, too, are the subject of a distinctly economic interpretation, referring to both the costs of bearing higher regulatory burdens, and foregone economic growth. The acceptability of risk, therefore, not only is a function of the likelihood and magnitude of narrowly interpreted adverse effects, but also is co-determined by economic considerations.

The confined discursive space goes some way towards explaining the EU's behaviour as a risk regulator, as well as its choice of regulatory techniques. It would be a serious stretch to portray the EU as an expansive, confident risk manager, secure in the knowledge that its perception and values accord with those of the European public, and happy to cut any Gordian knots on the way. The requirement of an inter-State economic context creates a perennial need for justification of EU risk control strategies. This is compounded by the expectation built into EU law, *inter alia* by way of the subsidiarity principle, that EU risk regulation will be qualitatively superior and more effective than what the national level can offer.[58] The agenda of EU risk regulation is, therefore, as preoccupied with the task of justifying decision-making, as it is with substituting acceptable for unacceptable risk.

The narrowness of EU risks, the necessary inter-State economic context, and the pronounced need for self-justification crystallise into a distinct EU risk regulation pathology, characterised, firstly, by a rigorously itemised approach to risk management.[59] Not only does EU regulation painstakingly circumscribe the remit of risk through a strict focus on physical and monetisable adverse impacts, it also reviews identified risks substance-by-substance, technological application-by-application, product-by-product, installation-by-installation, and project-by-project. The REACH Regulation, for instance, sets up an institutional framework and procedures for substance evaluation that zero in on the risk particularities of singular chemicals, but are not equipped to generate or even fully integrate information on synergistic effects caused by exposure to chemical compounds.[60] Within EU risk regulation, itemisation fosters the representation of risk as containable and therefore non-threatening to aspirations of economic growth through free enterprise.[61] Moreover, itemisation facilitates the involvement of regulatory addressees in both the risk characterisation and management process.

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[57] M. Lee, *EU Environmental Law: Challenges, Change and Decision-Making* (Oxford: Hart Publishing, 2005); J. Jans and H. Vedder, *European Environmental Law* (The Netherlands: Europa Law Publishing, 2008).
[58] D. Chalmers, 'Gauging the Cumbersomeness of EU Law' (2010, *forthcoming) Current Legal Problems*.
[59] On the link between oversight, accountability, and risk regulation, see n 3 above, 96.
[60] Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Establishing a European Chemicals Agency, Amending Directive 1999/45/EC and Repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC [2006] OJL 396/1.
[61] cf n 2 above, 673; Morgan, et al, n 32 above, 273-274.

Indeed, under the auspices of EU risk regulation, processes of risk identification and, increasingly, assessment, management, and even communication are characterised by an advanced degree of privatisation.[62] Besides alleviating the public financial burden of risk regulation – a key consideration for a regulator as cash-strapped as the EU – privatisation fulfils vital legitimising functions towards the regulatory addressees, who are co-opted within the regulatory process and regain some degree of self-determination, albeit within tightly drawn parameters, over risk control.

The pressing demand for justification makes the EU deeply beholden to the fiction of certainty in risk decision-making. Regulatory outcomes must appear as the necessary consequences of decision-making, taken in accordance with the dictates of good governance. The 'necessity need' explains the enormous effort EU regulation expends on the organisation and normalisation of information-gathering. Inevitably, risk assessments are based on predictions derived from models, statistics, in vitro test results, and short-term observation, but EU regulation seeks to boost the credibility of inputs by insisting on their production, in prodigious amounts, through rigorously standardised and independently verified processes.[63] Moreover, EU legislation, case-law and policy documents are studded with repeated assurances that, even in areas of pronounced uncertainty, risk decision-making must and will happen on the basis of the 'best available information.'[64] Adherence to good governance is secured through the formal incorporation of governance standards, such as openness and participation, into risk regulatory regimes. Thus, EU risk decision-making procedures divert attention away from bodies, particularly the Commission, as discretionary decision-makers and present regulatory measures as the logical conclusion of information-gathering and assessment processes conducted outside the decision-maker's purview and, hence, free from any attempts at tampering or manipulation. The wedge between the stages of risk assessment and risk management, as well as the artificiality of this particular divide, are familiar features of EU risk regulation. However artificial, the separation performs a vital function in amplifying the effect of necessity of regulatory outcomes, and allowing the Commission as decision-maker to project the image of a dispassionate, neutral arbiter of exogenously generated information, rather than a discretionary, unconstrained regulatory force.[65] The quest for apparent neutrality might also go some way towards explaining the EU's well-documented tendency to 'proceduralise' over time the interpretation of decision-

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[62] V. Heyvaert, 'Regulating Chemical Risk: REACH in a Global Governance Perspective' in J. Eriksson, M. Gilek, and C. Ruden (eds), *Regulating Chemical Risk: Multidisciplinary Perspectives on European and Global Challenges* (New York: Springer, 2010 *forthcoming*); and E. Fisher, 'The 'Perfect Storm' of REACH: Charting Regulatory Controversy in the Age of Information, Sustainable Development, and Globalization' (2008) 9(2) *Journal of Risk Research* 541, 548.

[63] cf C. Hood and H. Rothstein, 'Risk Regulation under Pressure: Problem Solving or Blame Shifting?' (2001) 33(1) *Administration and Society* 21, 40.

[64] Commission Communication on the Precautionary Principle, n 45 above; Case C-236/01, *Monsanto Agricoltura Italia SpA* v *Council* [2003] ECR I-8105; Heyvaert, n 45 above, 201.

[65] T. Porter, *Trust in Numbers: the Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995).

making principles, such as the proportionality principle and the precautionary principle.[66]

To recap, the EU's understanding of risk as a regulatory trigger is narrow, highly compartmentalised, and perceived against a backdrop of inter-State economic activity. EU risk regulation aims both to reconcile its understanding of health, environmental, and economic objectives within decision-making on acceptable risk, and to legitimise said decision-making. The pursuit of these objectives dictates reliance on a regulatory methodology that is geared towards the creation of actionable 'facts', that maintains a strict functional and institutional separation between fact-finding and decision-making, and that displays a highly formalised approach to good governance.

THE CLIMATE RISK PARADIGM

Compared to the wealth of studies dissecting and critiquing every conceivable aspect of EU risk regulation, climate change as a regulatory project is still under-theorised. This is hardly surprising, taking into account its relative youth, and the enormous complexity of climate change as a political, economic, social, environmental, scientific, and cultural challenge for regulation to come to terms with. The following paragraphs make an admittedly preliminary contribution to the articulation of an EU paradigm of climate change risk regulation (to avoid the cumbersomeness of the term, ensuing references are to the 'climate risk paradigm'). As with the review of EU risk regulation, the approach is analytical: the aim is to trace the contours of the climate risk paradigm as it emerges from EU legislation, policy statements, and regulatory instruments; not to prescribe the ideal ingredients for a climate change strategy. The analysis serves a twofold ambition: it lays a foundation for further study and critique; and creates a fuller picture against which to gauge concerns over risk-based approaches to climate change regulation.

One of the most eye-catching features of the concept of climate risk as it matures in the EU is that, for all the uncertainty that surrounds the science of climate change, the EU accepts and promotes the reality of man-made global warming as a political fact.[67] The overall target of a maximum 2° C rise, and the determination of maximum emission levels cutting back 8, 20, or 30 per cent respectively from 1990 emissions levels, were forged in a political process

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[66] J. Corkin. 'Science, Legitimacy and the Law: Regulating Risk Regulation Judiciously in the European Community' (2008) 33(3) *European Law Review* 359; Heyvaert, n 45 above, 196; V. Heyvaert, 'Trade and the Environment: Proportionality Substituted?' (2001) 13(3) *Journal of Environmental Law* 392; Case C-473/98 *Chemikalieninspektionen* v *Toolex Alpha AB* [2000] ECR I-5681; Case C-309/02 *Radlberger* [2004] ECR I-11763; Case C-320/03, *Commission* v *Austria* [2005] ECR I-9871.

[67] See, eg, Commission Communication on Winning the Battle Against Global Climate Change COM(2005)35 final.

culminating in the ratification of the Kyoto Protocol and the adoption the 2002 and 2009 Council Decisions;[68] not in a regulatory process orchestrated by the European Commission, a European Agency, Member States Committees, regulatory addressees, and public and private interest groups. Although European economic competitiveness is undeniably a crucial factor in the EU discourse on climate change, as it is in EU risk regulation, it is explicitly recognised not to be the only benchmark against which the EU climate change strategy should take shape. Instead, and in accordance with the heavily EU-sponsored UNFCCC and Kyoto Protocol, there is an open acknowledgement of climate change as a global threat, of the EU's role in contributing to the threat, and of its commensurate responsibility vis-à-vis third countries in mitigating and furthering adaptation to climate change.[69] In this context, we should furthermore bear in mind that the EU has staked its reputation as a global political leader in no small amount on its ability to promote climate change mitigation and adaptation on the international agenda.[70] Thus, it has politically invested in the reality of the climate change risk to an extent that does not characterise other EU risk policies.[71]

The EU's political investment in the reality of global warming, together with the expectation that climate change will wreak most havoc in those regions that historically contributed least to global warming, affects both the understanding of risk and of opportunity within the European discourse. Consider, first, the shifting nature of 'risk-taking' in the climate change debate. Whereas, before, 'risk taking' was routinely associated with an active engagement with the new (such as the commercialisation of a new technology or the establishment of a new industrial facility, which activity must be assessed, controlled and, if necessary, curtailed),[72] the European climate risk paradigm increasingly links risk to *inaction*.[73] In other areas of health and environmental risk regulation, business-as-usual tends to function as a relatively stable benchmark, referring to a set of practices and techniques that are usually susceptible to incremental tweaking and upgrading, but

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[68]Council Decision 2002/358/EC of 25 April 2002 Concerning the Approval, on Behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the Joint Fulfilment of Commitments Thereunder [2002] OJL 130/1; European Parliament and Council Decision 406/2009/EC of 23 April 2009 on the Effort of Member States to Reduce Their Greenhouse Gas Emissions to Meet the Community's Greenhouse Gas Emission Reduction Commitments up to 2020 [2009] OJL 140/136.

[69] *Commission White Paper - Adapting to Climate Change: Towards a European Framework for Action* COM(2009)147 final, 1 April 2009.

[70] The opening lines of '20 20 by 2020' are: '2007 marked a turning point for the European Union's climate and energy policy. Europe showed itself ready to give global leadership: to tackle climate change, to face up to the challenge of secure, sustainable and competitive energy, and to make the European economy a model for sustainable development in the 21st century' (n 30 above).

[71] See M. Scheurs and Y. Thibergien, 'Multi-Level Reinforcement: Explaining European Union Leadership in Climate Change Mitigation' (2007) 7(4) *Global Environmental Politics* 19; F. Yamin, 'The Role of the EU in Climate Negotiations' in J. Gupta and M. Grubb (eds), *Climate Change and European Leadership: A Sustainable Role for Europe?* (USA: Kluwer Academic Publishing, 2000).

[72] cf O'Malley on the 'enterprising subject', n 46 above, 465; and R. Brockhaus, 'Risk-Taking Propensity of Entrepreneurs' (1980) 23 *Academy of Management Journal* 509.

[73] European Environment Agency, *Climate Change: The Cost of Inaction and the Cost of Adaptation* (EEA Technical Report Nr 13/2007).

that are rarely, if ever, in need of a complete overhaul. In the climate risk paradigm, the relationship between stability and change is inverted, with business-as-usual becoming the path that leads to epic, unpredictable, and possibly catastrophic change.

Secondly, the concept of risk in climate change has become singularly and exceptionally divorced from the positive connotations of risk-taking; it is considered morally suspect even to contemplate foregone opportunities in the wake of climate change mitigation.[74] At most, EU policy documents will concede that rising temperatures might have some discrete beneficial impacts, such as a decline in cold-related deaths during winter, but these are rarely quantified, in marked contrast to predicted negative impacts.[75] Nor is it suggested that any such localised positive impacts should affect determinations on the need for mitigation. The resounding message emanating from the EU's climate change policy is that global warming is an unambiguous social bad, and that no amount of accidental positive side-effects could ever tilt the scales in favour of regulatory relaxation, let alone inaction. When '20 20 by 2020' talks of the climate change opportunity, it refers to the scope for economic growth and competitiveness in the wake of climate change mitigation and adaptation measures, and most decidedly not to what Europe stands to gain in the absence of climate change control.[76]

A further point on risk conceptualisation is that the climate change discourse is certainly undergoing a degree of compartmentalisation, as law and policy makers seek to divide the amorphous and intellectually overwhelming prospect of global warming into discrete economic, health, environmental, social, and security threats. However, this process has not yet reached the maturity or thoroughness of compartmentalisation in EU risk regulation.[77] More importantly, the nature of climate change risks severely hampers a traditional core function of compartmentalisation, which is to make problems manageable and attributable. Even if we hone in on the risk caused by rising temperatures to the survival of a single species, climate change remains a risk caused by a near-endless range of diffuse sources of GHG emissions, happening as a consequence of how we, and more specifically industrialised societies, have organised our lives, rather than as a result of a particular technology, product, or service that we chose to embrace.[78] Hence, unless we resign ourselves to an adaptation-only strategy, lowering the threat of extinction for, say, the red columbus monkey cannot be accomplished through a discrete measure mandating and organising the conservation of red columbus monkeys, but must be achieved through an arsenal of instruments

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[74] cf Ellen Goodman's article in the Boston Globe of 9 February 2007, comparing climate change deniers with Holocaust deniers: E. Goodman, 'No Change in Political Climate' (9 February 2007) *The Boston Globe*.

[75] See Commission Communication on Winning the Battle Against Climate Change COM(2005)35 final, 9 February 2005, Annex.

[76] n 30 above.

[77] See the EU's climate and energy package at:
http://ec.europa.eu/environment/climat/climate_action.htm.

[78] cf G. Prins and S. Rayner, 'Time to Ditch Kyoto' (2007) 449 *Nature* 974; Bulkeley, n 32 above, 432.

governing areas as diverse as car manufacturing, carbon markets, fuel subsidies, CCS investment, nuclear energy, congestion charging, and waste disposal.

The impossibility of a discrete regulatory response to climate change also invites some preliminary considerations on the nature of uncertainty in the EU climate risk paradigm. Under the EU risk regulation paradigm, uncertainty predominantly relates to the seriousness of adverse impacts. A pivotal function of the regulatory process is to translate such 'impact uncertainty' into a fictional but actionable form of certainty through highly formalised processes of information gathering and risk assessment. We recall the effort expended on the transformation of discretionary decisions into necessary outcomes of thoroughly documented and rigidly organised procedures. In contrast, far less effort goes into legitimising the effectiveness of risk control techniques; this is generally taken for granted.[79] Differently put, the legitimacy-enhancing features built into EU risk regulation overwhelmingly aim to buttress EU decisions on whether and to what extent to intervene; not to justify the choice of risk control instruments *per se*. Climate change regulation is set to confront uncertainty in a markedly different way. From a regulatory perspective, the burning question is not whether global warming presents an unacceptable risk and, hence, whether the EU is justified in adopting risk reduction measures. The answer to both these issues is a matter of political 'fact' – the EU and the Member States have firmly pinned their colours to the mast. Rather, the question is *how* to curb this acknowledged unacceptable risk, what cocktail of assessment techniques, standards, restrictions, and incentives to rely on.[80] Whereas EU risk regulation faces its toughest legitimacy battles when grappling with impact uncertainty, climate change regulation is likely to confront its greatest challenges when responding to *control* uncertainty. Indeed, whether the EU's climate change regulation will be successful is effectively unanswerable at

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[79] EU regulatory regimes display a surprisingly high degree of stability in their choice of risk control techniques, particularly considering the EU's reputation as an engine of perpetual regulatory reinvention. Effectiveness deficits are typically explained as deficiencies in the reach or speed of regulatory decision-making, or as failures in implementation and enforcement. Hence, they are remedied by tightening up standards, streamlining and centralising decision-making and implementation, and stepping up the policing of enforcement, rather than by rethinking incumbent approaches to risk control. The point has been made previously that, for all its claims to innovation, the risk control strategies laid down in REACH regime show a high degree of continuity with those of the preceding regulatory framework. See V. Heyvaert, 'Guidance Without Constraint: Assessing the Impact of the Precautionary Principle on the European Community's Chemicals Policy' (2006) 6 *Yearbook of European Environmental* Law 27, 52. The more recent reforms of the EU pesticide control regime betray a similar degree of strategic and instrumental continuity. On the judicial front, the Greenpeace case offers an interesting illustration of the European Court's effectiveness assumptions regarding EU risk regulation. The Court denied that it might be appropriate for a Member State to halt an EU decision-making process once it had been set in motion, reasoning that the EU regime was fully equipped to cope with risks, including risks that came to light after the process had started. The fact that the regulatory regime in question was contained in the 1990 Directive on Deliberate Release of GMOs, which had failed to deliver acceptable GMO authorisation outcomes and had been effectively defunct for several years by the time of the ECJ's ruling in the Greenpeace case, underscores the extent to which the ECJ's belief in risk regulatory effectiveness is a matter of principle rather than experience. Case C-6/99, *Association Greenpeace France* v *Ministere de l'Agriculture et de la Peche* [2000] ECR I-1651.

[80] cf Bulkeley, n 32 above, 431 (regarding the climate change on the Australian political and regulatory agenda).

present; such is the diversity and complexity of the EU's climate change mitigation and adaptation package. Moreover, the EU's regulatory programme might become an exercise in futility if other industrial and industrialising countries such as the USA, China, and India refuse or fail to curb their GHG emissions. Legitimation debates, therefore, will more likely revolve around the effectiveness than the necessity of risk control measures.

The climate change regulatory agenda could in general terms be described as the substitution of acceptable for unacceptable risk, thus matching that of risk regulation. However, under the surface of this broad common denominator, we find a number of interesting and challenging idiosyncrasies. In policy terms, the aspired-for substitution of acceptable risk is driven by not one, but two distinct yet interdependent strategies: a mitigation and an adaptation strategy.[81] Moreover, recalling the inverted relationship between stability and change, the objective of the climate change regulatory agenda is as much about directing as it is about controlling change. Hence, the substitution process between acceptable and unacceptable risks happens through a combination of preventative and remedial risk control measures. Risk control cannot solely be achieved through 'better' management of existing practices, but also must be accomplished through the introduction of new practices and technologies, which in turn will trigger the adoption of new technological risk control strategies.[82] The EU's mandate as a risk regulator for climate change therefore covers both its contribution to global warming abatement, and its risk regulation of climate change abatement and adaptation strategies. This results in the formation of a dual agenda the objectives of which may not always be synchronised, and at times even at odds.

The distinct characteristics of climate change risks and the composite nature of the regulatory agenda pose unique challenges to the development of an EU regulatory strategy for climate change. As in EU risk regulation, information gathering is pivotal, but the range of data is much more diverse, and the sources much more dispersed. This implies, inter alia, that climate change regulatory frameworks cannot be self-sufficient in meeting their information needs to the extent that, for instance, pharmaceuticals regulation can, but hinge on much more fluid and diverse configurations of inputs. In terms of standard-setting, the EU must seek to achieve its regulatory ambitions not through single, designated sets of rules, but through intricate combinations of measures that either amend existing frameworks or create new ones, and that tend to be either much blunter or considerably more subtle than the approaches that characterise traditional EU risk regulation. Indeed, the political commitment to climate change rendered possible the adoption of strict, across-the-board, and ambitious CO2 emission reduction targets, representing a degree of EU regulatory aggression than would be hard to

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[81] *Commission Communication on Limiting Global Climate Change to 2 Degrees Celsius – the Way Ahead for 2020 and Beyond* COM(2007)2 final, 10 January 2007; and *Commission White Paper on White Paper on Adapting to Climate Change: Towards a European Framework for Action* COM(2009)147 final, 1 April 2009.

[82] cf D. Farber, 'Confronting Uncertainty under NEPA' (2009) 8(3) *Issues in Legal Scholarship. Balancing the Risks: Managing Technology and Dangerous Climate Change* 1.

replicate in other areas. On the other hand, we recall that climate change regulation is not only about controlling but also about mandating and directing change. This calls for the design of dirigistic and technology-forcing measures, which, in the context of climate change, are developed under conditions of severe control uncertainty. Hence, the EU must resort to instruments that facilitate rather than constrain, that seek to optimise the conditions for change in line with the pre-set regulatory targets but are flexible enough not to mandate change, so that it remains possible for Member States and private parties to respond to updated information which might point in a different technological or organisational direction. The needs for flexibility, openness to adaptation, and technological insurability far exceed those of other risk regulatory regimes. Hence, the instrumental parsimony that typifies the EU risk regulation paradigm, where individualised safety objectives are pursued through a single or narrow set of control techniques (eg, pharmaceutical safety through product authorisation; chemical substance safety through registration, evaluation, and use authorisation) is lost within the realm of climate risk regulation, which must summon a dazzling variety of regulatory instruments and control techniques to pursue its stated objectives of climate change mitigation and adaptation.

FUTURE DEVELOPMENT: COLONISATION, CO-EXISTENCE, OR CROSS-REGIME LEARNING

The foregoing discussion reveals that, although 'risk' is a pivotal axis around which risk regulation, EU risk regulation, and climate change regulation revolve, each domain constructs and responds to its own conceptualisation of regulatory risk – and each carries its own distinct agenda and strategies. To recap, the risk regulation paradigm targets the substitution of acceptable for unacceptable risk, is rooted in a belief in causation in that regulatory responses can affect levels of risk, and pursues its agenda through the individualisation of risk into discrete, manageable threats of future harm. The compartmentalisation of risk into a set of discrete management projects is particularly pronounced within the EU risk regulation paradigm. The latter is also typified by an overriding need to justify and legitimise regulatory decisions to intervene, which fosters the adoption of scientific data-intensive and heavily proceduralised regulatory frameworks. The EU climate risk paradigm, finally, is buoyed by a degree of political commitment to risk control that is lacking from other areas of EU risk regulation, but the highly complex and global nature of climate change causation challenges the function of risk compartmentalisation, and imbues regulatory responses with an unprecedented degree of control uncertainty. If we are to understand the way that EU regulation will develop as a response to climate change it is accordingly essential to appreciate how these three different paradigms – or agendas – will play roles, and will interact, within the broad thrust of EU regulation. Much, here will

depend on the ways in which the three approaches come to resolution – and, notably, whether there will be colonisation, co-existence, or cross-regime learning.

COLONISATION

In light of the differences observed between the risk regulation, the EU risk regulation, and the climate risk paradigm, concerns about the appropriateness of processing climate change challenges through a risk-based model do appear to have a *prima facie* validity. If EU climate change regulation is erected from the same building blocks that support the EU risk regulatory framework, the resulting regime will most likely fail to deliver effective instruments for climate change governance in accordance with the EU's aspirations for '20 20 by 2020'. The pursuit of an itemised approach to climate risk control, where diverse contributing factors to global warming are individualised and assessed in isolation from the overall context of mitigation and adaptation strategies, could result in the adoption of disjointed, at times counter-productive, risk control measures adopted at an excruciatingly slow speed, which would render the regime wholly incapable of delivering substantial emission cuts within the projected time scales. Moreover, the EU approach to risk assessment and risk management, which is highly formalised, functionally and institutionally sequential, which heavily privileges scientific evidence of discrete health and environmental risks as the foundation and justification for decision-making, and acknowledges alternative sources of information to the extent that they voice socio-economic concerns relevant to the EU, does not respond to either the global nature of the climate change risk or the global political aspirations that co-determine the EU's climate change policy. Finally, while the EU risk regulation paradigm does provide opportunities for learning, review, and adaptation, adaptation processes are generally contained within individual regulatory frameworks and are carried out at the micro-level, resulting in tweaking rather than systemic change. The climate change regime, which contends with exponentially higher levels of control uncertainty, would be ill-served by a regulatory framework that only accommodates incremental change.[83]

These are but three examples of potential regime misfits; further reflection would undoubtedly generate more. Although incomplete, they clearly point at deficiencies resulting from a wholesale colonisation of climate change by EU risk regulation, and exhort EU law and policy-makers to develop self-awareness about their distinct conception of climate risks in the design of regulatory responses, even if it means veering off the tried and tested path of EU risk regulation. As EU climate change regulation is presently in a rapid expansion phase, the message is urgent, all the more so since some of the recently adopted pieces of EU climate change legislation do show worrying signs of colonisation. The 2009 Directive on

[83] cf D. Kysar, 'Climate Change, Cultural Transformation and Comprehensive Rationality' (2004) 31 *Boston College Environmental Affairs Law Review* 555.

the Geological Storage of Carbon Dioxide (CCS Directive),[84] for example, approaches the environmental risks posed by CCS technology in a notably insular manner, highly reminiscent of the compartmentalisation of, say, the risks of contemporary farming into, among others, water pollution risks, pesticide risks, and GMO risks. Although the preamble asserts that CCS technology 'should not serve as an incentive to increase the share of fossil fuel power plants', nor 'lead to a reduction of efforts to support energy saving policies, renewable energies and other safe and sustainable low carbon technologies', the Directive's objectives are narrowly constructed and focus on ensuring that novel CCS technology is deployed in an environmentally safe way. The Directive addresses the risk of carbon leakage, but understands 'leakage' only as the involuntary escape of CO_2 from a storage complex; not as the resurgence of fossil fuel industries, whether in the EU or outside of it, in the wake of the commercialisation of CCS technology.[85] And even though the acceptability of the environmental risks posed by CCS technology will at least partly depend on the success of alternative mitigation approaches, the Directive's rather anaemic-looking framework for the risk assessment of storage sites does not offer any entry-points for contextual information to be introduced.

A final point to consider its that, in addition to the risks of colonisation for climate change regulation itself, a failure to develop a suitable regulatory regime for climate change mitigation and adaptation could undermine the (already contested) effectiveness of existing EU risk regulation. For instance, rules on the planting of genetically modified crops and on co-existence are developed on the assumption of these crops maturing under relatively stable ecological conditions that are knowable and analysed when applications for authorisation are made. Climatological change could rapidly and drastically affect the ecosystem and climate in which GMO crops grow, and hence obliterate the value of conducted risk assessments.[86]

CO-EXISTENCE

Climate change regulation is not necessarily doomed to tread the barren path of colonisation. In a more positive scenario, the burgeoning body of climate change regulation will increasingly articulate its own risk discourse, set its agenda, and develop methodological tools commensurate with the nature of the risks it seeks to govern. Recent developments in climate change governance, characterised by the establishment of a growing range of political and bureaucratic bodies with specific responsibilities for climate change at the national and European level, to the exclusion of a general environmental or health mandate, might actually facilitate the emancipation of the climate risk paradigm and the development of a

[84] [2009] OJ L140/14.
[85] cf M. Babiker, 'Climate Policy, Market Structure and Carbon Leakage' (2005) 65(2) *Journal of International Economics* 421.
[86] M. Zinn, 'Adapting to Climate Change in a Warmer World' (2007) *ELQ* 61, 64.

sui generis regulatory regime.[87] Such a regime would probably be less attuned to, for example, the specific 'trade versus environment' preoccupations of EU risk regulation, but might in contrast devote more regulatory resources to the management of control uncertainty.[88] It might explore options for flexibility and adaptation between rather than within regulatory frameworks, and develop decision-making procedures that are better equipped to integrate and respond to the broader range of political, environmental, economic, and social interests that collide within the field of climate change. Going back to the carbon capture and storage example, under a full-fledged climate risk paradigm the 2009 Directive would engage not only with the risks of CCS technology having environmentally harmful effects, but also with those of CCS *as a technological response* failing to contribute sufficiently to the desired degree of global climate change mitigation and adaptation. The Directive would need to develop new tools to construct and evaluate the risks caused by control uncertainty within the regulatory framework, and introduce decision-making criteria and procedural guarantees to optimise the legitimacy of control risk evaluation. It would need to incorporate response mechanisms enabling it to act upon fluctuating control risks. It is a daunting list of desiderata, but it equally represents a fantastic new challenge for the field of risk regulation studies to re-invent itself and broaden its field of exploration.

The development of two regulatory regimes operating at arm's length is, in my opinion, preferable to the scenario where climate change is shoehorned into the dominant format of EU risk regulation, but that does not make it an ideal solution. History attests that in 'separate but equal' relations, true equality is rarely found. EU risk regulation could still overshadow climate change regulation. Or, conversely, the ascendance of a climate risk paradigm might eclipse and ultimately marginalise the discourse and agenda of EU risk regulation. This is not a purely hypothetical concern: as many environmental researchers and scholars across disciplines will attest, when it comes to securing funding or reaching a broad audience, climate change is pretty much the only game in town.[89] With political, regulatory, scholarly, and media attention pronouncedly channelled towards climate change, it does not exactly take a leap of the imagination to see the field of EU risk regulation as potentially exposed to a long dry spell. From this perspective, the boomtown nature of climate change institution-building in the past five years assumes a rather more ominous character.

CROSS-REGIME LEARNING

Even if the EU risk regulation paradigm and the climate risk paradigm manage to co-exist peacefully, we can envisage a superior outcome. In a third and

[87] 'Hedegaard Becomes New EU Climate Commissioner' *ENDS Europe Daily* (29 November 2009).
[88] J. Lefevere, 'A Climate of Change: An Analysis of Progress in EU and International Climate Change Policy' in J. Scott (ed), *Environmental Protection. European Law and Governance* (Oxford: OUP, 2007) 171, 183.
[89] See, in this context, Tony Giddens' related argument that climate change is too important to be treated as an environmental issue: T. Giddens, *The Politics of Climate Change* (Cambridge: Polity Press, 2009).

unabashedly optimistic scenario, the two regulatory regimes corresponding to, respectively, the EU risk regulation and the climate risk paradigm would indeed run along separate tracks, but at various points their paths would intersect, creating opportunities for comparison and exchange, to their respective benefit as they set off again on their individual journeys. In this third scenario, the EU and climate risk regulation paradigm would not only evolve on the basis of internally generated experience, but also through cross-regime learning.

The imagery of autonomous but kindred spirits meeting at cross-roads and departing again, each with different destinations but both enriched by the contact, may seem leagues removed from the nuts and bolts of regulation. Moreover, until the climate risk paradigm acquires a stable enough identity to function as the reference frame for the articulation of an autonomous regulatory regime, separate from yet co-existing with the EU risk regulatory regime, the identification of specific opportunities for cross-regime learning must of necessity remain speculative. However, the preceding analysis does offer a solid enough foundation to enable speculation in a reasoned rather than random manner. At a basic level, awareness of different risk discourses, and their impact on the agenda and strategies of regulation, could spur further investigation into health and environmental risk control challenges that are thus far insufficiently articulated or lumped together under the broad heading of EU risk regulation. One area that might considerably benefit from such exercise is biodiversity protection, which has a risk profile that is quite distinct from that of technological and product risks, but is characterised by regulatory strategies in the typical EU risk regulation mould, displaying a high degree of compartmentalisation, dependence on scientific evidence, and itemised decision-making. They are also notoriously ineffective at curbing biodiversity loss.[90] Further investigation of whether and the extent to which biodiversity risks behave like EU health and environmental risks, or alternatively like climate risks, or whether they constitute a third and separate category, could stimulate the development of a more suitable, and potentially more effective, approach to biodiversity regulation.

The EU risk regulation and climate risk paradigms could also function as valuable counterpoints in the analysis of regime weaknesses. If subservience to scientific rationality is a notorious weak spot of EU risk regulation, then the Achilles heel of climate change regulation may well be its dependence on the Member States' continued political willingness to subscribe to the EU's ambitious mitigation and adaptation strategy in the face of overwhelming control uncertainty. Hence, whereas commentators have called for a re-politicising of EU risk regulation in order to balance its in-built tendencies towards formalisation, compartmentalisation, and rationalisation, the survival of the climate change regulatory package might on the contrary hinge on the extent to which it can develop an autonomous *raison d'être*, with some degree of independence from the

[90] See A. Ross, 'Modern Interpretations of Sustainable Development' (2009) 36(1) *Journal of Law and Society* 32, 44.

political context in which the climate risk paradigm took shape.[91] In considering de- or re-politicising strategies, the experiences gained under the two respective regimes could offer invaluable input.

Climate change control as an EU regulatory project is still in its infancy. As it matures, further opportunities for cross-regime learning are sure to emerge. For instance, the fictions of certainty and necessity, already fragile within the EU risk regulation paradigm, are bound to shatter against the overwhelming uncertainties of climate change control. It is hardly possible to imagine that, in this area, the EU would be able to make any stronger claims than it is doing the best it can, learning as it goes along, adapting in response to new experience, and correcting earlier mistakes. Moreover, the presence of an overall, quantified target against which the EU's regulatory success, or lack thereof, can be measured, should sour any appetite for Panglossian enthusiasm. The development of new legitimating strategies in the face of systemic control uncertainty will offer important lessons on the EU's ability (or lack thereof) to step out of its eudemonic rationale and justify itself without firm guarantees of regulatory superiority. This experience could, in turn, prove wonderfully instructive for EU risk regulation, which displays a keen awareness of the stifling impact of eudemonia, but has thus far not been able to muster a credible response.[92]

As to instructive exchanges flowing in the opposite direction, the EU risk regulatory experience, and particularly its history of contestation, will undoubtedly remain a crucial source of inspiration for the climate risk regime. For instance, the EU regulatory regime governing food safety has faced formative internal and external legitimacy challenges,[93] which have forced EU regulatory bodies and reviewing bodies alike to grapple with many of risk regulation's most intractable challenges, ranging from the role of local preferences within Europeanised decision-making procedures to the reconciliation between competing expectations of timeliness, certainty, and inclusiveness of EU rule-making. For all their limitations, EU institutions have tried to respond to calls for better governance, greater responsiveness, and resilience of risk regulation. The political momentum in favour of action against climate change may thus far have supplied a degree of insulation against claims of illegality and illegitimacy, but the cracks are already appearing,[94] as the turmoil surrounding the adoption of the 2009 climate change package attests.[95] Once climate change regulation starts to bite at the local level, and particularly if adaptation policies are reeled into the sphere of EU governance,

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[91] See 'British Economist Tears EU Climate Policy to Pieces' (4 September 2009) *ENDS Europe Daily*, reporting that 'Dieter Helm, a professor at Oxford University and chair of the UK environment ministry's academic panel, says the climate and energy package is profoundly flawed because its targets are entirely political and do not make economic sense'.

[92] n 58 above.

[93] Lee, n 57 above, 239-267; D. Chalmers, 'Risk, Anxiety and the European Mediation of the Politics of Life' (2005) 30(5) *European Law Review* 649.

[94] 'European Leaders Clash over Pledges on Global Warming' (11 December 2008) *The Guardian*; 'Climategate Generating More Heat than Light' (February 2010) *The ENDS Report* 9.

[95] 'EU Struggles Toward Climate Package Consensus' (4 December 2008) *ENDS Europe Daily*.

contestation will be all but inevitable. The EU risk regulatory experience of challenge and response, and of the opportunities and limitations created through response and reform, will be invaluable to the climate risk paradigm as it seeks out and defines its approach to governance.

CONCLUSION

The rapid expansion of climate change control as a regulatory programme calls for a thorough consideration of its underlying ideas, objectives, and strategies. Spurred by observations on the rise of risk in climate change, as well as growing concerns about this development, this paper proposed to structure the debate by mapping out salient features of the risk regulation paradigm, the EU risk regulation paradigm, and the emerging climate risk paradigm, arguing that a better understanding of the similarities and differences between them is helpful, first, in gauging the risks of risk colonisation and, second, in developing a regulatory response to climate change commensurate with the EU's aspirations and objectives. Although preliminary, the analysis of the three paradigms reinforces concerns over the appropriateness of risk regulation, and particularly the EU version of risk regulation, as the dominant conceptual framework for climate change governance. The above arguments, accordingly, favour the development of autonomous, co-existing regulatory regimes, enabled by a further articulation and emancipation of the climate risk paradigm, and explore opportunities for the harnessing of both EU risk regulation and climate change regulation through cross-regime learning.

The pronounced degree of individualisation and itemisation that characterises the EU risk regulation paradigm, certainly contributes to the conclusion that the former is not a wholly appropriate template for the development of climate risk control strategies. The irony that concerns over itemisation end up in support of an argument for the development of separate, 'individual' risk paradigms, will not be lost on anyone. However, the idea behind promoting co-existence and cross-regime learning rather than colonisation is not to narrow the field of risk regulation by excluding climate change from its purview, but rather to revitalise it through a greater awareness of the richness and diversity within the regulatory landscape.[96] Thus, in keeping with the EU spin of the moment, climate change is not a threat, but an opportunity for the future of risk regulation.

[96] cf M. Lodge, ' Regulation, the Regulatory State and European Politics' (2008) 31(1/2) *West European Politics* 280, 297.