

PRECAUTIONARY FEDERALISM AND THE SHARING ECONOMY

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The rise of the sharing economy exposes cracks in legislative and regulatory regimes designed with a different vision of the economy in mind. To date, scholars and policymakers have focused primarily on whether and how the government should regulate the sharing economy – that is on what form, if any, regulation should take. This Article focuses on a logically antecedent question – *who* should decide. Using the potentially significant, yet uncertain, environmental impacts of Uber and Lyft as a case study, this Article argues that regulatory authority should be allocated according to the principle of *precautionary federalism*. Just as the precautionary principle tells us that regulation can proceed in the face of uncertainty about significant environmental, health, or safety risks, precautionary federalism embodies a default presumption in favor of multiple regulatory voices, and against broad exercises of preemption under such conditions. The presumption must be weighed against the benefits of uniformity and other values, taking into account tradeoffs across different kinds of risks. And precautionary federalism is time-bound – it acknowledges that greater certainty about impacts may warrant a shift from one allocation of authority to another. This precautionary approach can serve an information-forcing function about the significance of uncertain impacts, and offers the best way to achieve the kind of rules called for by the precautionary principle.

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CONTENTS

INTRODUCTION..... 3

I. A PRECAUTIONARY APPROACH TO FEDERALISM..... 11

 A. The Precautionary Principle..... 12

 B. Dual Federalism..... 16

 1. Uniformity versus Regulatory Competition..... 16

 2. Spillovers, Externalities, and the Matching Principle..... 18

 3. Public Choice Theories..... 19

 4. Good Governance and Non-Consequentialist Theories..... 21

 C. Dynamic Federalism..... 21

 D. Precautionary Federalism 24

II. UBER/LYFT’S UNCERTAIN ENVIRONMENTAL IMPACTS 28

 A. How Uber/Lyft Work 28

 B. The Potential Environmental Impacts of Uber/Lyft..... 29

 C. Demographics of Uber/Lyft 34

III. EXISTING AND EMERGING LEGAL FRAMEWORKS 35

 A. Federal Preemption of Vehicle Emissions Standards..... 35

 B. State Preemption of Local Governance 41

IV. LAW AND POLICY IMPLICATIONS 47

 A. A Precautionary Approach 48

 1. Uniformity and Interstate Spillovers..... 49

 2. Public Choice, Laboratories of Experimentation,
 and Good Governance 51

 3. Informational Benefits 53

 B. Broader Applications of Precautionary Federalism 56

V. CONCLUSION 57

INTRODUCTION

The rise of the “sharing economy” challenges many of our previous assumptions about the law.¹ In areas as diverse as employment, insurance, privacy, and civil rights law, new firms like Uber and Lyft are rewriting traditional economic relationships both within and outside the firm.² These new business models do not easily fit into legislative, regulatory, or doctrinal schemes designed with a different vision of the economy in mind.³ Scholars and policymakers are grappling with whether and how to govern these new firms. Some advocate a free market, contending that regulating Uber/Lyft will stymie innovation.⁴ Others favor regulation, contending that failure to do so will place Uber/Lyft at a competitive advantage over existing firms.⁵ Still others ask what form such rules should take. But before determining *whether* and *how* to govern, we first ought to determine *who* should govern.

In some instances, the answer to this question may be straightforward. Dual federalism theory has deeply analyzed the types of problems that would be better served through uniform federal rules or state experimentation, depending, for example, upon whether interstate spillovers or a “race to the bottom” are concerns.⁶ In contrast, advocates of dynamic federalism have argued

¹ The term “sharing economy” is defined as “[a]n economic system in which assets or services are shared between private individuals, either for free or for a fee, typically by means of the Internet.” *Sharing economy*, OXFORD ENGLISH DICTIONARY (3d ed. 2015).

² Uber/Lyft have been categorized in various jurisdictions as “Transportation Network Companies” or TNCs. *See infra*, Part II.

³ Old statutes must confront not only new ecological problems like climate change, *see* Jody Freeman & David B. Spence, *Old Statutes New Problems*, 163 U. PA. L. REV. 1, 2 (2014), but also new business models.

⁴ Richard A. Epstein, *The Political Economy of Crowdsourcing: Markets for Labor, Rewards, and Securities*, 82 U. CHI. L. REV. 35, 36 (2015) (arguing that burdens of regulation will outweigh the benefits); Arun Sundararajan, *Why the Government Doesn’t Need to Regulate the Sharing Economy*, WIRED (Oct. 22, 2012), <http://www.wired.com/2012/10/from-airbnb-to-coursera-why-the-government-shouldnt-regulate-the-sharing-economy/>.

⁵ Freeman Klopott, *De Blasio Scraps Plan to Curb Uber’s New York City Growth After Backlash*, BLOOMBERG (July 22, 2015), <http://www.bloomberg.com/politics/articles/2015-07-22/de-blasio-scraps-plan-to-curb-uber-s-nyc-growth-after-backlash> (quoting Mayor DeBlasio as rejecting self-regulation for Uber/Lyft). *See generally* Kevin Werbach, *The Song Remains the Same: What Cyberlaw Might Teach the New Internet Economy* (working paper) (draft on file with author) (noting that the debate over whether to regulate the sharing economy echoes early debates in cyberlaw).

⁶ For discussions of the rationales favoring federal, uniform rules, *see* Daniel C. Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570 (1996) (offering a pragmatic approach); David B. Spence, *Federalism, Regulatory Lags, and the Political Economy of Energy Production*, 161 U. PA. L. REV. 431 (2013) (examining federalism in the context of hydraulic fracturing); Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in*

that overlapping jurisdiction across different levels of government can facilitate experimentation and policy diffusion, promote good governance, and even serve the national interest.⁷ Recently, scholars of both “localism” and “federalism” have begun to recognize the independent interests and capacity of local governments in these debates.⁸ And many of the legal issues or impacts arising out of the sharing economy, such as insurance rules, interact

Mandating State Implementation of National Environmental Policy, 86 YALE L.J. 1196, 1210-15 (1977) (examining theories favoring state or federal governance). For views favoring greater decentralization, see Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the ‘Race-to-the-Bottom’ Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210 (1992) (rejecting the race-to-the-bottom argument for federal rules); David B. Spence, *The Political Economy of Local Vetoes*, 93 TEX. L. REV. 351 (2014) (examining rationales for state and local governance of hydraulic fracturing).

⁷ See, e.g., David E. Adelman & Kirsten H. Engel, *Adaptive Federalism: The Case Against Reallocating Environmental Regulatory Authority*, 92 MINN. L. REV. 1796 (2008) (arguing that ecosystems, which both optimize and promote diversity, serve as a theoretical model for dynamic federalism); William W. Buzbee, *Asymmetrical Regulation: Risk, Preemption, and the Floor/Ceiling Distinction*, 82 N.Y.U. L. REV. 1547 (2007) (favoring federal “floor preemption” rather than “ceiling preemption” to support experimentation); William W. Buzbee, *Interaction’s Promise: Preemption Policy Shifts, Risk Regulation, and Experimentalism Lessons*, 57 EMORY L. J. 145 (2007) (favoring federal regulatory “floors” rather than pure experimentalism); Ann E. Carlson, *Iterative Federalism and Climate Change*, 103 NW. U. L. REV. 1097, 1100 (2009) (observing the interplay between federal and state governments on motor vehicle emissions standards); Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 176-77 (2006) (favoring dynamic regulatory overlap); Robert A. Schapiro, *Toward a Theory of Interactive Federalism*, 91 IOWA L. REV. 243, 244 (2005) (“Polyphonic federalism . . . seeks to harness the interaction of state and national power to advance the goals associated with federalism.”).

⁸ While federalism theory has traditionally addressed the balance of power between two sovereigns – the federal and state governments – with local governments viewed as a constituent part of the state, many federalism scholars now recognize that local governments have interests separate and apart from states. See e.g., Heather K. Gerken, *Federalism All the Way Down*, 124 HARV. L. REV. 4, 21 (2010) (recognizing the important role in federalism played by local and sublocal governments); Nestor M. Davidson, *Cooperative Localism: Federal-Local Collaboration in an Era of State Sovereignty*, 93 VA. L. REV. 959, 1000 (2007) (offering a vision of federal-state cooperation in which federal action can empower local governments, contrary to the unitary vision of states as “utterly powerless”); Hari M. Osofsky, *Diagonal Federalism and Climate Change: Implications for the Obama Administration*, 62 ALA. L. REV. 237 (2011) (discussing the “multiscalar” nature of climate change and the need to address emissions at multiple levels of government); Cristina M. Rodriguez, *The Significance of the Local in Immigration Regulation*, 106 MICH. L. REV. 567, 568 (2008) (arguing that policymakers should “restrain their impulses to preempt legislation by lower levels of government and to create incentives for cooperative ventures in immigration regulation”); Erin Ryan, *Environmental Federalism’s Tug of War Within*, at 6-7 & n. 37, in *THE LAW AND POLICY OF ENVIRONMENTAL FEDERALISM: A COMPARATIVE ANALYSIS* (2015) (citing scholars addressing local government within theories federalism); cf. David J. Barron, *A Localist Critique of the New Federalism*, 51 DUKE L.J. 377, 378-79 (2001) (discussing similarities between “federalism” and

with these debates in relatively straightforward ways. What is missing from this federalism scholarship, however, is a deep analysis of the role that uncertainty about potentially significant, even irreversible, impacts – such as the effect of new forms of shared transportation on climate change – should play in these analyses. This is not the traditional domain of federalism theory, but rather of the precautionary principle.⁹

At heart, the precautionary principle tells us that it is better to be safe than sorry in the face of significant risk of irreversible harm, even if we are uncertain about the magnitude of the risk.¹⁰ This Article's central claim is that what I call *precautionary federalism* offers a more complete answer than existing theories of federalism to the question of *who* should regulate under conditions of uncertainty. It also suggests an answer to a different question: *for how long*. Thus, precautionary federalism takes lessons from debates over the precautionary principle to a different context – the allocation of authority across different levels of government.

Precautionary federalism has three primary features. First, it embodies a default presumption in favor of multiple regulatory voices and against broad exercises of preemption under conditions of uncertainty about potentially significant environmental, health, or safety impacts. This approach can promote the gathering of information, interest group interaction in multiple fora, and tailoring to local conditions through policy diversity. Second, precautionary federalism takes a “wide viewscreen” approach to risk-risk tradeoffs.¹¹ It rec-

“localism”). While other federal systems of government exist, and climate impacts are arguably global, my focus here is exclusively on federalism in the United States.

⁹ See, e.g., Cass Sunstein, *Irreversible and Catastrophic*, 91 CORNELL L. REV. 841 (2006) (arguing that the precautionary principle is well suited to address both risk and uncertainty regarding irreversible and catastrophic harms, such as climate change, terrorism, and genetically modified foods). Sunstein argues that when a harm is “irreversible, and when regulators lack information about its magnitude and likelihood, they should purchase an “option” to prevent the harm at a later date.” *Id.* at 841. See also sources cited *infra*, Part I.A.

¹⁰ DOUGLAS A. KYSAR, REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY 9 (2010) (regulators are “not to be hampered by a default assumption against government regulation in advance of complete scientific demonstration of harm”); Sunstein, *supra* note 10, at 1019. “Risk” is a known unknown – when probabilities can be assigned to different outcomes. “Uncertainty” is an unknown unknown – when no such probability can be assigned. Cass R. Sunstein, *Beyond the Precautionary Principle*, 151 U. PA. L. REV. 1003, 1032 (2003). Here, because we cannot assign probabilities to the magnitude of Uber/Lyft’s impact on greenhouse gas emissions, their impact is thus in the domain of uncertainty.

¹¹ Sunstein, *supra*, note 9, at 846-47 (“[T]he refined precautionary principles should be implemented with wide rather than narrow viewscreens. They must be attentive to the full range of consequences, not simply to a subset.”). The concept of risk-risk tradeoffs embodies

ognizes that concerns regarding uncertainty must be weighed against competing values – such as the value of promoting innovation – or other values supporting more uniform rules. And third, precautionary federalism is time-bound. It acknowledges that greater certainty about impacts may warrant a shift from one allocation of authority to another, such as from regulatory overlap to greater consolidation. Allocating authority through a lens of precaution can serve an information-forcing function about the significance of uncertain impacts, and offers the best way to achieve the kind of rules called for by the precautionary principle.

Precautionary federalism thus differs from a traditional dual federalism approach because it recognizes the value of dynamic, overlapping authority under conditions of uncertainty about the impact of new forms of business on potentially significant – even irreversible – risks of harm. But a precautionary approach also differs from dynamic federalism because it acknowledges the possibility that greater certainty regarding potentially significant impacts, or other values, may shift the balance in favor of a single, optimal regulator. This possibility of a shift is crucial for the approach's information-forcing function. Firms that prefer regulatory uniformity may be willing to provide information or modify their business practices to achieve greater regulatory certainty.

The case study I focus on here – Uber/Lyft's environmental impacts – poses a particularly acute form of this uncertainty problem because three different types of uncertainty interact: regulatory uncertainty (what is the best policy), uncertainty about the magnitude and direction of Uber/Lyft's potentially significant impact on the climate (as well as other local impacts), and uncertainty about how Uber/Lyft's business model may change over time (in response to either market or regulatory conditions).¹² But the rise of Uber/Lyft also provides a motivating opportunity to rethink current allocations of authority over transportation emissions. Like other firms in the sharing economy, Uber/Lyft play an aggregative function for what otherwise might be considered millions of individual actions, each of which contributes

the idea that controlling for one risk, such as avoiding potential dangers from a new drug that has yet to enter the market, can create another risk, such as the failure to protect people who might be helped by the new drug.

¹² Similar conditions exist in the case of hydraulic fracturing, for example. *See infra*, Part IV (discussing broader implications of precautionary federalism); Spence, *Local Vetoes*, *supra* note 6 (discussing federalism and localism in the hydraulic fracturing context).

in only an insignificant way to the problem at issue – here, climate change.¹³ Uber/Lyft own no vehicles yet facilitate access to transportation for more than a million people each day in private cars.¹⁴ Though global players, these firms operate in, and in many ways interact differently across, local markets.¹⁵ And their environmental impacts range from the most global of all externalities – greenhouse gas emissions – to more arguably “local” impacts on traffic, congestion, and public transportation systems. Uber/Lyft thus highlight the cumulative impact of these individual rides in a new way.¹⁶

While legal scholars and policymakers have paid virtually no attention to the uncertain environmental consequences of Uber/Lyft,¹⁷ these impacts are potentially significant at a global level, and directly implicate the federalism questions posed here. Transportation accounts for more than one quarter of all greenhouse gas emissions in the United States.¹⁸ The Paris Agreement on

¹³ Cf. Michael P. Vandenbergh, *From Smokestack to SUV: The Individual as Regulated Entity in the New Era of Environmental Law*, 57 VAND. L. REV. 515 (2004) (arguing that environmental law must incorporate a greater focus on individual contributions to environmental harms, but acknowledging the challenges of focusing on individual action).

¹⁴ Ellen Huet, *Uber Says It's Doing 1 Million Rides Per Day, 140 Million In Last Year* FORBES (Dec. 17, 2014), <http://www.forbes.com/sites/ellenhuet/2014/12/17/uber-says-its-doing-1-million-rides-per-day-140-million-in-last-year/>; Jon Russell, *Uber Is Raising \$1B to Crack China, Soon to be its Largest Market Worldwide*, TECHCRUNCH (June 11, 2015), <http://techcrunch.com/2015/06/11/ubers-business-in-china-is-doing-a-lot-better-than-we-thought/#.avzuae:uv12>.

¹⁵ Nestor M. Davidson & John J. Infranca, *The Sharing Economy as an Urban Phenomenon*, 34 YALE L. & POL'Y REV. (forthcoming 2016) (on file with author) (manuscript at 2) (discussing the sharing economy's synergistic relationship with local urban density). In contrast, traditional car rental agencies, which also operate in local markets, do not require the same kinds of local “networks” for their business models to succeed.

¹⁶ Traditional policy rationales in federalism debates apply in unusual ways to these disaggregated firms. See *infra*, Part IV.

¹⁷ For one exception, see K. Casey Strong, Note, *When Apps Pollute: Regulating Transportation Network Companies to Maximize Environmental Benefits*, 86 U. COLO. L. REV. 1049 (2015) (arguing that centralizing control in one regulator and treating transportation network companies differently from existing taxi or limousine services would best protect the environment). Interest in the environmental impacts of these firms is emerging. On November 13, 2015, the Natural Resources Defense Council (NRDC) announced that it would partner with the University of California Berkeley's Transportation Sustainability Research Center “on the first-ever climate impacts analysis” of Uber/Lyft. Amanda Eaken, *NRDC Urban Solutions to Lead First Climate Analysis of Uber and Lyft*, NRDC SWITCHBOARD (Nov. 13, 2015), http://switchboard.nrdc.org/blogs/aeaken/nrdc_urban_solutions_to_lead_f.html. See also Victor Ngo, *Transportation Network Companies and the Ridesourcing Industry: A Review of Impacts and Emerging Regulatory Frameworks for Uber* (Oct. 2015), (unpublished research project) (prepared for the City of Vancouver).

¹⁸ U.S. ENVTL. PROT. AGENCY, EPA 430-R-15-004, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2013 (2013).

climate change reached on December 12, 2015, makes clear that to avoid the most catastrophic impacts of climate change, the global economy must transition away from reliance on fossil fuels by the middle of this century, not only in electricity generation, but also in transportation.¹⁹ Thus, there is the potential that Uber/Lyft – which facilitate transportation by personal vehicle – have significant, global environmental consequences.

But we actually do not know whether Uber/Lyft are “good” or “bad” for the environment in general, or for global greenhouse gas emissions in particular.²⁰ Each ride generates emissions, as well as other impacts on traffic and congestion. Whether this is good or bad for the environment depends upon what form of transportation is being replaced – rides in personal vehicles, taxis, or rides via public transportation. If the competing option is taxis, the emissions impact depends further upon the relative fuel economy and emissions profiles of the two types of vehicles. Some cities have adopted incentives to encourage taxi fleet owners to purchase hybrid or low-emissions vehicles.²¹ In addition, other cities charge a fee on taxi rides to support the local public transportation system.²² These local rules do not currently apply to Uber/Lyft. If Uber/Lyft rides are perceived to be a more convenient and affordable option than public transit, they could decrease demand for continued investment and improvements in public transportation, with long-term consequences.

On the flip side, Uber/Lyft may be better for the climate than the status quo. If they are replacing rides in personal vehicles, this may reduce demand for (and the lifecycle emissions associated with the production of) personal vehicles. If Uber/Lyft integrate their services well with public transit, their

¹⁹ Paris Agreement to the United Nations Framework Convention on Climate Change, art. IV, U.N. Doc. FCCC/CP/2015/L.9 (Dec. 12, 2015); Joeri Rogelj et al., *Energy System Transformations for Limiting End-of-Century Warming to Below 1.5 °C*, 5 NATURE CLIMATE CHANGE 519-527 (2015) (concluding that to limit global warming to below 1.5 or 2 degrees Celsius will require greenhouse gas emissions from transportation to be reduced by 25 percent); Kelly Levin, Jennifer Morgan & Jiawei Song, *INSIDER: Understanding the Paris Agreement's Long-term Goal to Limit Global Warming*, WORLD RES. INST. (Dec. 15, 2015), <http://www.wri.org/blog/2015/12/insider-understanding-paris-agreement%E2%80%99s-long-term-goal-limit-global-warming>.

²⁰ See *infra*, Part II.

²¹ See *infra*, Part II.

²² Jose Martinez, *Proposal to Add 50-Cent Surcharge Onto Car Service Rides to Fund MTA Gains Steam*, NY1 (June 17, 2015), <http://www.ny1.com/nyc/all-boroughs/news/2015/06/17/proposal-to-add-50-cent-surcharge-onto-car-service-rides-to-fund-mta-gains-steam.html>; Bill de Blasio, *Bill de Blasio: A Fair Ride for New Yorkers*, N.Y. DAILY NEWS (July 18, 2014), <http://nydailynews.com/opinion/bill-de-blasio-fair-ride-new-yorkers-article-1.2296041>.

rise could increase demand for public transit.²³ In several cities, Uber has introduced UberPool, in which individuals can share rides to common or nearby destinations, which may reduce vehicle miles traveled.²⁴ And there are non-environmental benefits to Uber/Lyft, such as the potential to decrease drunk-driving accidents.²⁵ These impacts may vary according to local conditions.

Nor is it safe to presume that the current business model is static. Uber/Lyft in their current form may simply be a temporary stopover on the way to further disruptive innovation, including the introduction of autonomous vehicles, which likewise implicate challenges for the allocation of regulatory authority.²⁶ Though empirical studies are beginning to emerge on the environmental impacts of Uber/Lyft, a great deal of uncertainty remains about the impact of these new firms on the environment.²⁷

The question of how to allocate regulatory authority over these impacts does not arise on a blank slate. Federal laws, including the Clean Air Act and the Energy Policy Conservation Act, govern emissions standards for greenhouse gases and conventional pollutants from new motor vehicles. And each statute contains language preempting state or local regulation. Courts have interpreted these statutes' preemption provisions broadly to prevent local governments from seeking to limit greenhouse gas emissions arising out of

²³ Changes in demand for public transit among more affluent riders who can afford to use Uber/Lyft may implicate environmental justice considerations. On the concept of environmental justice, see Richard Lazarus, *Pursuing "Environmental Justice": The Distributional Effects of Environmental Protection*, 87 NW. U. L. REV. 787, 793 (1993).

²⁴ Currently, UberPool operates in New York, San Francisco, Los Angeles, Boston, Austin, and Washington, D.C., as well as Paris and Bangalore. *Announcing UberPool*, UBER (Aug. 5, 2014), <https://newsroom.uber.com/announcing-uberpool/>; Philip Garrity, *What You Need to Know About UberPool*, WASHINGTONIAN.COM (Oct. 23, 2015), <http://www.washingtonian.com/2015/10/23/what-you-need-to-know-about-uberpool/>.

²⁵ *New Report from MADD, Uber Reveals Ridesharing Services Important Innovation to Reduce Drunk Driving*, Jan. 27, 2015, <http://www.madd.org/media-center/press-releases/2015/new-report-from-madd-uber.html?referrer=https://www.google.com/>.

²⁶ On January 4, 2016, General Motors (GM) invested \$500 million in Lyft, and the firms have announced their plans to work together toward the development of a fleet of driverless cars. Eric Newcomer, *GM Invests \$500 Million in Lyft*, BLOOMBERG (Jan. 4, 2016), <http://www.bloomberg.com/news/articles/2016-01-04/gm-invests-500-million-in-lyft-to-bolster-alliance-against-uber>. These investments and partnerships demonstrate the rapidly evolving nature of firms like Uber/Lyft, and the fact that they simultaneously have a local, national, and even global presence. For brief discussion of how precautionary federalism would apply to autonomous vehicles, see *infra*, Part IV.

²⁷ See *infra*, Part II.

the use and operation of local taxi fleets.²⁸ These broad preemption interpretations may likewise be extended to prohibit state or local efforts to address emissions arising out of Uber/Lyft. At the state level, Uber/Lyft have successfully lobbied more than a dozen state legislatures to preempt all local and municipal governance.²⁹ While these recently enacted state laws do not explicitly address environmental impacts, their language is extremely broad. These state preemption provisions could likewise prohibit experimentation with local environmental governance of Uber/Lyft. Under these circumstances, a precautionary approach would limit the reach of this preemption language to permit local governments to exceed existing federal or state emissions rules.

This Article thus offers two new insights for federalism theory. First, federalism theory has paid inadequate attention to the need for precaution under conditions of uncertainty. It is not only uncertainty about ecological impacts such as climate change that warrant a precautionary approach; it is also the rise of new, adaptable business models and technologies.³⁰ Most of all, it is essential to recognize the *interaction effects* between uncertain environmental consequences and new, adaptable forms of business organization and technologies. Second, precautionary federalism has implications for when one allocation of authority should be replaced by another. In other words, scholars and policymakers should grapple more actively with the question of whether there is ever a basis for federalism's "exit."³¹ Precautionary federalism answers this question in ways that neither dual nor dynamic federalism theory does. When uncertainty is at its height (about interaction effects among uncertain impacts, chosen regulations, and dynamic business models), the benefits of experimentation and information gathering are at their highest; when greater certainty is achieved, more consolidation or uniformity may be appropriate. Again, issues surrounding uncertainty must be weighed against competing values. Thus, the theory of precautionary federalism I advance

²⁸ For a discussion of the distinction between local policies that have been preempted and those that have survived a preemption challenge, see *infra*, Part III.

²⁹ See *infra*, Part III.

³⁰ Scholars have addressed the implications of the rise of the service economy for the choice of public policy instruments, without focusing on issues of federalism. James Salzman, *Beyond the Smokestack: Environmental Protection in the Service Economy*, 47 UCLA L. REV. 411 (1999).

³¹ Cf. J.B. Ruhl & James Salzman, *Regulatory Exit*, 68 VAND. L. REV. 1295, 1295 (2015) (arguing that "exit is a fundamental feature of regulatory design," but not focusing on questions of federalism); Justin Pidot, *Governance and Uncertainty*, 37 CARDOZO L. REV. 113, 121 & n.27 (2015) (offering a framework for governance through static or dynamic law under conditions of uncertainty, but declining to address federalism or the allocation of authority other than as a matter of resources).

here makes a significant contribution both at the theoretical and policymaking levels.

This Article is structured as follows. Part I begins by describing the values served by the precautionary principle. It then demonstrates that neither dual nor dynamic theories of federalism have grappled explicitly with these values, and lays out the theory of precautionary federalism as a step forward. Part II discusses the rise of Uber/Lyft as a case study for a precautionary approach in light of these firms' potentially significant, yet uncertain environmental impacts. Part III demonstrates that existing legal rules at the federal and state levels are precluding the kind of precautionary approach that best fits in this context. Part IV demonstrates that existing theories of federalism do not capture certain unique features of Uber/Lyft, and argues that precautionary federalism offers a better approach. This Part also suggests broader applications of precautionary federalism, for example to the cases of hydraulic fracturing and autonomous vehicles.³² It concludes that precautionary federalism offers the best way to achieve the kind of rules called for by the precautionary principle.

I. A PRECAUTIONARY APPROACH TO FEDERALISM

Both the theory and practice of federalism are primarily concerned with two questions: (1) which level of government is best situated to enact legal rules addressing a particular problem, and (2) what values or purposes does this choice serve.³³ Theoretical and practical approaches to these questions have changed over time.³⁴ Dual federalism scholars ask which of two sovereigns – the federal government or the states – is the optimal regulator. Dynamic federalism scholars contend, in contrast, that federalism need not be a

³² I address these questions from a *policy-neutral* perspective – that is, without any preference as to what particular form regulation should take. Cf. Spence, *Federalism*, *supra* note 6, at 436 (taking a policy-neutral approach in the context of hydraulic fracturing).

³³ Elsewhere I have argued that private firms and non-governmental organizations should be considered both as complementary “regulators” and possibly competing ones. Sarah E. Light & Eric Orts, *Parallels in Public and Private Environmental Governance*, 5 MICH. J. ENVTL. & ADMIN. L. 1, 3 (2015) (arguing that instrument choice literature must recognize the parallel forms of governance employed by public and private actors); Sarah E. Light, *The New Insider Trading: Environmental Markets within the Firm*, 34 STAN. ENVTL. L.J. 3 (2015) (examining the parallel use by public and private actors of tradable permits and carbon fees to reduce greenhouse gas emissions). How private action fits into a theory of precautionary federalism will be the subject of a separate paper, as my focus here is exclusively on public law rules.

³⁴ Esty, *supra* note 6, at 600-05 (discussing the historical trajectory of the balance of federal versus state power in environmental regulation).

“zero-sum” game between exclusive federal or state authority.³⁵ But these theories have not grappled explicitly with the role that precaution under conditions of uncertainty should play in guiding our answers to these fundamental questions.

This Part first discusses the precautionary principle, and its application in contexts of potentially catastrophic or irreversible harms such as climate change. It then discusses the rationales for and values advanced by theories of both dual federalism and dynamic federalism. Precaution does not play an explicit role in either of these approaches. Finally, I offer the general principle of precautionary federalism and discuss the values that it serves.

A. *The Precautionary Principle*

The precautionary principle addresses the question of *whether* to regulate when there is a risk of potentially significant environmental, health, or safety consequences, even when there is a lack of certainty about the magnitude or type of the potential harm.³⁶ The principle tells us, broadly speaking, that regulators need not wait until there is certainty before taking action. Rather it “shifts the burden of proof” by requiring the regulated community to demonstrate that regulation is not warranted, rather than the regulator to demonstrate that it is.³⁷ In colloquial terms, the precautionary principle tells us that it is better to be safe than sorry.³⁸

Despite this tidy summary, there is arguably no single precautionary principle.³⁹ While the strongest form of the principle – one that would prohibit an activity in the face of risk even before the magnitude of risk is known – has been controversial and widely criticized for failing to account for risk-risk

³⁵ ERIN RYAN, *FEDERALISM AND THE TUG OF WAR WITHIN*, at xii-xiii (2012) (rejecting the model of “‘zero-sum’ federalism”); Erin Ryan, *Negotiating Federalism*, 52 B.C. L. REV. 1, 5 (2011) (examining evidence of intergovernmental bargaining distinct “from the stylized model of zero-sum federalism dominating political discourse”); cf. Robert A. Schapiro, *Justice Stevens’s Theory of Interactive Federalism*, 74 FORDHAM L. REV. 2133, 2133 (2006) (rejecting descriptive power of dual federalism model).

³⁶ David A. Dana, *A Behavioral Economic Defense of the Precautionary Principle*, 97 NW. U. L. REV. 1315, 1316, 1320 (2003).

³⁷ Dana, *supra* note 36, at 1315; KYSAR, *supra* note 37, at 9; cf. Noah M. Sachs, *Jumping the Pond: Transnational Law and the Future of Chemical Regulation*, 62 VAND. L. REV. 1817 (2009) (discussing the different burdens of proof in toxic chemical regulations in the United States and Europe).

³⁸ Sunstein, *supra* note 10, at 1019.

³⁹ Richard B. Stewart, *Environmental Regulatory Decision Making Under Uncertainty*, in 20 RESEARCH IN LAW AND ECONOMICS 71, 76 (Timothy Swanson ed., 2002) (discussing four versions of the principle).

tradeoffs,⁴⁰ that is not the form of the principle I employ here. Rather, I rely on what even critics of the principle have called “important” and “uncontroversial” formulations.⁴¹ When there is a risk of harm that is potentially irreversible and catastrophic, such as in cases of climate change or genetically modified organisms, it makes sense to regulate an activity in a way that adopts special precaution even if we are uncertain about the magnitude of the risk.⁴² Cass Sunstein has equated the use of the precautionary principle under these conditions to purchasing an “option” to prevent the harm at a later date” once better information becomes available.⁴³

Of course, in the case study I offer here, as in all cases of risk regulation, there are overlapping risks and uncertainties. There is general uncertainty about the environmental harm – the magnitude of potential risks of climate change. But there is also uncertainty about how the new business model adopted by Uber/Lyft interacts with climate change. We do not yet know whether it increases or decreases greenhouse gas emissions or emissions of local air pollutants. We do not know whether it increases or decreases support for public transportation. What we *do* know is that it involves millions of individual rides in personal vehicles, each of which contributes emissions to the atmosphere. In the transportation setting in particular, where climate change is caused by the cumulative contributions of millions of individuals – but any individual contribution is not significant on its own – individuals are prone to minimize the need for regulatory action, especially action that increases costs in the short run.⁴⁴ In this context, it is precisely when there are

⁴⁰ For example, Cass Sunstein has argued that the strongest form is “paralyzing” and provides “no guidance” because both regulatory action (such as banning a new drug to prevent the risk of deaths, which may lead to deaths for those the drug would have helped) and inaction (allowing the new drug to enter the market, but causing the deaths of those who are harmed by the drug) can be described as precautionary. Sunstein, *supra* note 10, at 1023. Frank Cross has put it bluntly, “If a public health regulation of nuclear power causes a shift to fossil fuels, the health costs may be considerable.” Frank B. Cross, *The Paradoxical Perils of the Precautionary Principle*, 53 WASH. & LEE L. REV. 851, 865 (1996). *But see* Noah M. Sachs, *Rescuing the Strong Precautionary Principle from its Critics*, 2011 U. ILL. L. REV. 1285 (disputing Sunstein’s claims in the context of chemical regulatory reform).

⁴¹ Sunstein, *supra* note 9, at 845-46.

⁴² *Id.*

⁴³ *Id.* at 841.

⁴⁴ Kevin M. Stack & Michael P. Vandenbergh, *The One Percent Problem*, 111 COLUM. L. REV. 1385, 1386-88, 1398-1402 (2011) (arguing that although climate change can only be solved through regulation of small contributions to global greenhouse gas emissions, biases lead individuals to discount or ignore small values); *see also* Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243, 1244 (1968) (arguing that individuals are not motivated to protect resources when their impact from resource use is small but personal gains are large).

calls for no regulation in situations of uncertainty that regulators should be attuned to the need for precaution.⁴⁵

The precautionary principle serves several core functions. A precautionary approach can counteract certain cognitive biases, including people's tendency to prefer avoiding "sure, immediate losses" rather than "unsure, non-immediate losses."⁴⁶ This is particularly important in the context of environmental, health, and safety rules, where policy choices explicitly require balancing between the immediate costs of regulation (including the financial costs of compliance, and the restriction of certain forms of activity) and abstract environmental, health, or safety benefits that accrue in the future, often to future generations.⁴⁷ Another bias that a precautionary approach can counteract is the inability of individuals to perceive their small contributions to climate change to be significant in the aggregate – the so-called "one percent problem," which contributes to the tragedy of the commons.⁴⁸ Finally, a precautionary approach can also counteract the bias of myopia, which is the higher value that individuals place on avoiding "immediate or nearly immediate losses" rather than future losses.⁴⁹

These concerns are compelling in the context of vehicle emissions. Combining these biases creates a perfect storm. The prospect that an Uber/Lyft ride might be more expensive in the short term – for example, because of a tax or a requirement to use more expensive low-emissions vehicles – is not necessarily an appealing prospect for those drawn to the firm's lower fares compared to taxis. And while the cumulative environmental impact of millions of individual rides is unquestionably significant, individuals are unlikely to perceive their own contributions to be meaningful. There may thus be a tendency toward under-regulation.

While the precautionary principle has faced criticism, the criticisms can be overcome through careful design. David Dana has described the two primary critiques as the "indeterminacy critique" and the "bad choices critique."⁵⁰ The indeterminacy critique rests on the premise that the precautionary principle does not dictate specific policy outcomes, and thus does not constrain agency discretion in governance. However, this does not render the

⁴⁵ Cf. Sunstein, *supra* note 10, at 1016 ("Sometimes people do seek certainty before showing a willingness to expend costs, and well-organized private groups like to exploit this fact. Insofar as the precautionary principle counteracts the tendency to demand certainty, it should be approved.").

⁴⁶ Dana, *supra* note 36, at 1316-17.

⁴⁷ *Id.*, at 1320.

⁴⁸ See sources cited *supra* note 44.

⁴⁹ Dana, *supra* note 36, at 1324-25.

⁵⁰ *Id.* at 1317.

principle without meaning, as many other legal principles likewise do not dictate specific policy outcomes.⁵¹ As Dana has argued:

Principles can express and reinforce value commitments and procedurally structure decisionmaking without dictating a single set of specific, substantive outcomes; principles may help put extreme options off the table, provide a boost to the advocacy of some in the political community, and force others in that community to marshal more evidence on behalf of their positions.⁵²

The “bad choices” critique suggests that the principle fails to take into account risk-risk tradeoffs. For example, if banning Uber/Lyft meant that families would purchase more private cars, this choice would not necessarily serve the ends of combating climate change, because of the lifecycle emissions that would be generated in the production of additional cars. And it is important to look beyond the particular risk of harm – climate change – to consider other social impacts. For example, if banning Uber/Lyft led to an increase in local drunk-driving deaths, this too, should be factored into the regulatory decision-making process. Thus, it is important to acknowledge that both action and inaction can have social consequences.⁵³ But this fact does not necessarily lead to paralysis. These critiques can be overcome. Policies can be designed in ways that minimize such concerns, for example, by not banning a potentially harmful activity outright, but rather using targeted rules to address the particular concern at issue. Such targeting may be easier in the case of firms like Uber/Lyft that gather vast troves of data about their rides, as data can support more precise targeting.⁵⁴

These two critiques become especially important when considering the lessons of the precautionary principle for federalism theory. As I explain further below, precautionary federalism does not dictate a specific outcome in all cases. It simply requires taking uncertainty into account in determining the allocation of regulatory authority. It suggests that uncertainty tips the balance in favor of overlapping jurisdiction, but recognizes that other factors can outweigh that presumption. Precautionary federalism can correct for biases that may be particularly acute in the environmental, health, and safety context, in which vague benefits of future environmental protection are being weighed against immediate, tangible costs. And it can help to put “extreme options” like broad preemption language, off the table – at least until further information becomes available. The next two sections examine the values

⁵¹ Dana, *supra* note 36, at 1317-18.

⁵² *Id.* at 1317.

⁵³ Sunstein, *supra* note 10, at 1056.

⁵⁴ *See infra*, Part IV.

motivating choices among regulators in the federalism context, and demonstrate that these motivations do not include an appreciation of the role that precaution should play.

B. Dual Federalism

Traditional dual federalism arguments ask which level of government – federal or state – can provide “optimal” environmental rules.⁵⁵ The arguments generally coalesce into four categories, but favor exclusive authority in a single regulator. They do not, however, expressly address whether precaution about potentially significant risks should play any role.⁵⁶

1. Uniformity versus Regulatory Competition

The first set of arguments about the optimal regulator addresses the choice between the need for uniform federal rules versus the value of regulatory competition. Advocates of centralization argue first, that if states are competing for mobile industrial capital, there is a risk that they will engage in a “race to the bottom” to set the most lax environmental standards to attract investment, jobs, and tax revenue to their state.⁵⁷ Second, federal uniformity is more efficient and can promote “economies of scale” both for industry and for regulators setting environmental standards.⁵⁸

On the flip side, regulatory competition allows states to serve as Brandeisian “laboratories of experimentation.”⁵⁹ Decentralized experimentation can

⁵⁵ I prefer the more neutral terms of “centralized” or “decentralized” authority to recognize that local governments can play a decentralized role, and state governments can be “centralized” vis-à-vis states. To the extent that I refer to a choice between federal versus state authority in this section, this reflects the language of dual federalism scholarship.

⁵⁶ See, e.g., Esty, *supra* note 6, at 574 (seeking the “optimal environmental policy level”); Revesz, *supra* note 6, *passim* (discussing economic goal of finding the “optimal” level of regulation); see also Cary Coglianese & Kalypso Nicolaidis, *Securing Subsidiarity: The Institutional Design of Federalism*, in *THE FEDERAL VISION: LEGITIMACY AND LEVELS OF GOVERNANCE IN THE UNITED STATES AND EUROPEAN UNION* 277 (Oxford 2001).

⁵⁷ Stewart, *supra* note 6, at 1211.

⁵⁸ Esty, *supra* note 6, at 585-86 (arguing that federal bureaucrats are more capable of setting environmental standards cost-effectively than fifty state bureaucracies).

⁵⁹ On the origins of this idea, see *New State Ice Co. v. Liebman*, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting) (“It is one of the happy incidents of the federal system that a single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country.”); FELIX FRANKFURTER, *THE PUBLIC AND ITS GOVERNMENT* 49-50 (1930) (“[O]ur federalism calls for the free play of local diversity in dealing with local problems”); see also Henry M. Hart, Jr., *The Relations Between State and Federal Law*, 54 COLUM. L. REV. 489, 493 (1954). But see Susan Rose Ackerman,

enhance social welfare because policies can be tailored to local conditions and preferences.⁶⁰ And in a marketplace of ideas, the best policies may be adopted by other states or even the federal government.⁶¹ Competition among local governments for mobile industrial capital restrains any tendency to overregulate.⁶²

Those favoring decentralization question whether the “race to the bottom” actually occurs.⁶³ For example, Ricky Revesz has rejected the idea that states will make suboptimal choices about environmental regulations in order to attract industry.⁶⁴ States selling the public good of “location rights” to mobile firms are not equivalent to market participants selling widgets, who compete by lowering prices. States do not face the “discipline of the market” or the risk of bankruptcy if they fail.⁶⁵

Others contend that the “race to the bottom” exists, but that it does not “play out” in the manner that economic models suggest.⁶⁶ The trade-offs for

Risk Taking and Reelection: Does Federalism Promote Innovation, 9 J. LEGAL STUD. 593 (1980) (concluding that states are unlikely to innovate in light of risk-averse state and local policymakers).

⁶⁰ Charles M. Tiebout, *A Pure Theory of Local Expenditures*, 64 J. POL. ECON., 416, 418 (1956) (“The consumer-voter may be viewed as picking that community which best satisfies his preference pattern for public goods . . . The greater the number of communities and the greater the variance among them, the closer the consumer will come to fully realizing his preference position.”). Tiebout’s hypothesis depends upon certain assumptions, including full mobility of voters, full knowledge of the different expenditure patterns of local governments, and no externalities (positive or negative) among communities based on the provision of public goods. *Id.* at 419. See also ALBERT O. HIRSCHMAN, EXIT, VOICE, AND LOYALTY: RESPONSES TO DECLINE IN FIRMS, ORGANIZATIONS, AND STATES (1970).

⁶¹ Esty *supra* note 6, at 606.

⁶² Spence, *Local Vetoes*, *supra* note 6, at 384-85. Of course, residents and voters are not entirely mobile; and some kinds of investment are location-specific. For example, in evaluating whether state or local governments are best situated to regulate hydraulic fracturing, it is important to acknowledge that some assets, such as oil, gas, and minerals, are immobile. *Id.* at 384.

⁶³ Revesz, *supra* note 6, at 1219-20 (critiquing “race-to-the-bottom” arguments), *id.* at 1236-39 (citing William A. Fischel, *Fiscal and Environmental Considerations in the Location of Firms* in SUBURBAN COMMUNITIES, in FISCAL ZONING AND LAND USE CONTROLS 119 (Edwin S. Mills & Wallace E. Oates eds., 1975); Wallace Oates & Robert Schwab, *Economic Competition Among Jurisdictions: Efficiency Enhancing or Distortion Inducing?*, 35 J. PUB. ECON. 333 (1988)).

⁶⁴ *Id.* at 1217-18.

⁶⁵ *Id.* Recently, legal scholars have discussed whether states should, like municipalities, be permitted to use Chapter 9 of the Bankruptcy Code to shed excess debt in light of significant pension liabilities. See, e.g., Vincent Buccola, *An Ex Ante Approach to Excessive State Debt*, 64 DUKE L.J. 235, 269-275 (2014) (discussing this debate).

⁶⁶ Esty, *supra* note 6, at 607, n.134 (“Firms rarely move based on environmental standards. Nor do governments overtly change their laws to keep businesses from migrating. . . .

firms and individual voters between economic and environmental benefits are not easily compared, especially when environmental benefits and costs are not easily quantified.⁶⁷ States may not be examining the costs and benefits of attracting a specific firm, but rather attempting generally to be “business-friendly,” thus systematically overvaluing employment and tax revenues, and undervaluing environmental protection.⁶⁸

These discussions assume, however, that the regulators understand with some degree of certainty the environmental harms to be regulated. There are smokestacks with measurable rates or types of emissions. At least – they do not factor uncertainty or precaution into the analysis. These analyses also seem to assume a certain kind of business firm – one that must make choices about where to locate, rather than firms in the sharing economy, which can locate simultaneously in multiple jurisdictions at little additional cost.

2. *Spillovers, Externalities, and the Matching Principle*

The second set of arguments about the optimal regulator is concerned with externalities or spillovers outside the jurisdiction. This debate acknowledges that there can be market failures when decentralized actors set environmental standards. A state can externalize environmental harms to neighboring states, while internalizing the benefits of industrial activity.⁶⁹

The “matching principle” is one solution to this problem, though not the only one.⁷⁰ Under this principle, the ideal regulator is the smallest jurisdiction

Instead, governments relax their environmental enforcement. Or, even more commonly, governments choose not to adopt more stringent standards, even if more vigorous requirements would be welfare enhancing, because economic interests are heard while environmental ones are not.”) See also Kirsten H. Engel, *State Environmental Standard-Setting: Is There a “Race” and Is It “to the Bottom”?*, 48 HASTINGS L.J. 271 (1997) (reviewing empirical evidence to suggest state competition leads to suboptimal standard-setting).

⁶⁷ Esty, *supra* note 6, at 607.

⁶⁸ *Id.*

⁶⁹ Ricky Revesz, *Federalism and Interstate Environmental Externalities*, 144 U. PA. L. REV. 2341 (1996) (arguing that interstate externalities are a compelling reason for federal environmental rules, but that current federal statutes fail to address the externality problem effectively); Stewart, *supra* note 6, at 1215 (discussing spillovers); see also Esty, *supra* note 6, at 587-97 (discussing “structural mismatches” that encompass both negative and positive externalities). Many scholars identify this problem as one of “poorly defined property rights.” Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocation Environmental Regulatory Authority*, 14 YALE L. & POL’Y REV. 23, 36 (1996).

⁷⁰ Butler & Macey, *supra* note 69, at 23-24. Although the “matching principle” sounds neutral, it assumes a default of decentralized governance and requires justification for federal intervention. *Id.* at 24. See also Revesz, *supra* note 69, at 2410-14 (proposing tradable permits in units of “environmental degradation” to address interstate externalities).

that captures both the positive and negative externalities associated with the polluting activity. The relevant inquiry under the matching principle is where the burdens and benefits of industrial activity fall. If all of the significant effects (both burdens and benefits) lie within a state's borders, then the state is likely to set the optimal level of environmental stringency, because it can balance between its citizens' preferences for environmental protection and economic growth. If, however, there are significant environmental effects *outside* the state's borders, then federal rules may be required.⁷¹ Even advocates of decentralization often recognize that federal rules may be necessary to address the spillover problem.⁷²

Again, however, to apply the matching principle, there must be at least some degree of certainty regarding the burdens and benefits of the activity to be regulated.

3. *Public Choice Theories*

The third set of arguments about the optimal regulator derives from public choice theory, which involves the application of economic concepts to the legislative process.⁷³ Public choice scholars examine the interest group dynamics that drive policymaking. Within this literature, competing models exist, from the pluralist vision of legislators as "referees" who "ratif[y] the victories of successful coalitions" to the view that interest groups' policy success depends upon the relative costs and benefits of proposed legislation.⁷⁴

In the environmental context, the costs of regulations are often borne by a small number of firms – concentrating their interests and their intensity of preferences. In contrast, the benefits of regulation like cleaner air accrue to the public, which is likely to be less well organized.⁷⁵ Although one might assume that larger groups would be more successful in a majoritarian political system, Mancur Olson and others have demonstrated that smaller groups with

⁷¹ While the affected states could bargain, this would be costly. Butler & Macey, *supra* note 69, at 30. This approach also fails to account for non-use value (the value of nature for its own sake, rather than for whatever utility it offers to humans).

⁷² *Id.* at 25; Revesz, *supra* note 69, at 2342-44.

⁷³ Esty, *supra* note 6, at 597-99; Daniel A. Farber & Philip P. Frickey, *The Jurisprudence of Public Choice*, 65 TEX. L. REV. 873, 883 (1987) (discussing implications of public choice literature for judicial decisions); Richard L. Revesz, *Federalism and Environmental Regulation: A Public Choice Analysis*, 115 HARV. L. REV. 553 (2001) (challenging the assumption that environmental interest groups will be more successful at a federal level); Spence, *Federalism*, *supra* note 6, at 466.

⁷⁴ Farber & Frickey, *supra* note 73, at 883-86.

⁷⁵ Esty, *supra* note 6, at 597-98.

concentrated interests often organize more effectively, especially when potential beneficiaries of regulation are the “diffuse public.”⁷⁶

Two other complications affect public choice models in the environmental context. First, environmental protection is not the only salient issue for voters.⁷⁷ Second, and relatedly, because of information asymmetries and the challenges of valuing intangibles like a “clean environment,” members of the public are less able to determine their environmental interests as compared to more concrete interests, such as regarding taxes or employment.⁷⁸

Which regulator is optimal under this analysis depends upon a number of assumptions. Firms often prefer national, uniform, standards because it is inefficient and expensive for them to follow multiple, possibly conflicting standards, or to lobby dozens or even hundreds of jurisdictions separately.⁷⁹ Early scholars of federalism argued that environmental interests would be more successful in a federal forum than in a state or local forum.⁸⁰ They argued that state and local governments are more easily influenced by industry and union pressures, which are well funded and well organized at local levels.⁸¹ Under this view, concentrating advocacy at a single level of government – the federal level – would therefore be more efficient and most likely to succeed.⁸² In addition, some have suggested that national politicians and regulators would take more of a “‘long run’ or ‘national’ perspective” than state or local actors.⁸³ However, more recent scholarship has rejected these assumptions, and empirical evidence likewise does not support the claim in all

⁷⁶ MANCUR OLSON, *THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS* 53-57 (1965) (small groups with concentrated interests can organize more effectively than large groups with diffuse interests). Other scholars have suggested some caveats to this assumption. John E. Jackson & David C. King, *Public Goods, Private Interests, and Representation*, 83 AM. POL. SCI. REV. 1143-64 (1989).

⁷⁷ Esty, *supra* note 6, at 598.

⁷⁸ *Id.*; cf. Cary Coglianese, *Social Movements, Law, and Society: The Institutionalization of the Environmental Movement*, 150 U. PA. L. REV. 85, 118 (2001) (arguing that environmental social movements require concrete, rather than abstract, focal points).

⁷⁹ Revesz, *supra* note 6, at 1212, & n.4 (referring to such arguments as capturing “economies of scale”); Stewart, *supra* note 6, at 1211.

⁸⁰ Stewart, *supra* note 6, at 1213.

⁸¹ *Id.*; Revesz, *Public Choice*, *supra* note 6, at 562; Spence, *Federalism*, *supra* note 6, at 460-68 (discussing rationales favoring federal regulation).

⁸² Stewart, *supra* note 6, at 1213.

⁸³ *Id.* at 1215. This point relates to Stewart’s argument that federal regulators may be better at making “commitments entailing material sacrifice.” *Id.* at 1217.

cases.⁸⁴ For example, environmental interest groups have organized successfully in local disputes over hydraulic fracturing,⁸⁵ and many environmental organizations have regional and local offices, rather than national representation alone.⁸⁶ For existing industrial activity, it may be straightforward to assess where interest-group coalitions are likely to form. For new firms like Uber/Lyft, there is some uncertainty regarding how and where interest group battles will play out.

4. *Good Governance and Non-Consequentialist Theories*

The fourth category of arguments favors either centralized or decentralized governance to promote values such as political participation, expressive values, or the “national interest.” For example, because state and local government representatives are closer to the citizens who elect them, decentralized decisionmaking can facilitate feelings of self-determination and active participation in the democratic process.⁸⁷ Moreover, policy diversity for its own sake may have “moral virtue.”⁸⁸ Utilitarian and social welfare-maximizing theorists, however, would reject such a virtue-based, non-consequentialist approach as “forc[ing] people to pay for goods they don’t want.”⁸⁹

C. *Dynamic Federalism*

In contrast to this search for a single, optimal regulator lies dynamic federalism, which favors diversity and overlapping jurisdiction among multiple regulators.⁹⁰ Dynamic federalism exists in many different forms.⁹¹ There is, for example, what Bill Buzbee calls federal “floor” preemption – the setting of minimum environmental standards by the federal government, with the

⁸⁴ Revesz, *Public Choice*, *supra* note 6, at 558-73; Butler & Macey, *supra* note 69, at 45 & n.43; cf. Claire Cain Miller, *Liberals Turn to Cities to Pass Laws and Spread Ideas*, NY TIMES (Jan. 26. 2016), http://www.nytimes.com/2016/01/26/upshot/liberals-turn-to-cities-to-pass-laws-and-spread-ideas.html?smprod=nytcore-iphone&smid=nytcore-iphone-share&_r=0.

⁸⁵ Spence, *Federalism*, *supra* note 6, at 480-83 (discussing local bans on hydraulic fracturing).

⁸⁶ Revesz, *Public Choice*, *supra* note 6, at 569.

⁸⁷ Stewart, *supra* note 6, at 1210.

⁸⁸ *Id.* at 1211.

⁸⁹ Butler & Macey, *supra* note 69, at 51; Esty, *supra* note 6, at 612.

⁹⁰ Adelman & Engel, *supra* note 7, at 1830 (discussing the virtue of policy diversity).

⁹¹ Cf. Heather Gerken, *Our Federalism(s)*, 53 WM. & MARY L. REV. 1549, 1550 (2012) noting the many forms of federalism).

understanding that states (or possibly local governments) may exceed this floor.⁹² At the far end of the dynamic spectrum is pure “democratic experimentalism,” which favors “local experimentation and decentralization to promote learning through “benchmarking, simultaneous engineering, and error detection.”⁹³ In this form of dynamism, any level of government may govern, without preemption by any higher authority, and without the certainty of a federal floor.

Cooperative federalism shares features of both dual and dynamic approaches, but does not sit fully in either camp. In cooperative federalism, the federal government issues national performance standards (such as National Ambient Air Quality Standards under the Clean Air Act), and then authorizes states to enforce those standards through their own regulatory programs, with the option to exceed the federal standards in some instances. It is neither purely dual (because both federal and state actors have authority to act), nor purely dynamic (because the federal government sets the standards to be implemented by the states).⁹⁴

Dynamism serves multiple normative ends.⁹⁵ For example, the *adaptive* view of dynamic federalism replaces the search for an optimal solution to environmental problems with an ecosystem-based model that balances optimization with the search for diverse and malleable solutions.⁹⁶ *Iterative* federalism describes a world in which different levels of government influence one another’s policies in an iterative process over time.⁹⁷ *Empowerment* federalism and *polyphonic* federalism embrace the diversity of multiple voices

⁹² Buzbee, *Floor/Ceiling Distinction*, *supra* note 7, at 1547.

⁹³ Michael C. Dorf & Charles F. Sabel, *A Constitution of Democratic Experimentalism*, 98 COLUM. L. REV. 267, 314 (1998).

⁹⁴ Buzbee, *Interaction’s Promise*, *supra* note 7, at 160; Adelman & Engel, *supra* note 7, at 1811-13.

⁹⁵ RYAN, TUG OF WAR, *supra* note 35, at xiv, 34-67 (discussing “checks and balances” across different levels of government; greater “accountability and transparency;” “local autonomy;” “centralized authority to manage collective action problems and vindicate core constitutional promises;” and “synergies”).

⁹⁶ Adelman & Engel, *supra* note 7, at 1801, 1849 (arguing that dynamic approaches serve adaptive values, because dynamism, like ecosystems, can simultaneously promote optimization and diversity).

⁹⁷ See, e.g., Buzbee, *Interaction’s Promise*, *supra* note 7, at 162-64 (arguing that “floor” preemption provides opportunities for interactive dynamism, while avoiding the risks of the regulatory commons); Carlson, *supra* note 7, at 1100 (discussing the development of motor vehicle standards as an iterative process between the federal government and California); Engel, *supra* note 7, at 170 (same, and observing interactivity over sulfur dioxide and mercury limits on power plants).

in governance.⁹⁸ Most recently, scholars of the new “national” school of federalism have argued that states, and even local governments, can promote *national* values through more decentralized participation in governance.⁹⁹

Overlap promotes accountability and democratic participation by creating multiple fora in which the public can participate.¹⁰⁰ This overlap can limit the risks of interest group capture at one level of government,¹⁰¹ and thus may enhance individual liberty.¹⁰² In addition, when interest groups have the potential to approach and convince multiple regulators to enact their favored policies, this can lead not only to innovation, but also policy diffusion.¹⁰³ Dynamic federalism is more comfortable than dual federalism with diversity and regulatory learning, especially when addressing diffuse contributions to harm.

Of course, the values that dynamism promotes are sometimes in tension, and regulators must choose which values to prioritize.¹⁰⁴ For example, the need for “checks and balances” may conflict with the desire for transparency

⁹⁸ See, e.g., ERWIN CHERMERINSKY, *ENHANCING GOVERNMENT: FEDERALISM FOR THE 21ST CENTURY* 1 (2008); ROBERT A. SCHAPIRO, *POLYPHONIC FEDERALISM: TOWARD THE PROTECTION OF FUNDAMENTAL RIGHTS* 7 (2009). Other approaches exist. Jody Freeman and Daniel Farber have offered a vision of “modular,” flexible institutional frameworks. Jody Freeman & Daniel A. Farber, *Modular Environmental Regulation*, 54 DUKE L.J. 795, 797 (2005).

⁹⁹ See Jessica Bulman-Pozen & Heather K. Gerken, *Uncooperative Federalism*, 118 YALE L.J. 1256 (2009); Heather K. Gerken, *Federalism as the New Nationalism: An Overview*, 123 YALE L.J. 1889, 1893 (2014); Heather K. Gerken, *Dissenting by Deciding*, 57 STAN. L. REV. 1745 (2005); Heather K. Gerken, *Exit, Voice, and Disloyalty*, 62 DUKE L.J. 1349 (2013); Abbe R. Gluck, *Our [National] Federalism*, 123 YALE L.J. 1996 (2014); Cristina M. Rodriguez, *Negotiating Conflict Through Federalism: Institutional and Popular Perspectives*, 123 YALE L.J. 2094 (2014). William Boyd and Ann Carlson observe that in light of Congress’s failure to adopt a uniform federal approach to electricity regulation, state public utility commissions have engaged in significant innovation that will help achieve a federal goal: the transition to a less-carbon-intensive electric grid. William Boyd & Ann E. Carlson, *Accidents of Federalism: Rate Design and Policy Innovation in Public Utility Law*, 63 U.C.L.A. L. Rev. __ (forthcoming 2016) (on file with author).

¹⁰⁰ RYAN, *TUG OF WAR*, *supra* note 35, at 44.

¹⁰¹ Engel, *supra* note 7, at 161.

¹⁰² THE FEDERALIST, No. 51, at 323 (James Madison) (Clinton Rossiter ed., 1961).

¹⁰³ Engel, *supra* note 7, at 173 (“[I]nterest groups spread innovation when they move between levels of government in an effort to find policymakers receptive to their agenda. Ambitious politicians at one level of government also spread innovation when they adopt an issue neglected by other levels of government . . . in an effort to distinguish themselves in bids for higher office.”).

¹⁰⁴ RYAN, *TUG OF WAR*, *supra* note 35, at 38-67 (discussing tension between competing values).

and accountability: in cases of overlapping jurisdiction, voters may not know which sovereign is responsible for the laws that they dislike.¹⁰⁵

There are other drawbacks to dynamism. For example, Buzbee has argued that there is a risk of under-regulation in cases of jurisdictional overlap, such as in pure democratic experimentalism.¹⁰⁶ To correct for this concern, as well as inertia, status quo bias, and other factors that may inhibit innovation in the regulatory space, he advocates federal regulatory “floors” that leave room for higher local standards.¹⁰⁷ Buzbee argues that federal regulatory floors can promote policy diversity while avoiding the tragedy of a regulatory commons.¹⁰⁸ Others recognize that dynamism is in conflict with the desire for “uniformity, finality, and hierarchical accountability.”¹⁰⁹ There is no question that industry prefers uniform rules and complete “ceiling preemption” of alternative forms of governance.¹¹⁰

Thus, there are many competing values to consider. Balancing among these competing normative concerns remains a central consideration both of federalism theory and of federalism practice.¹¹¹ But there should be room to consider uncertainty and the need for precaution more deeply. Even dynamic federalism, which recognizes the need for policy diversity – and thus, inherently assumes some view of regulatory uncertainty – does not incorporate any deep analysis of the role of precaution. The theory of precautionary federalism builds upon the foundations of dual and dynamic federalism, but advances the discussion by examining the interaction effects between new business models and uncertain impacts.

D. Precautionary Federalism

Precautionary federalism has three main elements. First, it sets a default presumption in favor of dynamism and against broad exercises of preemption under conditions of uncertainty to promote policy diversity, allow interest

¹⁰⁵ *Id.* at 45.

¹⁰⁶ William Buzbee, *Recognizing The Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1, 6-7 (2003) (relying on political economic literature and behavioral law and economics to argue that potential regulators will underinvest in regulation when jurisdictional overlap occurs).

¹⁰⁷ *Id.*; Buzbee, *Floor/Ceiling Distinction*, *supra* note 7, at 1547; *cf.* Dorf & Sabel, *supra* note 93, at 314 (favoring local experimentation and decentralization).

¹⁰⁸ Buzbee, *Floor/Ceiling Distinction*, *supra* note 7, at 1547.

¹⁰⁹ Robert A. Schapiro, *Toward a Theory of Interactive Federalism*, 91 IOWA L. REV. 243, 290-92 (2005).

¹¹⁰ Buzbee, *Interaction's Promise*, *supra* note 7, at 160.

¹¹¹ RYAN, *supra* note 35, at xii-xiii (recognizing this tension among competing values in federalism, and advocating a theory of “Balanced Federalism”).

group interaction in multiple fora, and permit local tailoring to local conditions.¹¹² Second, it recognizes that there are tradeoffs across risks.¹¹³ Thus, it recognizes that the benefits of dynamism under conditions of uncertainty must be weighed against other values, including those favoring uniform rules. And third, precautionary federalism is time-bound. It acknowledges that greater certainty about impacts may warrant a shift from one allocation of authority to another, such as from dynamism to greater consolidation.¹¹⁴

In situations in which we are uncertain about the current environmental, health, or safety impacts of a new form of activity, and the effect that the regulatory scheme might have on those impacts over time, a dynamic approach is likely to serve precautionary ends better than a dual federalism one. Just as we do not know under conditions of uncertainty what the best regulatory policy is, we also do not necessarily know who will be the best regulator, or whether a “best” regulator exists at all. Precautionary federalism thus offers a theoretical grounding for dynamism under conditions of significant uncertainty, when the need for multiple regulatory voices and policy innovation is most salient.¹¹⁵ Interest group dynamics cannot be easily determined under such conditions. If there is a possibility of capture at one level of government, then having multiple fora in which to debate policy can promote better outcomes. And it may be useful to determine in the first instance whether regulation should be tailored to local conditions, or whether diversity in local conditions is not salient. Thus, broad exercises of preemption should be avoided if states or local governments desire to exceed federal floors.

But this presumption in favor of dynamism must be weighed against other factors, including whether policy diversity will stifle potentially positive innovation. In addition, the type of uncertainty must be considered. If, for example, there is uncertainty about whether a new economic activity will lead to significant interstate spillovers, then a certain type of dynamism – such as federal floor preemption (rather than federal uniform rules) may be the most appropriate dynamic approach.¹¹⁶ But the fact of interstate spillovers

¹¹² Cf. KYSAR, *supra* note 37, at 19 (“[P]recautionary approaches can be defended as being particularly well suited to safeguarding life and the environment under conditions of uncertainty and ignorance . . .”).

¹¹³ Sunstein, *supra* note 9.

¹¹⁴ Cf. Ruhl & Salzman, *supra* note 31, at 1295 (discussing regulatory “exit”).

¹¹⁵ Cf. Buzbee, *Interaction’s Promise*, *supra* note 7, at 158 (“In settings of dynamism and uncertainty, especially where problems are caused by diverse sources at different scales and manifested in different ways, a single federal answer displacing all other regulatory approaches and institutions is particularly risky.”).

¹¹⁶ For example, if there were uncertainty over whether a new species of grain might interbreed with native species, and the seeds would be carried on the wind from a state with

should not preempt state or local governments from exceeding those floors to better understand the interaction of these new forms of business with local conditions. However, if the risk of potentially significant harm arises from *policy diversity itself* – for example, conflicting algorithms among autonomous vehicles about how to behave under certain traffic conditions – then the need for uniformity may outweigh the benefits of having multiple regulatory voices.¹¹⁷

Precautionary federalism implicates an important but undertheorized issue in this literature – namely, under what circumstances there is a basis to rethink the initial allocation of regulatory authority. Put another way, at some point, must one form of federalism “exit”? Theorists of dynamic federalism suggest that dynamism can promote adaptive learning and adjustment to new information in the types of policies that are developed.¹¹⁸ Precautionary federalism goes one step further to suggest that one allocation of authority may give way to another when there is greater certainty about the interaction effects among environmental impacts, new forms of business, and regulation.¹¹⁹ Precautionary federalism thus addresses head-on Sunstein’s critique that the precautionary principle fails to consider the harms of regulatory *action* alongside its concern with regulatory *inaction*.¹²⁰ Because different regulators may choose different policies – or no regulations at all – precautionary federalism can offer a window into how different approaches fare. Once more information is known about the interaction effects between environmental

lax or no regulation to a state with strict rules, allowing a single state not to regulate could have the same impact as no regulation at all. While a dual theorist would argue that this interstate spillover warrants a federal uniform rule, precautionary federalism suggests that a federal uniform regulatory “floor” can address the spillover problem, while simultaneously allowing other regulators – including state or local governments, or both – to exceed that floor or adopt alternative, non-conflicting rules simultaneously.

¹¹⁷ See *infra*, Part IV.

¹¹⁸ Adelman & Engel, *supra* note 7.

¹¹⁹ Cf. William W. Buzbee, *Contextual Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 108, 112 (2005) (discussing how the “time element, or changing historical circumstances, will modify regulatory capabilities and behavior”). Time is not only important for regulatory capabilities, environmental harms, and political incentives, as Buzbee argues. *Id.* at 114. Time likewise matters for changes in the form of business organization.

¹²⁰ In this way, precautionary federalism addresses head on “what seems to be the most indefensible aspect of the traditional precautionary approach to environmental law and policy: the apparent inattention demonstrated by the precautionary principle to the costs of environmental, health, and safety regulation, including costs that themselves take the form of environmental, health, and safety harms.” KYSAR, *supra* note 37, at 11-12.

impacts and the form of business organization, a different allocation of authority may become appropriate. This potential for a shift can promote learning about the values of the tools chosen and those not chosen.

Like the precautionary principle, precautionary federalism can thus serve an information-forcing function. By placing the burden on firms to justify why regulation is not required, the precautionary principle “legitimately requires risk creators to research and justify the risks they impose on society.”¹²¹ Similarly, precautionary federalism provides incentives to firms to demonstrate why a default of dynamism is not required, either by providing information about what their impacts are, or by minimizing those impacts. In turn, greater certainty about impacts may support industry’s preference for fewer regulatory voices and greater uniformity of standards. For example, firms may demonstrate that local conditions are not sufficiently different to warrant local experimentation.¹²² This element of precautionary federalism may be especially important for firms in the sharing economy which collect vast troves of data, yet have only selectively disclosed that data to date.¹²³

Just as the precautionary principle would reject the claim that the sharing economy or other new forms of economic organization should be allowed room to innovate without *any* government interference or regulation,¹²⁴ precautionary federalism rejects the claim that at this point, a single regulator can be selected as “optimal.” Although other scholars focus on *whether* the government should regulate the new sharing economy, the normative principles of precaution apply as well to the question of *who gets to decide*. Uncertainty about the impacts of new business models – in the face of significant

¹²¹ Sachs, *supra* note 40, at 1285.

¹²² This is not to argue in favor of information disclosure as a particular governance instrument. Rather, the point is that firms facing precautionary federalism as a result of uncertainty should be motivated to address that uncertainty head on – by making public more data regarding their environmental, health, or safety impacts, or by reducing those impacts. A challenge for precautionary federalism, just as for the precautionary principle, is precisely how to measure the level of uncertainty that would trigger a shift to more consolidated governance.

¹²³ These firms are, at heart, about data. Channele Bessette, *Does Uber Even Deserve Our Trust?* FORBES (Nov. 25, 2014), <http://www.forbes.com/sites/channelebessette/2014/11/25/does-uber-even-deserve-our-trust/#69a8719d66d5> (discussing Uber’s “God view” pursuant to which customer data and movement can be tracked, including data suggestive of “one-night stands”).

¹²⁴ See sources cited *supra* note 7; Cf. Molly Cohen & Arun Sundararajan, *Self-Regulation and Innovation in the Peer-to-Peer Sharing Economy*, 82 U. CHI. L. REV. DIALOGUE 116, 118 (2015) (“[P]latforms should not be viewed as entities to be regulated but rather as actors that are a key part of the regulatory framework in this arena.”) (emphasis added). Even these authors recognize that in some cases in which “the interests of digital, third-party platforms are not always perfectly aligned with the broader interests of society, some governmental involvement or oversight is likely to remain useful.” *Id.*

environmental, health, or safety risks – should not be a signal to avoid or defer regulation; nor should it be a signal to select a single regulator and to exclude others. Rather, uncertainty requires *precaution* about who gets to decide. We cannot choose *ex ante* who will be the optimal regulator to the exclusion of others (or whether an optimal regulator exists). At the outset, the burden should be on the regulated community to demonstrate why uniform rules are best.

A precautionary approach can adapt quickly to changes in forms of business organization. The rise of for-profit firms like Uber/Lyft, which incorporate elements of hierarchies, markets, and sharing, are not the teleological endpoint of industrial organization. They are rather a stepping stone – but one that could lead in innumerable directions. Whatever form of corporate organization Uber/Lyft or their successors adopt, precautionary federalism, in which multiple voices are speaking, can ensure that their potentially significant consequences are addressed in a meaningful way.

Having laid out the principle of precautionary federalism in general terms, the next two Parts turn to the case study of Uber/Lyft. Part II establishes that Uber/Lyft pose a risk of significant environmental impacts, but that there is uncertainty about those impacts. Part III argues that, in light of precautionary federalism, the current approach to preemption at both the federal and state levels should be reevaluated.

II. UBER/LYFT'S UNCERTAIN ENVIRONMENTAL IMPACTS

A. *How Uber/Lyft Work*

Uber/Lyft provide an internet-based application (“app”) that connects people who need rides with drivers who can offer those rides. The rider pays by credit card via the app, and the payment is split between the driver and Uber.¹²⁵ Uber owns no vehicles.¹²⁶ Lyft offers similar services. Uber thus describes itself “as a ‘technology company,’ not a ‘transportation company,’ and describes the software it provides as a ‘lead generation platform.’”¹²⁷

Uber currently operates in 341 cities in 63 countries, including 179 cities in North America.¹²⁸ In December, 2014, the firm asserted that it was providing one million rides globally each day; as of June, 2015, the firm asserted

¹²⁵ O'Connor v. Uber Techs, Inc., 82 F. Supp. 3d 1133, 1135 (N.D. Cal. 2015); Uber Techs., Inc. v. Berwick, No. CGC-15-546378, *appeal filed* (Cal. Super. Ct., S.F. Cnty. June 17, 2015).

¹²⁶ O'Connor, 82 F. Supp. 3d at 1136.

¹²⁷ *Id.*

¹²⁸ *Cities*, UBER, www.uber.com/cities (last visited Jan. 28, 2016).

that it was providing one million rides daily in China alone.¹²⁹ Lyft operates in 205 cities in the United States, and projects that it will provide 90 million rides in 2015 and 205 million rides in 2016.¹³⁰

B. The Potential Environmental Impacts of Uber/Lyft

The transportation sector accounts for twenty-eight percent of all greenhouse gas emissions in the United States.¹³¹ Light-duty vehicles, including passenger cars and light-duty trucks make up sixty-eight percent of that total.¹³² The emissions arising from any single car trip are negligible; it is only the cumulative emissions from millions of trips that become significant. One recent study by Rogelj et al. has demonstrated that to limit global warming to 1.5 degrees Celsius – an ambitious goal to avoid the most catastrophic effects of climate change – will require significant reductions in emissions not only from electricity generation, but also from the transportation sector.¹³³

Uber sets no rules for its uberX drivers on vehicle type or fuel economy other than requiring the vehicle model year to be 2000 or newer, with some cities requiring the model year to be 2005 or newer.¹³⁴ Newer model-year

¹²⁹ See *supra* note 14, and accompanying text.

¹³⁰ *Cities*, LYFT, www.lyft.com/cities (last visited Jan. 28, 2016); Maya Kosoff, *Shockingly, Lyft Isn't Getting Demolished By Uber*, BUSINESS INSIDER (Mar. 16, 2015), <http://www.businessinsider.com/lyft-internal-growth-numbers-revealed-2015-3>; Daniel Miller, *Lyft vs. Uber: Just How Dominant IS Uber in the Ridesharing Business?*, MOTLEY FOOL (May 24, 2015), <http://www.fool.com/investing/general/2015/05/24/lyft-vs-uber-just-how-dominant-is-uber-ridesharing.aspx>.

¹³¹ Env'tl. Prot. Agency, *Fast Facts: U.S. Transportation Sector Greenhouse Gas Emissions: 1990-2012* (Mar. 2015). This is the second-largest emitting sector, after electricity generation. *Id.* See also David E. Adelman, *Environmental Federalism: When Numbers Matter More Than Size*, 32 UCLA J. ENVTL. L. & POL'Y 238, 267 (2014) (“[m]otor vehicles continue to be the single most important source of air pollution”). Notably, there is significant regional variation in these figures. GABE PACYNIAC ET AL., GEORGETOWN CLIMATE CTR., REDUCING GREENHOUSE GAS EMISSIONS FROM TRANSPORTATION: OPPORTUNITIES IN THE NORTHEAST AND MID-ATLANTIC, Georgetown Climate Ctr. 8 (Nov. 2015), http://www.georgetownclimate.org/sites/www.georgetownclimate.org/files/GCC-Reducing_GHG_Emissions_from_Transportation-11.24.15.pdf [hereinafter “GCC, Reducing Emissions”].

¹³² GCC, Reducing Emissions, *supra* note 131, at 1.

¹³³ See Rogelj et al., *supra* note 19.

¹³⁴ *Driving Jobs v. Driving With Uber*, UBER, <https://www.uber.com/driver-jobs> (last visited Jan. 28, 2016). In contrast, UberBlack and UberSUV vehicles have more restrictions. For example, in New York City, these vehicles must be newer than model year 2010 if the vehicle already has a Taxi and Limousine Commission license plate, or than 2011 if the vehicle does not yet have a TLC license plate. *Full Vehicle List*, UBER, <http://www.driveubernyc.com/vehicles/full-list/> (last visited Jan. 28, 2016). Notably, when uberX launched in San Francisco and New York in 2012, it was promoted as a less-expensive alternative to UberBlack with privately owned hybrid vehicles. See Liz Gannes, *A Status Symbol Moves Down Market: The Context*

vehicles are likely (on average) to have better fuel economy, in light of progressive increases in Corporate Average Fuel Economy (CAFE) standards over time; however, this depends entirely on the vehicle.¹³⁵ Trading an older economy car for a newer sport utility vehicle would lead to a decrease in fuel efficiency. Greenhouse gas emissions are also generated at other stages of the business value chain, including upstream in car manufacture.

There are many unknowns about whether, taking a lifecycle approach, the entry of Uber/Lyft into new markets increases or decreases greenhouse gas emissions as compared to the status quo. In order to answer this question, it is essential first to calculate the cumulative emissions from all rides in Uber/Lyft vehicles. But second, it is important to ask whether these rides are “induced” – meaning, that the rider would not have made the trip in the absence of Uber/Lyft. Also relevant is whether the trip would have resulted in fewer emissions had the rider used an alternative form of transportation. Public transit would undoubtedly result in fewer emissions. Even taxi rides might lead to fewer emissions if those taxis were low-emissions vehicles – as incentivized by certain municipal governments.¹³⁶ On the flip side, if the existence of Uber/Lyft leads individuals to forego purchasing cars in the first place, then these firms may be avoiding upstream emissions by reducing demand for the manufacture of new cars.

To date, empirical research on transportation in the sharing economy has focused more broadly on the environmental impact of carpooling, or on car-sharing systems, in which a single firm (such as Zipcar or car2go) owns vehicles that members can rent on a short-term basis.¹³⁷ That research suggests that voluntary ridesharing and car-sharing systems may reduce greenhouse gas emissions, but evidence is incomplete. For example, one study concluded

for *Uber's Lower-Priced Launch*, ALL THINGS D (July 2, 2012), <http://all-thingsd.com/20120702/a-status-symbol-moves-down-market-whats-behind-the-uberx-launch/>.

¹³⁵ See *infra*, Part III.A.

¹³⁶ See *infra*, Part III.A.

¹³⁷ See, e.g., Nelson D. Chan & Susan A. Shaheen, *Ridesharing in North America: Past, Present, and Future*, 32 TRANSPORT REVS. 93 (2012) (discussing environmental impacts of ridesharing, but not TNCs); Joerg Firnkorn & Martin Muller, *What will be the environmental effects of new free-floating car-sharing systems? The case of car2go in Ulm*, 70 ECOL. ECON. 1519 (2011); Eliot Martin, Susan A. Shaheen, & Jeffrey Lidicker, *Impact of Carsharing on Household Vehicle Holdings: Results from North American Shared-Use Vehicle Survey*, 2143 TRANSP. RES. RECORD 150, 150 (2010) (demonstrating that households participating in car-sharing programs “reduce their vehicle holdings to a degree that is statistically significant”); Elliot W. Martin & Susan A. Shaheen, *Greenhouse Gas Emission Impacts of Carsharing in North America*, MINETA TRANSP. INST. REPORT No. 09-11 (June 2010) (concluding that large emissions reductions by some households outweigh small increases by many households joining car-sharing organizations).

that while the overall effect of membership in carsharing organizations reduces household GHG emissions, the “reduction is not generalizable,” as some households’ very large reductions offset the “collective small emission increases of other households.”¹³⁸ That study concluded that member households significantly reduced their vehicle ownership after joining a carsharing organization, but the study’s authors did not independently calculate the impact of the embedded lifecycle emissions on the overall impact of carsharing.¹³⁹ Other empirical studies of carsharing membership organizations likewise concluded that households participating in carsharing programs reduced their own vehicle ownership to a statistically significant degree.¹⁴⁰ There is no empirical evidence, however, on the long term implications of these programs for public transit demand.

To date, only one study exists, by Rayle et al., regarding the greenhouse gas emissions impacts of Uber/Lyft (which the authors call “ridesourcing”) in San Francisco.¹⁴¹ Rayle et al. concluded that Uber/Lyft “appears to substitute for longer public transit trips but otherwise complements transit. Impacts on overall vehicle travel are ambiguous.”¹⁴² The authors conducted an intercept study in three neighborhoods in San Francisco. They interviewed two groups of people: (1) individuals exiting Uber/Lyft vehicles, and (2) individuals they stopped on the street who had used Uber/Lyft within the prior two weeks.¹⁴³ They asked about the nature of rides, including distance traveled, point of origin and destination, and how the individual would have traveled if Uber/Lyft did not exist.¹⁴⁴

The authors reached several conclusions about what transportation alternatives are being replaced, with caveats about the observational nature of the study and the limited number of neighborhoods they surveyed. They observed that “a substantial portion of sampled ridesourcing trips are spatially

¹³⁸ Martin & Shaheen, *supra* note 137, at 3.

¹³⁹ *Id.* at 17-18, 62.

¹⁴⁰ Martin et al., *supra* note 137, at 150.

¹⁴¹ Lisa Rayle et al., *App-Based, On-Demand Ride Services: Comparing Taxi and Ridesourcing Trips and User Characteristics in San Francisco* 1-22 (U.C. Berkeley Transp. Center Working Paper) (Aug. 2014) (on file with author). They contrast “ridesourcing” with “ridesharing” which “involves the grouping of travelers in a private vehicle, each heading to a similar destination, with the goal of reducing congestion, travel costs, fuel consumption, and vehicle emissions.” In contrast, Uber/Lyft drivers “do not share a destination with passengers,” but rather derive income from the arrangement. *Id.* at 2.

¹⁴² Rayle et al., *supra* note 141, at 1.

¹⁴³ *Id.*

¹⁴⁴ *Id.* at 6-12.

and temporally not well served by public transit, suggesting a complementary relationship for transit.”¹⁴⁵

The impact on car ownership and the displacement of other forms of transportation were not as positive as advocates might have hoped. Individuals using Uber/Lyft “appear to be less likely to own an automobile” in the first instance.¹⁴⁶ In terms of the ambiguous effects on car ownership:

Ninety percent of vehicle owners said they had not changed their ownership levels since they began using ridesourcing and those who did were as likely to own more cars as those with fewer, so the change likely had little to do with the presence of ridesourcing.¹⁴⁷

This finding stands in contrast to assertions by Uber’s CEO in London about its 7,000 driver-partners in that city: “For each of those cars on the road, you are taking seven and half cars off the road.”¹⁴⁸

The study also suggested that Uber/Lyft has a small (eight percent) “induced travel effect,” meaning that the presence of the service leads to rides that would not otherwise have taken place.¹⁴⁹ For those who would have made the trip in the absence of Uber/Lyft, thirty-nine percent reported that they would have used a taxi, thirty-three percent would have used bus or rail, and six percent would have driven.¹⁵⁰ The authors observed that wait times for Uber/Lyft vehicles are “markedly shorter and more consistent than those of taxis,” and that individuals using Uber/Lyft differ from those using traditional taxis in that they are “younger, own fewer vehicles and more frequently travel with companions.”¹⁵¹ With respect to Uber/Lyft’s impact on overall vehicle miles traveled, the authors reached no definitive conclusion but said that further research is warranted.¹⁵²

A number of important questions remain unanswered. For example, Rayle et al. contend that the relationship between Uber/Lyft with public transit is likely “complementary” because many of the rides were not well served by public transit either in terms of location or timing. What is not

¹⁴⁵ *Id.* at 1-2.

¹⁴⁶ *Id.* at 2.

¹⁴⁷ *Id.* at 13.

¹⁴⁸ Natasha Lomas, *Let’s Talk about Uber, Congestion and Urban Air Quality*, TECHCRUNCH (Aug. 26, 2015), <http://techcrunch.com/2015/08/26/uber-london-impact/>.

¹⁴⁹ Rayle et al., *supra* note 141, at 13.

¹⁵⁰ *Id.* at 13, & Table 4.

¹⁵¹ *Id.* at 1 (noting that the supply of Uber/Lyft vehicles may be greater because these firms do not face the same regulations, including supply caps or medallion rules, as traditional taxis).

¹⁵² *Id.* at 17.

accounted for, however, is what impact the availability of Uber/Lyft may have on support for public transportation availability *in the future*. If Uber/Lyft were not available, perhaps those who needed to get to areas underserved by public transit would lobby for better public transportation. The San Francisco Municipal Transportation Agency is seeking such data from Uber/Lyft for its planning purposes, but the data has not been forthcoming.¹⁵³

There are also few data available on other local environmental impacts of Uber/Lyft such as on traffic and congestion, though these issues have arisen as local concerns. The City of London released statistics in August, 2015, demonstrating that the number of private, for-hire vehicles increased in the city by more than twenty-five percent since 2013 (from 49,854 to 62,754) when Uber entered the market, while the number of London taxis remained essentially constant with only a 1.5 percent increase.¹⁵⁴ London is especially concerned about increased traffic, as it has registered higher levels of nitrogen dioxides (a local component of transportation emissions) than other European capitals.¹⁵⁵

Other local officials have raised concerns about the effect of Uber/Lyft on traffic.¹⁵⁶ For example, the Mayor of Seattle has argued that these firms could worsen traffic congestion.¹⁵⁷ The Austin, Texas Transportation Department is seeking data on the impact of Uber/Lyft on traffic.¹⁵⁸ The mayor of Santa Monica claimed that the “overall business model is just horrible for air

¹⁵³ Carmel DeAmicis, *Why ridesharing companies like Uber and Lyft have yet to prove their environmental friendliness*, GIGAOM (Sept. 21, 2014), <https://gigaom.com/2014/09/21/why-ridesharing-companies-like-uber-and-lyft-have-yet-to-prove-their-environmental-friendliness/> (“If Uber, Lyft, and Sidecar draw people away from the Muni, buses, BART, and taxis, San Francisco will have to change public transit supply to match the decreased demand. That in turn could make the system even less reliable, and people with higher incomes might reject it altogether.”).

¹⁵⁴ Lomas, *supra* note 148.

¹⁵⁵ *Id.*

¹⁵⁶ Annie Zak, *Seattle Mayor: Apps Like Uber Could Make Traffic Problems Worse If Not Managed Correctly*, BUDGET SOUND BUS. J. (Oct. 16, 2015), <http://www.bizjournals.com/seattle/blog/techflash/2015/10/seattle-mayor-apps-like-uber-could-make-traffic.html> (“Technology could actually make the problem worse unless we figure out managing it.”).

¹⁵⁷ *Id.*

¹⁵⁸ Terrence Henry, *Have Lyft and Uber Made Traffic in Austin Worse? The City Wants to Find Out*, KUT.ORG (Aug. 3, 2015), <http://kut.org/post/have-lyft-and-uber-made-traffic-austin-worse-city-wants-find-out> (noting that taxi trips in the City declined by one quarter since the legalization of TNCs).

quality and traffic congestion.”¹⁵⁹ But research on the local impact of Uber/Lyft on congestion, traffic speeds, and impacts on demand for public transit remains limited.

C. *Demographics of Uber/Lyft*

Because public choice theories figure prominently in scholarly work on federalism, it is important to understand who belongs to the potential political constituencies that might support or oppose Uber/Lyft. Supporters are likely to include both riders and drivers,¹⁶⁰ while opponents are likely to include taxi drivers, taxi fleet owners, and advocates of public transit, among others. Uber/Lyft riders are often young (approximately three-quarters of Uber riders are between the ages of sixteen and thirty-four) and urban (approximately ninety-five percent live in urban or suburban areas).¹⁶¹ More than one quarter of Uber users come from the top income quartile.¹⁶² The same age group also dominates customers of Lyft.¹⁶³ Uber recently released a study demonstrating that its drivers tend to be younger than traditional taxi drivers and chauffeurs, as well as more likely to be college-educated.¹⁶⁴

This demographic also tends to use public transportation more than other demographics. For example, Americans under the age of thirty are 2.3 times more likely to ride public transit than Americans between the ages of thirty and sixty, and 7.2 times more likely to use public transit than Americans over

¹⁵⁹ Jonathan Friedman, *Uber ‘Horrible for Air Quality and Traffic Congestion,’ Santa Monica Mayor Says*, SANTA MONICA LOOKOUT (Mar. 23, 2015), http://www.surfsantamonica.com/ssm_site/the_lookout/news/News-2015/March-2015/03_23_2015_Uber_Horrible_for_Air_Quality_and_Traffic_Congestion_Santa_Monica_Mayor_Says.html.

¹⁶⁰ Many drivers have raised concerns about lack of worker protections, but these concerns have translated into calls for better worker protections, not calls for a rejection of the new firms entirely. *See, e.g.*, Noam Scheiber, *Uber Drivers and Others in the Gig Economy Take a Stand*, N.Y. TIMES (Feb. 2, 2016).

¹⁶¹ Felim McGrath, *The Demographics of Uber’s US Users*, GLOBAL WEB INDEX (July 29, 2015), <http://www.globalwebindex.net/blog/the-demographics-of-ubers-us-users>.

¹⁶² *Id.* *See also* Felim McGrath, *Uber: Half of 16-34s are Interested*, GLOBAL WEB INDEX (Apr. 24, 2015), <http://www.globalwebindex.net/blog/uber-half-of-16-34s-are-interested>.

¹⁶³ Audrey Hungerman, *Uber vs. Lyft*, STATSOCIAL (Nov. 19, 2014), <http://blog.statso-social.com/uber-vs-lyft/>.

¹⁶⁴ Jonathan Hall & Alan Krueger, *An Analysis of the Labor Market for Uber’s Driver-Partners in the United States 7-9* (Princeton Univ. Indus. Relations Section, Working Paper No. 587 (2015)).

sixty.¹⁶⁵ Thus, “switching” from public transit to Uber/Lyft by this demographic could lead to less support for public transit. A worsening of public transportation options could have environmental justice implications for those who cannot afford to ride Uber/Lyft. Taking a wide view approach, however, it is important to recognize one study that suggested Uber vehicles were faster and cheaper at serving low-income neighborhoods than taxis.¹⁶⁶

Uber/Lyft pose the risk of significant environmental harms – harms that have global, national, state, and local implications. Yet there is significant uncertainty about the magnitude and direction of these potential impacts. This uncertainty warrants a precautionary approach. The regulatory reality, however, looks quite different. The next Part examines how existing federal and state laws broadly preempt local environmental experimentation to manage vehicle emissions. A precautionary federalism approach suggests that these existing rules should be reevaluated.

III. EXISTING AND EMERGING LEGAL FRAMEWORKS

A. *Federal Preemption of Vehicle Emissions Standards*

The environmental impacts of transportation are simultaneously global, national, and local in scope. Yet Congress has determined – and the Supreme Court has reinforced through a broad exercise of preemption – that both fuel economy and greenhouse gas emissions standards are best regulated through uniform, federal rules. Precautionary federalism suggests that this state of affairs is ripe for reconsideration.

Under the Energy Policy and Conservation Act (EPCA) and the Clean Air Act, Congress has delegated to the Department of Transportation and the Environmental Protection Agency (EPA) authority to regulate fuel economy and greenhouse gas emissions standard for new vehicles.¹⁶⁷ The EPCA directs the Secretary of Transportation to “prescribe by regulation average fuel

¹⁶⁵ TRANSIT CENTER, WHO’S ON BOARD: MOBILITY ATTITUDES SURVEY 38-39 (2014), <http://transitcenter.org/wp-content/uploads/2014/08/WhosOnBoard2014-ForWeb.pdf>.

¹⁶⁶ ROSANNA SMART ET AL., BOTECH ANALYSIS CORP., FASTER AND CHEAPER: HOW RIDE-SOURCING FILLS A GAP IN LOW-INCOME LOS ANGELES NEIGHBORHOODS (2015), <http://botecanalysis.com/wp-content/uploads/2015/07/LATS-Final-Report.pdf>. Note that this research was funded by Uber Technologies. *Id.* at 2.

¹⁶⁷ For a detailed discussion of how the federal government and car manufacturers collaborated to set these rules, see Jody Freeman, *The Obama Administration’s National Auto Policy: Lessons from the “Car Deal,”* 35 HARV. ENVTL. L. REV. 343 (2011) (discussing the joint rulemaking to set harmonized corporate average fuel economy standards and the first

economy standards for automobiles,” requiring each standard to be the “maximum feasible average fuel economy level that the Secretary decides the manufacturers can achieve in that model year.”¹⁶⁸ The EPCA’s text contains express preemption language that prohibits any state or local government from adopting or enforcing “a law or regulation related to fuel economy standards or average fuel economy standards for automobiles covered by an average fuel economy standard under this chapter.”¹⁶⁹

The Clean Air Act’s rules for vehicle emissions likewise embody a strong vision of federal power, although with an important caveat. The Act requires the EPA to set “standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles.”¹⁷⁰ Section 209(a) of the Act contains express preemption language similar to that of the EPCA, precluding any state or political subdivision from adopting or attempting to enforce “any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines.”¹⁷¹ There is one important exception to this preemption language, however. California is authorized to establish its own standards (and other states are authorized, under some circumstances, to adopt those standards) if it first obtains a waiver from the EPA concluding that its standards are “at least as protective of public health and welfare as applicable Federal standards.”¹⁷² Most recently, the Department of Transportation and

national greenhouse gas emissions standards for motor vehicles); *see also* Osofsky, *supra* note 8, at 249-52 (discussing regulation of motor vehicles).

¹⁶⁸ 49 U.S.C. § 32902(a) (2012); 49 C.F.R. §§ 1.50(f), 501.2(a)(8) (2013).

¹⁶⁹ 49 U.S.C. § 32919(a) (2012). Courts tend to read express preemption language using the words “related to” broadly. *See, e.g.,* Rush Prudential HMO, Inc. v. Moran, 536 U.S. 355, 392 (2002) (discussing “related to” language within ERISA as evidence of Congress’s intent to designate employee benefits as “exclusively a federal concern”); *Morales v. Trans World Airlines, Inc.*, 504 U.S. 374, 383-84 (1992) (reading “relating to” language in Airline Deregulation Act broadly).

¹⁷⁰ 42 U.S.C. § 7251(a)(1) (2012). The EPA initially declined to apply this provision to greenhouse gas emissions. However, after the Supreme Court’s decision in *Massachusetts v. EPA*, 549 U.S. 497, 534-35 (2007), the EPA reversed course. In 2009, the agency determined that greenhouse gas emissions from new motor vehicles contribute to air pollution and may reasonably be anticipated to endanger public health and welfare. Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009).

¹⁷¹ 42 U.S.C. § 7542(a) (2012).

¹⁷² Clean Air Act §§ 177; 209(b), 42 U.S.C. § 7507 (2012) (noting that states in non-attainment areas may adopt California’s standards for motor vehicle emissions); § 7543(b) (2012) (noting that compliance with the California standard, if preemption is waived by the EPA, constitutes compliance with the Act). The California and federal standards have influenced one another in an iterative process over time. *See* sources cited, *supra* note 97.

the EPA have issued joint rulemakings to increase the fuel efficiency (and simultaneously reduce greenhouse gas emissions) of new vehicle fleets.¹⁷³

On the flip side of this strong federal preemption language is a longstanding recognition both by Congress and the Court of the significant local interest in transportation. For example, Section 209(d) of the Clean Air Act states:

Nothing in this part shall preclude or deny to any State or political subdivision thereof the right otherwise to control, regulate or restrict the use, operation, or movement of registered or licensed motor vehicles.¹⁷⁴

Since 1952, the Supreme Court has recognized that the “operation of taxicabs is a local business” and that “Congress has left the field largely to the states.”¹⁷⁵ Likewise, the D.C. Circuit has recognized that even in the context of uniform federal emissions control standards, “the longstanding scheme of motor vehicle emissions control has always permitted the states to adopt in-use regulations – such as carpool lanes, restrictions on car use in downtown areas, and programs to control extended idling of vehicles – that are expressly intended to control emissions.”¹⁷⁶

Despite this recognition of a strong local interest in the environmental impacts of transportation, however, the Supreme Court has read the Clean Air Act’s preemption provisions broadly. This interpretation reflects a dual federalism approach that favors uniform federal rules and excludes state and local governments from attempting to exceed federal standards to address transportation emissions. In *Engine Manufacturers Association v. South Coast Air Quality Management District*, the Supreme Court held that the Clean Air Act preempted standards governing not only the manufacture of new vehicles, but also standards governing the purchase of private vehicle fleets.¹⁷⁷ The South Coast Air Quality Management District had enacted

¹⁷³ See Freeman, *supra* note 167. Notably, the car manufacturers sought uniform, federal rules, agreeing to support these regulations in settlement of a lawsuit. *Green Mountain Chrysler-Plymouth-Dodge-Jeep vs. Crombie*, 2007 WL 922255 (D.Vt. 2007) (voluntarily dismissed per motion to dismiss filed April 7, 2010).

¹⁷⁴ 42 U.S.C. § 7543(d) (2012).

¹⁷⁵ *Buck v. California*, 343 U.S. 99, 102 (1952). See also MARK A. FRANKENA & PAULA A. PAUTLER, FTC, BUREAU OF ECON., *An Economic Analysis of Taxicab Regulation* 15 (1984); Paul S. Dempsey, *Taxi Industry Regulation, Deregulation & Reregulation: The Paradox of Market Failure*, 24 TRANS. L.J. 73 (1996); Robert Hardaway, *Taxis and Limousines: The Last Bastion of Economic Regulation*, 21 HAMLINE J. PUB. L & POL’Y 319 (2000).

¹⁷⁶ *Engine Mfrs. Ass’n v. EPA*, 88 F.3d 1075, 1094 (D.C. Cir. 1996).

¹⁷⁷ *Engine Mfrs. Ass’n v. South Coast Air Quality Mgmt. Dist.*, 541 U.S. 246, 255 (2004) (“A command, accompanied by sanctions, that certain purchasers may buy only vehicles with particular emission characteristics is as much an ‘attempt to enforce’ a ‘standard’ as a command, accompanied by sanctions, that a certain percentage of a manufacturer’s sales volume must consist of such vehicles.”). Ultimately, the Court remanded the matter to determine

“Fleet Rules” requiring the purchase of low-emissions vehicles by both public and private actors, to the extent that such vehicles were available in the market.¹⁷⁸ The Court’s opinion reflected an overriding concern about economies of scale in production.¹⁷⁹ The Court declined to address, however, whether “voluntary incentive programs” were preempted, leaving some room for state or local governments to offer incentives for the purchase or use of low-emissions vehicles.¹⁸⁰

Recognizing the impact that transportation emissions have in their cities and towns, local governments have attempted to reduce emissions arising out of local vehicle travel, including for-hire vehicles like taxis. However, because of the Court’s expansive reading of this preemption language, these efforts have met with mixed results.¹⁸¹ More successful efforts have included incentive programs to encourage the purchase of hybrid or low-emissions vehicles by taxi fleet owners, including offering “head of the line” privileges to such vehicles at airports, or increasing lease caps – the rates that fleet owners can charge drivers – for hybrid vehicles. Less successful efforts have placed additional burdens on the purchase or use of lower fuel-economy vehicles. Owners of taxi fleets have challenged some of these efforts, claiming preemption under EPCA and the Clean Air Act. The success or failure of these programs has largely depended upon whether the local efforts can be characterized as voluntary incentive programs (which are not preempted) or mandatory purchase obligations (which are).

For example in the Second Circuit, the court characterized one program adopted by the City of New York, which lowered the rate that fleet owners could charge drivers for vehicles with poor fuel economy, as a prescriptive mandate to purchase a vehicle with particular emissions standards. The court

whether all of the Fleet Rules—in particular those that applied only to state proprietary purchases—were preempted under section 209 of the Clean Air Act. *Id.* at 258-59.

¹⁷⁸ *Id.* at 248-49.

¹⁷⁹ *Id.* at 255.

¹⁸⁰ *Id.*

¹⁸¹ These efforts have been consistent with the leading role local governments have played in policymaking to address climate change, including both increasing resiliency and reducing emissions. For example, the C40 Cities Climate Leadership Group now encompasses 75 affiliated cities worldwide to address climate change. *About C40*, <http://www.c40.org/about> (last visited Jan. 31, 2016). In 2014, the Mayors of Philadelphia, Houston and Los Angeles announced the formation of the Mayors’ National Climate Action Agenda to set more concrete emissions reduction goals. *Mayors’ National Climate Action Agenda: An Initiative to Combat Climate Change and Prepare for Global Warming* (2014), http://www.houstontx.gov/mayor/press/Climate_Action_Agenda.pdf.

held that the City rule was preempted.¹⁸² In contrast, the Fifth Circuit and other courts have rejected preemption challenges to local programs that could be characterized as incentives to purchase low-emissions vehicles rather than mandates, or where the programs applied only to a small portion of the taxi fleet, rather than the entire fleet.¹⁸³

Other municipal efforts to reduce emissions from local taxi fleets been successful when cities have managed to adopt rules collaboratively and avoid legal challenges. For example, in 2008, the City of San Francisco enacted the Clean Taxi Act to reduce greenhouse gas emissions by twenty percent by 2012, as compared to a 1990 baseline. As of July 2013, the San Francisco Municipal Transportation Agency reported that ninety-seven percent of the city's taxis are either hybrid or CNG (compressed natural gas) vehicles.¹⁸⁴ In San Francisco, opposition from the taxi industry to these environmental rules was limited in part as a result of the collaborative nature of the process of adopting the rule, and the provision of funding to help offset incremental costs. But not all cities can count on such favorable interest-group dynamics.

In contrast, there are currently no such rules governing the emissions of Uber/Lyft rides. In Portland, Oregon, a "Private For-Hire Transportation Innovation Task Force" issued a report entitled *Recommendations on Taxis and TNCs* in August, 2015.¹⁸⁵ Despite being one of the few local governments to acknowledge environmental concerns, the report recommended that "no action is appropriate at this time" regarding the "environmental footprint" of

¹⁸² See, e.g., *Metro. Taxicab Bd. of Trade v. City of New York*, 615 F.3d 152 (2d Cir. 2010). Ironically, the United States filed an *amicus* brief in that action siding with the City of New York, arguing that preemption should be exercised narrowly. *Id.* See also *Ophir v. City of Boston*, 647 F. Supp. 2d 86 (D. Mass. 2009).

¹⁸³ See, e.g., *Ass'n of Taxicab Operators USA v. City of Dallas*, 720 F.3d 534 (2013); *Green All. Taxi Cab Ass'n, Inc. v. King Cty.*, No. C08-1048 (RAJ), 2010 WL 2643369 (W.D. Wash. June 29, 2010).

¹⁸⁴ S.F. MUNI. TRANSP. AUTH., CAB COMPANIES PERCENTAGE OF CLEAN VEHICLES, (July 5, 2013), <https://www.sfmata.com/sites/default/files/pdfs/2013-15-7%20Cab%20Companies%20Percentage%20of%20Clean%20Vehicles.pdf> (providing 97% figure); Press Release, S.F. Mayor, San Francisco Taxis Surpass Emissions Goal (Feb. 8, 2012), <http://www.sfmayor.org/index.aspx?page=684> (defining "clean" taxis as hybrid or CNG). See also *California Clean Cab Partnership*, CTR. FOR SUSTAINABLE ENERGY, <https://energycenter.org/programs/clean-cab-partnership> (last visited Feb. 1, 2016). Patricia Patton, *San Francisco Greens Its Taxi Fleet*, CARE2 (Feb. 17, 2012), <http://www.care2.com/causes/sf-greens-it-fleet-without-mandating.html>; cf. *Metropolitan Taxicab Bd. of Trade v. City of New York*, 615 F.3d 152 (2d Cir. 2010) (noting that fleet owners did not challenge the rule that increased lease caps for hybrid vehicles)

¹⁸⁵ PORTLAND PRIVATE FOR-HIRE TRANSP. INNOVATION TASK FORCE, RECOMMENDATIONS ON TAXIS AND TNCs (Aug. 11, 2015), <https://www.portlandoregon.gov/transportation/article/542148>.

taxis and Uber/Lyft.¹⁸⁶ The Task Force concluded that insufficient data were available, but recommended collecting data to assess environmental impacts, and to assess the data on “trips and users, transit ridership, congestion, parking availability, distributional impacts (who benefits and who is burdened), and other factors.”¹⁸⁷ In 2015, the New York City Council decided not to cap the number of Uber vehicles operating in the City, and instead to undertake a four-month “study on the effect of Uber and other for-hire vehicle operators on New York’s traffic.”¹⁸⁸ The proposed cap was based on concerns that the increased number of vehicles was slowing traffic speeds in the city.¹⁸⁹ In January, 2016, a report was released, concluding that in New York City, “Increases in e-dispatch trips [Uber/Lyft] are largely substituting for yellow taxi trips” in the City’s central business district, and thus are not “new” trips contributing to congestion.¹⁹⁰ The study did not address emissions. New York City has the lowest rate of ownership of private vehicles, and the highest rate of use of for-hire vehicles in the country.¹⁹¹ Other localities have different conditions. In 2015, the City of Boston entered into a “data-sharing” agreement with Uber, pursuant to which Uber is authorized to operate within the City, but must provide the City with anonymized data (searchable at the zip code level) regarding trip start and end locations, as well as other information about distance traveled and duration, to facilitate City oversight.¹⁹² These existing federal laws may preclude local experimentation on how to reduce the emissions impacts of these firms.

¹⁸⁶ *Id.*

¹⁸⁷ *Id.*

¹⁸⁸ Carl Bialik, *The Debate on Uber’s Impact in New York City is Far From Over*, FIVETHIRTYEIGHT (July 23, 2015), <http://fivethirtyeight.com/datalab/the-debate-on-ubers-impact-is-far-from-over/>; Matt Flegenheimer, *De Blasio Administration Dropping Plan for Uber Cap, for Now*, N.Y. Times (July 22, 2015) (noting that since 2011, when Uber entered the New York City market, the number of private, for-hire vehicles has increased by more than 60 percent, while the number of taxis has not increased markedly).

¹⁸⁹ *Id.* It is possible that these stated concerns were merely a cover for the City’s real underlying concerns about protecting its taxi industry.

¹⁹⁰ City of New York, Office of the Mayor, *For-Hire Vehicle Transportation Study 5* (January 2016).

¹⁹¹ *Id.* at 1.

¹⁹² SUNIL JOHAL, SARA DITTA & NOAH ZON, MOWAT CENTRE, UNIV. OF TORONTO, EMERGING ISSUES IN THE TAXI AND LIMOUSINE INDUSTRY (2015), http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/otlrslr_emerging_issues_en.pdf; Emily Badger, *Uber Offers Cities an Olive Branch: Your Valuable Trip Data*, WASH. POST (Jan. 13, 2015); Justin Kintz, *Driving Solutions to Build Smarter Cities*, UBER (Jan. 13, 2015), <https://newsroom.uber.com/us-massachusetts/driving-solutions-to-build-smarter-cities/>.

B. State Preemption of Local Governance

Uber/Lyft's significant lobbying efforts to enter new markets have been the subject of a great deal of commentary. While many other firms face significant costs to enter new markets, such as the purchase of assets or the building of facilities, Uber/Lyft are different. To enter new markets, they do not need to purchase new vehicles, hire new drivers, or find parking spaces. Regulatory barriers are, in many cases, the only significant barriers to entry into new markets that Uber/Lyft face, as long as there are drivers willing to drive. In some cases, local governments have welcomed their entry. In other cases, local governments have resisted. For purposes of precautionary federalism, the key fact about emerging legal regimes governing Uber/Lyft is the adoption of state rules that preempt all local governance, including, potentially, environmental governance.¹⁹³ While the focus of these emerging state laws has not been on environmental impacts – rather the states are setting minimum insurance requirements, mandating background checks, and providing licensing rules – several of the laws are worded so broadly that they may be interpreted to preempt local regulation of *any aspect* of Uber/Lyft's operation by local governments, including any efforts to address emissions. Given the uncertainty about these firms' environmental impacts, a precautionary approach suggests that local governance that may exceed state rules in this regard should not be preempted.

To date, more than a dozen states have enacted legislation authorizing Uber/Lyft to operate, and containing broad language preempting local regulation.¹⁹⁴ Two states have adopted laws governing Uber/Lyft with slightly

¹⁹³ There has been only limited action at the federal level specific to Uber/Lyft, and none focused on environmental impacts. In June, 2015, the Federal Trade Commission (FTC) convened a conference on the sharing economy, inviting scholars and policymakers to address issues regarding consumer protection, such as whether “reputation systems” and “trust mechanisms” protect consumers and promote “informed choices,” or are subject to bias and manipulation by self-interested parties; the impact of Uber/Lyft on competition and consumer choice; responsibility for consumer injury, and privacy protection. Fed. Trade Comm’n., *The “Sharing” Economy: Issues Facing Platforms, Participants, and Regulators: A Federal Trade Commission Workshop*, 4-7 (2015) (listing questions upon which the Commission seeks comments).

¹⁹⁴ ARIZ. REV. STAT. ANN. § 28-142 (West 2015) (preempting local regulations except with respect to airports); Colo. Rev. Stat. § 40-10.1-603 (West 2014); GA. CODE ANN. § 1-1-11 (West 2015) (repealing “all laws and parts of law in conflict with this Act”); IDAHO CODE ANN. tit. 49, § 3715 (2015); IND. CODE ANN. § 36-9-2-4 (West 2015); KY. REV. STAT. ANN. § 281.630 (West 2015) (authorizing municipalities of a certain size to regulate taxicabs and limousines concurrently with the state, but excluding TNCs from this concurrent jurisdiction); ME. REV. STAT. ANN. tit. 29-A § 1677 (West 2015); MONT. CODE ANN. § 69-12-342 (West 2015); NEB. REV. STAT. ANN. § 75-109.01 (West 2015) (providing for exclusive jurisdiction in the Public

more limited preemption language, prohibiting the imposition of fees or limits on “the operation of TNC services,” but recognizing that local traffic and parking rules apply.¹⁹⁵ Illinois, in contrast, has adopted “floor” preemption language regarding Uber/Lyft, which prohibits local governments from regulating them “in a manner that is less restrictive than the regulation by the State under this Act.”¹⁹⁶ Six states have adopted legislation authorizing Uber/Lyft to operate without any preemption language that would affect local or municipal rules.¹⁹⁷ In some cases, no preemption language would be necessary in light of the narrow scope of the state laws; for example, Utah’s law

Service Commission except as expressly provided by law); NEV. REV. STAT. ANN. §§ 175.26, 176.44 (West 2015); N.D. CENT. CODE ANN. § 39-34-06, (West 2015); OKLA. STAT. ANN. tit. 47, § 1030 (West 2015) (providing exclusive jurisdiction in the Oklahoma Corporation Commission); TENN. CODE ANN. § 65-15-303 (West 2015); VA. CODE ANN. § 46.2-2099.46 (West 2015) (“Nothing in this section shall be construed as authorizing the adoption of local ordinances providing for local regulation of transportation network companies, TNC partners, or TNC partner vehicles”); WIS. STAT. ANN. § 440.465 (West 2015) (preempting municipalities from regulating TNCs, with the exception of airport rules). Notably, one of those states, Maine, has a bill pending that would limit existing preemption language. Matt Byrne, *Bill Calls for letting Maine municipalities set rules for Uber drivers*, PORTLAND PRESS HERALD (Sept. 28, 2015), <http://www.pressherald.com/2015/09/28/bill-calls-for-letting-maine-municipalities-set-rules-for-uber-drivers/>.

¹⁹⁵ North Carolina, S.B. 541, § 20-280.8 (N.C. 2015). Similarly, South Carolina’s statute provides that TNCs are governed “exclusively” by state law, except that “TNC drivers remain subject to all local ordinances outside the scope of this article, whether directly or indirectly impacting the delivery of TNC driver services, including, but not limited to, parking and traffic regulations that are not inconsistent with the provisions of this article.” H.B. 3525, 2015 Leg., 121st Sess., § 58-23-1710(A) (S.C. 2015). However, political subdivisions may not impose taxes on TNCs. *Id.* § 58-23-1710(B).

¹⁹⁶ 625 ILL. COMP. STAT. ANN. 57/32 (West 2015) (containing “floor” preemption language).

¹⁹⁷ LA. REV. STAT. ANN. § 45:200.11 (West 2015) (nothing in statute “shall exempt any [TNC or TNC driver] from complying with all applicable laws and municipal and parochial ordinances relating to the ownership, registration, and operation of automobiles in the state”); MD. CODE. ANN., PUB. UTIL. § 10-402(b) (West 2015); MINN. STAT. ANN. § 65B.472 (West 2015); TEX. INS. CODE ANN. § 1954 (WEST 2015); H.B. 24, 2014 Leg., Gen. Sess. (Utah 2014) (insurance coverage only); 2015 Wash. Legis. Serv. 236 (S.S.B. 550) (West 2015) (defining “[c]ommercial transportation services provider” rather than TNC).

governs only insurance requirements. Finally, a number of states have legislation pending – some purporting to preempt local rules; some not.¹⁹⁸ In three states, proposed statewide rules have died in Committee or been vetoed.¹⁹⁹

The California Public Utilities Commission (Commission) was the first state government agency to wade into the debate over whether and how to regulate Uber/Lyft.²⁰⁰ The Commission initially contended that each of these services was illegally operating as a “charter-party carrier of passengers” without state authorization.²⁰¹ While California has not enacted a law governing Uber/Lyft that specifically preempts local rules, prior legislation grants to local government the authority to regulate taxis, but the state retains

¹⁹⁸ In some cases, the House and Senate bills differ as to preemption language. *See* Alaska: S.B. 58, 29th Leg., Reg. Sess. (Alaska 2015), H.B. 120, 29th Leg., Reg. Sess. (2015) (no preemption language); Connecticut: H.B. 6349, 2015 Gen. Assemb., Reg. Sess. (Conn. 2015) (no preemption); Florida: S.B. 1326, 2015 Leg., Reg. Sess. (Fla. 2015) (no preemption), H.B. 817, 2015 Leg., Reg. Sess. (Fla. 2015) (preemption); Hawaii: S.B. 1280, 28th Leg., Reg. Sess. (Haw. 2015), H.B. 1287, 28th Leg., Reg. Sess. (Haw. 2015) (no preemption in either bill); Iowa: H. File 394, 2015 Leg., Reg. Sess. (Iowa 2015) (preemption language); H.B. 931, 189th Gen. Court, Gen. Sess. (Mass. 2015-16) (preempting local governments from regulating TNCs); S.B. 184, 2015 Leg. (Mich. 2015) (no preemption language); Pennsylvania: S.B. 984, Reg. Sess. (Pa. 2015) (designating TNCs as “public utilit[ies]” and authorizing the Public Utility Commission to regulate TNCs to protect persons and public health, and providing that municipalities may “not impose a tax on or require a license for” a TNC, with the exception of Philadelphia); West Virginia: S.B. 385, 2015 Leg., Reg. Sess. (W. Va. 2015), H.B. 2736, 2015 Leg., Reg. Sess. (2015) (tabled in the Senate; containing preemption language).

¹⁹⁹ H.B. 1211, 2015 Leg., Reg. Sess. (Miss. 2015) (died in committee); H.B. 272, 2015 Leg., Reg. Sess. (N.M. 2015) (containing preemption language; died in committee). On April 20, 2015, the Governor of Kansas vetoed a bill, S.B. 117, 2015 Leg., Reg. Sess. (Kan. 2015), that would have regulated TNCs statewide. However, the legislature overrode the veto, and it appears that the bill has been adjourned to 2016. S.B. 117, 2016 Leg., Reg. Sess. (Kan. 2016), http://www.kslegislature.org/li/b2015_16/measures/sb117/.

²⁰⁰ In California, between 2013 and August, 2015, Uber spent \$925,000 on lobbyists and Lyft spent \$362,000. Alison Vekshin, *Uber Unleashes Lobbyists in California to Reshape Driver Rules*, BLOOMBERG (Aug. 24, 2015), <http://www.bloomberg.com/politics/articles/2015-08-24/uber-unleashes-lobbyists-in-california-to-reshape-driver-rules>.

²⁰¹ Notice to Cease and Desist from Joe Illjas, Investigator, Cal. Public Util. Comm’n to Lyft (Aug. 15, 2012), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Safety/Transportation_Enforcement_and_Licensing/Enforcement_Actions_Transportation_Network_Companies/SideCar%20CeaseandDesistLetters.pdf; CAL. PUB. UTILS. COMM’N, (CPUC) R.12-12-011, PROPOSED DECISION ADOPTING RULES AND REGULATIONS TO PROTECT PUBLIC SAFETY WHILE ALLOWING NEW ENTRANTS TO THE TRANSPORTATION INDUSTRY (2013) [hereinafter CPUC Decision]. The Commission regulates so-called “charter party passenger carriers” pursuant to Article XII of the California Constitution and the Passenger Charter-Party Carriers’ Act, CAL. PUB. UTIL. CODE § 5351 (West 1961); Rayle et al., *supra* note 137, at 3.

authority to regulate other vehicles for hire.²⁰² In September, 2013, the Commission adopted statewide rules to govern these services, creating a new regulatory category of TNCs (later adopted by other states and municipalities) to be governed by the Commission.²⁰³ The rules require Uber/Lyft to obtain a license from the Commission to operate within the state, establish driver training programs, implement a “zero-tolerance” policy on drugs and alcohol, hold a liability insurance, and conduct certain car inspections.²⁰⁴ The rule further provides for updating after review, and appears to have served as a model for other states.²⁰⁵ The rule makes no mention of environmental impacts.²⁰⁶

Other states have gone further, broadly preempting local governments from regulating Uber/Lyft, in broad language that may be read to preclude local efforts to reduce the environmental impact of these firms.²⁰⁷ For example, in Nevada, the legislature passed two laws that permit Uber/Lyft to operate statewide with exclusive jurisdiction vested in the Nevada Transportation Authority.²⁰⁸ The language vesting jurisdiction in the Nevada Transportation Authority is broad, providing that except for generally applicable local laws requiring business licensing, and rules governing permits to pick up passengers at airports, a “local governmental entity shall not” impose additional taxes or fees on TNCs, require a TNC to obtain any local license or certificate, or “*impose any other requirement upon a transportation network company or a driver which is not of general applicability to all persons who operate a motor vehicle within the jurisdiction of the local government.*”²⁰⁹

²⁰² CAL. CONST., art. XII, § 8 (West); CAL. PUB. UTIL. CODE §§ 5361, 5381; *id.* § 5353(g) (specifically exempting taxicab regulation from Commission jurisdiction).

²⁰³ CPUC Decision at 11.

²⁰⁴ Press Release, CPUC, CPUC Establishes Rules for Transportation Network Companies (Sept. 19, 2013), <http://sn.cpuc.ca.gov/SafetyBlog.aspx?id=301&blogin=88>.

²⁰⁵ *Id.*

²⁰⁶ CPUC Decision at 4. Notably, the agency mission incorporates environmental concerns. CAL. PUB. UTILS. COMM’N, www.cpuc.gov/puc/ (last visited Jan. 29, 2016), www.cpuc.gov/puc/ (noting the CPUC’s “commitment to environmental enhancement and a healthy California economy”).

²⁰⁷ The analysis of such state law preemption provisions is different as a doctrinal matter from the preemption analysis under federal law, as it implicates states’ Home Rule provisions. However, as a matter of policy, the issues favoring a narrow exercise of preemption are similar in both contexts.

²⁰⁸ S.B. 175, 2015 Gen. Assemb., 78th Sess. (Nev. 2015) (imposing rules on TNCs); Assemb. B. 176, 2015 Gen. Assemb., 78th Sess. (Nev. 2015) (providing for jurisdiction in the Nevada Transportation Authority); *Governor Signs Bills Giving Green Light to Rideshare Services Uber and Lyft*, L. V. SUN (May 29, 2015, 8:10PM), <http://lasvegas-sun.com/news/2015/may/29/governor-signs-bills-authorizing-companies-uber-ly/>.

²⁰⁹ Assemb. B. 176, § 44 (emphasis added).

These provisions appear to limit the authority of local governments to regulate Uber/Lyft not only with respect to issues of licensing, insurance, and safety, but also to other requirements – including possibly, environmental rules.

Other states have not enacted such statewide rules.²¹⁰ However, the expenditures on these efforts suggest the strong preference of these firms to preempt local governance that would limit their reach, or otherwise encumber these firms with some regulatory burdens. For example, Uber/Lyft collectively spent approximately \$1.2 million in Texas, seeking statewide legislation permitting ride-sharing “without the interference of city ordinances,” but were unsuccessful.²¹¹ The proposed bill, H.B. 2440, included the following language under the header “Controlling Authority”:

Notwithstanding any other provision of law, transportation network companies and transportation network drivers are governed exclusively by this chapter and any rules adopted by the department under this chapter.

A municipality or other local entity may not:

- (1) impose a tax on, or require a license for, a transportation network company or a transportation network driver; or
- (2) subject a transportation network company or transportation network driver to the municipality's or other local entity's rate, entry, operational, *or other requirements*.²¹²

The final law enacted in Texas did not contain this preemption language.²¹³ Similar efforts are underway in other states.²¹⁴

Local government officials have expressed concern about the statewide preemption of local rules, and have been actively attempting to regulate Uber/Lyft. For example, in 2014, the City of Seattle initially sought to impose a cap on the number of Uber/Lyft vehicles permitted to hail fares in the City,

²¹⁰ Etter, *supra* note 211; Quentin Mislav, *Ride-Share Bill Dies in Legislature*, THE DAILY IOWAN (Apr. 6, 2015), <http://www.dailyiowanepi.com/2015/04/06/ride-share-bill-dies-in-legislature/> (discussing House File 394).

²¹¹ Lauren Etter, *Uber Heads for Loss in Bid for Statewide Texas Rideshare Law*, BLOOMBERG (May 21, 2015), <http://www.bloomberg.com/politics/articles/2015-05-21/uber-heads-for-defeat-in-bid-for-statewide-texas-ridesharing-law>; David Saleh Rauf, *Legislative Show-down Over Ride-Share Begins in House*, SAN ANTONIO EXPRESS-NEWS (Apr. 8, 2015).

²¹² H.B. 2440, § 2402.018, 84th Leg., Reg. Sess. (Tex. 2015 (emphasis added)).

²¹³ TEX. INS. CODE ANN. Art. 1954 (West 2016).

²¹⁴ H.F. 394, § 16, 86th Gen. Assemb., Reg. Sess. (Iowa 2015).

but ultimately abandoned the measure.²¹⁵ The same issue arose in New York City.²¹⁶ Philadelphia and Washington D.C. have issued fines or impounded Uber/Lyft cars, and cities in Alaska, Alabama, Massachusetts, New York, Oregon and Tennessee have adopted rules suspending or banning TNCs.²¹⁷ In some cases, these local efforts may conflict directly with statewide rules or proposed rules. These efforts may reflect entrenched interests at the local level favoring existing taxi fleets, but they also reflect concerns regarding congestion and traffic. In addition, even some *state* legislators are questioning whether statewide preemption is wise. For example, after the state of Maine passed a law regulating Uber/Lyft that preempted local rules, a legislator introduced a bill entitled “An Act to Allow Municipalities to Regulate Transportation Network Companies,” because of the City of Portland’s inability to control Uber/Lyft at the airport.²¹⁸

There is no question that it is in Uber/Lyft’s interests to seek uniform rules at the state, rather than local, level. Statewide rules allow these firms to achieve economies of scale in their lobbying efforts. Support for local taxi firms/drivers is likely to be more concentrated at the local level, but more diluted at the state level. These lobbying efforts recall similar efforts by energy firms engaged in hydraulic fracturing to seek statewide rules preempting local efforts to regulate environmental impacts through local zoning.²¹⁹ Courts have been split as to whether statewide rules can preempt local zoning, though the courts have been motivated more by the text and purpose of specific statutes, rather than by a particular vision of federalism or localism. For example, the Pennsylvania Supreme Court held that a sweeping state law

²¹⁵ Rayle et al., *supra* note 141, at 15; Taylor Soper, *Seattle prepares to legalize Uber, Lyft on Monday*, GEEKWIRE (July 13, 2014, 11:57PM), <http://www.geekwire.com/2014/taxiseattle/>.

²¹⁶ *Supra* note 5.

²¹⁷ Lane Lambert, *Uber, Lyft banned from Braintree*, Patriot Ledger (May 13, 2015, 7:42AM), <http://www.patriotledger.com/article/20150512/NEWS/150518784> (Braintree, MA); Steve Quinn & Shelby Sebens, *Uber Quits Anchorage, Sued in Oregon*, HUFFINGTON POST (Mar. 6, 2015, 8:36PM), http://www.huffingtonpost.com/2015/03/06/uber-anchorage-oregon-lawsuit_n_6820966.html (last updated May 6, 2015); *Uber Regulation: US Cities That Have Successfully Stood Up to Uber*, WHO’S DRIVING YOU? (July 19, 2015), <http://www.whosdrivingyou.org/blog/us-cities-stood-up-regulate-uber> (Tuscaloosa, AL); Eva GrantSimran Khosla, *Here’s Everywhere Uber is Banned Around the World*, BUSINESSINSIDER (Apr. 8, 2015) (listing other cities).

²¹⁸ Matt Byrne, *Bill calls for letting Maine municipalities set rules for Uber drivers*, PORTLAND PRESS HERALD (Sept. 28, 2015), <http://www.pressherald.com/2015/09/28/bill-calls-for-letting-maine-municipalities-set-rules-for-uber-drivers/>.

²¹⁹ Spence, *Local Vetoes*, *supra* note 6, at 393-97. One such rule, Act 13 enacted in Pennsylvania in 2012, purported to override all local zoning rules governing hydraulic fracturing.

purporting to preempt all local zoning with respect to hydraulic fracturing was unconstitutional under the state constitution's Environmental Rights Amendment.²²⁰ In New York, the Court of Appeals likewise upheld the right of local governments to ban hydraulic fracturing within their borders.²²¹ However, in Ohio, West Virginia, and Colorado, courts have held that statewide laws governing oil and gas drilling preempted local efforts to ban hydraulic fracturing.²²²

As in the case of hydraulic fracturing, many of the environmental impacts of Uber/Lyft, such as changes in traffic and congestion, and those more significant for Uber/Lyft, such as changes in demand for public transit, are likely to be felt most deeply in local communities. And some of the environmental impacts – including greenhouse gas emissions – may lend themselves to local action in service of national interests. A vision of precautionary federalism should motivate both legislators and courts to narrow the scope of preemption at the federal and state levels to permit experimentation and learning about the uncertain impacts of Uber/Lyft on the environment.

IV. LAW AND POLICY IMPLICATIONS

As a normative matter, precautionary federalism tells us that uncertainty about the potentially significant environmental impacts of Uber/Lyft at this time favors a dynamic approach, in which state and local governments may exceed federal vehicle emissions rules, and local governments may exceed state rules. This either requires legislators to draft statutes without broad preemption language, or courts to exercise preemption narrowly in both the federal and state contexts. This approach advances a number of core values, including placing the burden on the regulated community to come forward with evidence as to why one level of government should preempt experimentation by other levels of government. It also can promote policy diversity and tailoring to local conditions in a way that enhances democratic participation. Overlapping jurisdiction can counter powerful interest-group dynamics by

²²⁰ *Robinson Twp. v. Commonwealth*, 83 A.3d 901, 913 (Pa. 2014).

²²¹ *Wallach v. Town of Dryden*, 16 N.E. 3d 1188, 1191 (N.Y. 2014).

²²² *See, e.g., State ex rel. Morrison v. Beck Energy Corp.*, 37 N.E. 3d 128 (Ohio 2015) (finding express preemption based on the statutory language); *Colorado Oil & Gas Ass'n v. City of Longmont*, No. 13CV63, 2014 WL 3690665, at **12-14 (Colo. Dist. Ct. July 24, 2014) (holding that the Longmont Municipal Charter ban on hydraulic fracturing is preempted by the Colorado Oil and Gas Conservation Act based on operational conflict); *Northeast Natural Energy, LLC v. City of Morgantown*, No. 11-C-411, 2011 WL 3584376, at *1 (W. Va. Cir. Ct. Aug. 12, 2011) (holding that statewide regulations issued by the West Virginia Department of Environmental Protection preempted a city ordinance banning hydraulic fracturing).

making multiple fora available for debate, and can limit the possibility of capture at a single level of government. But precautionary federalism recognizes that this initial allocation of authority may give way to more centralization either if other values compel it, or if greater certainty arises about the interaction effects between these new forms of business, their environmental impacts, and different forms of regulation.

This Part applies the values underlying federalism theory to the case of Uber/Lyft, and suggests that precautionary federalism more completely captures what is at stake in determining how to allocate regulatory authority than either dual or dynamic approaches. I conclude by suggesting how precautionary federalism would apply in two other contexts outside the sharing economy – hydraulic fracturing and autonomous vehicles – to demonstrate the theory's broader relevance.

A. A Precautionary Approach

Existing theories of dual and dynamic federalism, and the values that motivate them, do not easily capture all relevant aspects of the sharing economy. On one theory, the greenhouse gas emissions impacts of Uber/Lyft are the classic case of interstate (or more accurately, global) spillovers requiring a national, uniform approach.²²³ No state or local government internalizes both the benefits and the harms of business activity that emits greenhouse gases. Rather, decentralized governments can externalize the costs of emissions while reaping the benefits of economic activity within their borders. Under dual federalism theory, greenhouse gas emissions offer the best possible case for uniform national standards, if not for global standards, because states will have incentives to under-regulate, and “race to the bottom.”²²⁴ Similarly, as a matter of public choice theory, car manufacturers, whose upstream decisions about vehicle fuel economy and emissions affect the environmental impacts of downstream drivers, likewise favor national uniformity to achieve economies of scale. This approach is consistent with the uniform national vehicle emissions and fuel economy standards under the Clean Air Act and the EPCA. While these federal standards permit some state innovation under the California waiver provision, the federal standards preempt other states from experimentation, and almost all local government action seeking to reduce emissions.

²²³ Coglianese, *supra* note 78.

²²⁴ See, e.g., Cary Coglianese & Jocelyn D’Ambrosio, *Policymaking under Federal Pressure: The Perils of Incremental Responses to Climate Change*, 40 CONN. L. REV. 1413, 1415 (2008) (arguing that sub-federal climate policies may be “worse” than no action at all).

A dynamic theorist would disagree, arguing that climate change is actually the paradigmatic case for dynamism.²²⁵ As Elinor Ostrom has recognized, while the effects of climate change are global, its causes are deeply local, including “the actions undertaken by individuals, families, firms, and actors at a much smaller scale.”²²⁶ When federal leadership on climate change was not forthcoming, state, regional, and local governments stepped in to fill the void. State regulators and regional bodies have adopted rules and innovative policies that have refined one another’s regulatory programs. Indeed, at this point, it is somewhat uncontroversial to argue that state and local innovation with respect to climate change is an essential aspect of public policy to tackle this complex issue.²²⁷

A new “nationalist” theorist of federalism might argue that state and local governance can serve the national interest to combat climate change. Local transportation policy, including the availability of public transit, may have a profound impact on this national problem. This dynamism, of course, may come at the expense of greater uniformity and certainty for industry, as well as accountability and transparency.

What is missing from these accounts is a vision of precaution, and an understanding that new forms of business interact in different and in some cases, surprising, ways with the values underlying both dual and dynamic federalism.

1. *Uniformity and Interstate Spillovers*

Traditional justifications for federal uniform rules do not neatly apply to the environmental impacts of Uber/Lyft. To be sure, the platforms are themselves “national” and the “app” does not differ by locality. And greenhouse gas emissions raise the problem of interstate spillovers. However, while much

²²⁵ RYAN, *supra* note 35, at 167-76; Adelman & Engel, *supra* note 7, at 1846-49 (arguing that state initiatives on climate change demonstrate descriptive power of dynamic theories of federalism); Boyd & Carlson, *supra* note 99; Buzbee, *Interaction’s Promise*, *supra* note 7, at 148 (“Numerous state and local initiatives regulating GHG emissions follow federal reluctance to address the causes of climate change”).

²²⁶ Elinor Ostrom, *A Polycentric Approach for Coping with Climate Change* 6 (World Bank, Working Paper No. 5095, 2009), <http://www10.iadb.org/intal/intalcdi/pe/2009/04268.pdf> at 6.

²²⁷ Kirsten H. Engel, *Whither Subnational Climate Change Initiatives in the Wake of Federal Climate Legislation?*, 39 *PUBLIUS* 432 (2009); Kirsten Engel, *State and Local Climate Change Initiatives: What Is Motivating State and Local Governments To Address a Global Problem and What Does This Say About Federalism and Environmental Law?*, 38 *URB. LAW.* 1015 (2006); Kirsten H. Engel & Scott R. Saleska, *Subglobal Regulation of the Global Commons: The Case of Climate Change*, 32 *ECOLOGY L.Q.* 183, 209 (2005).

ink has been spilled on the states “racing to the bottom,” this dynamic is not likely to be a primary driver of state rules in the context of the sharing economy. By their very nature, Uber/Lyft are unlike classic “smokestacks,”²²⁸ in which a single, vertically integrated firm must decide where to locate, exclusively, among multiple state jurisdictions. Because Uber/Lyft rely on individual drivers to provide rides in their personal vehicles, these firms can co-exist in multiple jurisdictions – wherever there are willing drivers with private vehicles. The firms can simultaneously enter different markets, at minimal marginal cost for Uber/Lyft (other than regulatory costs), because the firms need not supply any of the cars or employ any new drivers.²²⁹

To be sure, there may be markets that are more desirable than others – for example, major cities such as New York or Los Angeles, such that other markets are not perfect substitutes. But the possibility of locating in multiple states and municipalities simultaneously affects the dynamics of regulatory competition differently from the case of more traditional vertically integrated firms facing exclusive choices. In this way, states and local governments are simply not “competing” for industrial investment in ways that would prompt a “race to the bottom.” There is thus less of a concern about under-regulation if decentralized actors are setting rules in this context. If one local government decides not to regulate the environmental impacts of Uber/Lyft, there may be some additional greenhouse gas emissions. However, this is not a case of interstate spillovers that could potentially *negate* all of the benefits of regulation elsewhere. For example, if there were uncertainty over whether a new species of genetically modified fish might interbreed with native species, and such fish might travel from one state to another in a river, then allowing a single state *not* to regulate could have the same impact as no regulation at all. That is not the type of externality here. Even if it were such a case, a dynamic approach of federal floor preemption, in which state or local governments could exceed the floor, would address the problem. Thus, a rationale for federal uniform rules with strong preemption is lacking when applied to sharing economy firms like Uber/Lyft.

²²⁸ Cf. Salzman, *supra* note 30, at 217 (defining “smokestack services”).

²²⁹ More vertically integrated firms, such as Zipcar, Enterprise CarShare or car2go, which actually own vehicles that can be rented for short-haul trips, would face higher marginal costs to purchase cars and locate parking spaces to enter new markets.

2. *Public Choice, Laboratories of Experimentation, and Good Governance*

Similarly, while public choice theories appear to describe somewhat accurately the strong preemption approach that Uber/Lyft have pursued in some states in the safety, privacy, and insurance context, they do not necessarily provide the best approach, as a normative matter, to these firms' environmental impacts. Uber/Lyft's chosen strategy of seeking preemption of local governance allows them to achieve certain economies of scale and efficiencies in their lobbying efforts. It avoids the need for them to obtain separate permission to operate in hundreds or thousands of localities nationwide. In addition, municipal taxi fleet owners and drivers are more likely to be well mobilized at the local level. At the state level, their interests are likely to be more diffuse.

But when we do not know whether these firms are good or bad for the environment, or the magnitude of differences among localities, dynamism and overlapping jurisdiction may provide an important precautionary check against the significant lobbying expenditures of Uber/Lyft at the state level.²³⁰ Dynamism provides an incentive for these firms to come forward with information regarding their impacts at the local level, in order to demonstrate that no local rules should be required, that local rules should be less stringent, or that state or federal rules with preemption language are actually appropriate, because local variation is not significant.²³¹

Depending upon one's view of "decentralization" – and whether *state* regulators or *local* regulators are the locus of decentralization – statewide uniform rules are either consistent or inconsistent with arguments in favor of uniform or decentralized rules. If one thinks of state regulators as the locus of "decentralization" (as many scholars of traditional dual federalism do), then uniform rules at the state (rather than the federal) level are consistent with decentralized approaches. Fifty regulators, rather than one, can promote policy diversity, tailoring to decentralized conditions and preferences, and different fora for interest group attention. Yet, if one thinks about a spectrum from uniform federal rules to decentralization at the *local* level, then

²³⁰ Engel, *supra* note 7, at 161. It is important to distinguish between the need for statewide rules on safety and insurance that protect consumers, and the overly broad preemption language in these laws that may stifle local government innovation, particularly with respect to how to integrate Uber/Lyft with public transit, or otherwise limit the environmental impacts of these firms.

²³¹ This may also provide substantive incentives for the firms to improve their emissions profiles.

statewide preemption of local rules is more consistent with a “uniform” approach that prevents local experimentation. This is especially true given the similarity in language among the state statutes governing Uber/Lyft. These state rules do not signal dynamic regulatory competition among states; nor are they evidence of significant state “experimentation” as laboratories of democracy.

Regardless of whether one views them as “centralized” or “decentralized,” statewide rules preempting local governance are inconsistent with precautionary federalism in this case. While the states, rather than the federal government, may be closer to the people, local governments are certainly more so.²³² Competition, both horizontally (for example, across states or across localities) and vertically (across different levels of government), can serve to diffuse the potential for regulatory or legislative capture, and can serve to “check and balance” concentrations of power at the hands of one level of government.²³³

Moreover, public choice theory is not merely about aggregation of preferences. It is also about recognizing the intensity of preferences.²³⁴ David Spence’s analysis of local bans on hydraulic fracturing is instructive on this point.²³⁵ Spence contends that “local-government decisions on [hydraulic fracturing] ought to be less susceptible to businesses’ organizational advantages than state-government decisions because the issue is much more salient at the local level.”²³⁶ In that context, data demonstrate that both at the state level and nationally, on average, there is considerable support for hydraulic fracturing.²³⁷ Yet the negative effects are likely to be most strongly felt (and thus the views are most strongly negative) at local levels. Thus, an approach that recognizes intensity of preferences ought to provide local government with a “veto option,” which can actually enhance overall welfare.²³⁸

Thus, even on a public choice account, there is a room for giving voice to local preferences that may differ from federal or state preferences. Local governments may care most deeply about the risks of climate change including sea-level rise, or they may care about traffic and congestion. Or they may care more deeply about other values and choose not to exceed federal emissions standards. But traditional values favoring uniform, federal rules, or

²³² Davidson, *supra* note 8, at 1000.

²³³ Ryan, *supra* note 35, at 12.

²³⁴ Spence, *Local Vetoes*, *supra* note 6, at 385-93.

²³⁵ *Id.* at 385-93.

²³⁶ *Id.* at 387.

²³⁷ *Id.* at 388-89.

²³⁸ *Id.* at 389.

even rules favoring state governance alone, do not neatly apply in this context at this time. A precautionary approach offers a step forward.

3. *Informational Benefits*

Precautionary federalism offers an independent reason for permitting state or local governments to exceed federal or state environmental standards. Precautionary federalism is information-forcing. It can help to generate information and answer unanswered questions about the environmental impacts of Uber/Lyft, particularly with respect to the significance of diversity among local conditions. If firms prefer uniform rules, then a precautionary approach would place the burden on these firms to provide more information about their environmental impacts in order to achieve the uniform rules they desire. Precautionary federalism would thus serve the ends of the precautionary principle through burden-shifting in the allocation of regulatory authority.

Ironically, a great deal of the needed data is collected by Uber/Lyft already. Some news reports have focused on the more tawdry aspects of this data collection, but these firms are, at heart, about data analytics.²³⁹ Uber, for example, tracks the locations of pickup and drop off, which can be compared to public transit stops.²⁴⁰ It likewise tracks the times of rides, which can be compared to the availability of public transit.²⁴¹ It tracks which vehicles pick up which passengers, and provides data regarding the average speed of travel on receipts after each trip.²⁴² Data regarding the particular vehicles driven could be analyzed to generate information about emissions. These data could help to calculate more precisely the emissions generated during each trip, and whether those trips could have been taken on public transit. Additional interview-based research is required to determine the impacts on user vehicle ownership, and why users choose the forms of transit that they do. But making available relevant data regarding would certainly go a long way to help answer these important questions about the environmental impacts of these

²³⁹ See *supra* note 123.

²⁴⁰ *Safety on uberX: The Facts*, UBER (June 17, 2014), <https://newsroom.uber.com/dc/2014/06/safety-on-uberx-the-facts/> (“Every Uber receipt includes your driver’s name and photo, your exact route and timeline, as well as your average speed and distance.”).

²⁴¹ *Id.*

²⁴² *Id.*

firms and reduce uncertainty.²⁴³ A precautionary approach can thus help to provide incentives to firms to offer more certainty about their impacts.

Precautionary federalism also offers advantages in a time of rapid changes in forms of business organization. It is much easier for firms to avoid static rules through creative use of corporate organization than for firms to avoid multiple, different rules. Firms have many different choices about how to organize themselves. Ronald Coase recognized that transaction costs affect whether entrepreneurs choose to incorporate into firms or utilize markets and contracts instead.²⁴⁴ Entrepreneurs will thus seek to minimize their costs – including regulatory costs – by selecting the most efficient size and type of business organization.²⁴⁵ Thus, whether Uber/Lyft were organized to revolutionize transportation or to avoid existing rules on taxi fleets becomes irrelevant to the inquiry. What *is* relevant is an understanding that regulations are costs that entrepreneurs take into account in organizing their business, and that overlapping, nimble rules are harder to avoid, and may be quicker to respond to changes in business organization. Precautionary federalism can allow regulators to remain agnostic about whether Uber/Lyft in their current form will be good or bad for the environment – we simply don’t yet know. But the choices we make today can influence the answer in the future, and can affect how quickly regulators can respond.

Under conditions of uncertainty, it is especially difficult – if not impossible – to determine who is the “optimal” policymaker (assuming that there is an optimal policymaker in all circumstances, which may not be the case). Precautionary federalism recognizes the importance not just of regulatory policy diversity, but “regulator” diversity as well. Not only do we not always

²⁴³ While this article does not discuss the role of private governance in precautionary federalism, there may be a role to play. If a firm provided greater certainty about environmental impacts through private environmental governance, that might support an argument for greater consolidation of regulatory authority. For example, if Uber/Lyft decided to partner only with “driver-partners” driving zero-emissions vehicles, then the environmental impacts of this form of business would be certain. There would be less need (from a precautionary standpoint) for overlapping jurisdiction across multiple regulators. I intend to explore these issues more fully in a separate paper.

²⁴⁴ R.H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 387 (1937).

²⁴⁵ *Id.* For a positive theory of the Supreme Court’s jurisprudence regarding corporate organization, see Vince Buccola, *Corporate Rights and Organizational Neutrality*, 101 *IOWA L. REV.* 499, 502 (2016) (“Entrepreneurs choose from among a range of organizational forms—from a highly integrated, hierarchical corporation to a loosely coordinated web of contracts—with an eye to minimizing their enterprise’s production costs.”); Oliver E. Williamson, *Markets and Hierarchies: Some Elementary Considerations*, 63 *AM. ECON. REV.* 316, 317 (1973); Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 *J. FIN. ECON.* 305 (1976); HENRY HANSMANN, *THE OWNERSHIP OF ENTERPRISE* (Harvard 1996).

know *ex ante* whether regulatory action or inaction will lead to greater risks or greater enhancements of welfare;²⁴⁶ we also do not always know whether a single regulator, or a combination of regulators will best serve those ends. Affording multiple levels of government the option to experiment and interact can help answer those questions. Of course, any policy will not only reveal facts about the world as it is; it will also shape the future direction of both the relevant regulatory targets and their environmental impacts. It is like the purchase of an “option” to prevent significant harm until better information is available.²⁴⁷

Imagine that one locality, particularly concerned with an increase in greenhouse gas emissions, wanted to mandate that all Uber/Lyft vehicles be low-emissions vehicles. If the federal courts exercised preemption more narrowly, a locality might be able to experiment in this way. The Uber/Lyft case, for example, is unlike California’s low-emissions vehicle rules that the Supreme Court struck down in *Engine Manufacturers Association v. South Coast Air Quality Management District*, which required certain specified entities to purchase such vehicles. In contrast, the local rule governing Uber/Lyft rides would not require Uber/Lyft themselves to purchase any low-emissions vehicles. Uber/Lyft do not own any vehicles. Nor would any individual driver be required to purchase a low-emissions vehicle, because individuals are not obligated to drive for these firms. Thus, such a rule would interact differently in the sharing economy context than for other forms of business organization.²⁴⁸ And while this limitation of federal preemption might impose some costs on Uber/Lyft, those costs would likely be lower than for a hierarchical firm that would then be required to purchase low-emissions vehicles itself. Recognizing the unlikelihood that Congress will revisit the text of these statutes, precautionary federalism at the very least suggests that courts should exercise preemption narrowly both in the federal and state contexts when it comes to regulating Uber/Lyft’s environmental impacts.

²⁴⁶ Yair Listokin has offered an economic justification for the argument that “the best policy choice in the face of uncertain outcomes depends critically on the reversibility of the policy.” Yair Listokin, *Learning Through Policy Variation*, 118 YALE L.J. 480, 553-54 (2008). Listokin argues that a “federal system offers the possibility of learning through the experience of one jurisdiction without having to impose a high-variance policy on all jurisdictions.” *Id.* at 552.

²⁴⁷ Cf. Sunstein *supra* note 9, at 841.

²⁴⁸ In addition, a precautionary approach would support regional efforts to reduce transportation emissions, such as through the Transportation and Climate Initiative. *Five Northeast States and DC Announce They Will Work Together to Develop Potential Market-Based Policies*, GEORGETOWN CLIMATE CTR. (Nov. 24, 2015), <http://www.georgetownclimate.org/five-northeast-states-and-dc-announce-they-will-work-together-to-develop-potential-market-based-poli>.

B. Broader Applications of Precautionary Federalism

While Uber/Lyft provide a strong case for precautionary federalism, the principle nonetheless has broader application beyond the sharing economy. I conclude by offering two brief examples from outside the sharing economy in which a precautionary approach offers insights beyond existing theories of federalism. One addresses environmental concerns in the hydraulic fracturing context; the second, safety concerns for autonomous vehicles.

The first example concerns the environmental impacts of hydraulic fracturing. In the hydraulic fracturing context, there are potentially significant, yet uncertain environmental impacts. Some of those impacts are global, such as greenhouse gas emissions, while others, like impacts on traffic, congestion, air quality, and water quality, are more local in nature. One key uncertainty is whether hydraulic fracturing is “good” or “bad” for the climate. On the positive side, advocates argue that natural gas is cleaner than coal, and produces fewer harmful emissions when burned. In contrast, critics argue that fugitive methane emissions during the fracturing process can negate some of those benefits, and contend that replacing coal with natural gas will simply delay a transition to renewables.²⁴⁹ Under conditions of uncertainty, a precautionary approach would permit local communities to limit hydraulic fracturing not only because of concerns over local impacts on traffic, congestion, or water contamination, but also in light of these more global concerns until greater certainty is achieved.

The second example goes beyond the environment to consider a primary concern in debates over autonomous vehicles: safety. Advocates contend that autonomous vehicles will transform transportation in the United States, if not the world, and will make transportation safer. For example, the National Highway Traffic Safety Administration, which is responsible for setting federal motor vehicle safety standards, has issued a policy statement lauding the promise of autonomous vehicles to reduce collisions and conserve fuel.²⁵⁰ While the Department of Transportation recently reported that it would develop rules regarding autonomous vehicles, until now the federal government

²⁴⁹ Spence, *Local Vetoes*, *supra* note 6, at 385-93 (discussing impacts of hydraulic fracturing).

²⁵⁰ National Highway Traffic Safety Administration, *Preliminary Statement of Policy Concerning Automated Vehicles* (2013) <http://www.nhtsa.gov/About+NHTSA/Press+Releases/U.S.+Department+of+Transportation+Releases+Policy+on+Automated+Vehicle+Development>.

has left it up to the states to set standards for how to test autonomous vehicles.²⁵¹ This is a case in which the *type* of uncertainty is particularly important for the precautionary federalism analysis. For autonomous vehicles, one of the biggest safety concerns is what would happen if there were conflicting instructions in vehicle software to avoid a collision or otherwise operate safely in traffic conditions. If all rides took place within a single state, state-level rules could ensure that such vehicles could avoid crashes. However, the fact that rides may cross jurisdictional boundaries suggests that there may be significant safety benefits to uniform standards for crash-avoidance. In this case, in which *policy conflict itself* could cause the safety problems, the fact that a precautionary approach can shift as more information becomes available may be its most salient feature. As the technology moves out of the test phase and into actual use, it may become necessary to shift away from regulatory experimentation in the states to greater consolidation and uniform safety standards. Thus, a precautionary approach has implications beyond environmental impacts and beyond the sharing economy.

V. CONCLUSION

While this Article has offered first principles of the theory of precautionary federalism, this approach raises questions that are ripe for additional research. Some of these questions arise also in the context of the precautionary principle, such as how much uncertainty is required for a precautionary approach, and how to measure that uncertainty. Others issues are unique to the federalism context. For example, when there is overlapping authority across jurisdictions, choice of law issues are implicated. In addition, since precautionary federalism suggests that there may be a basis to shift from one allocation of authority to another when better information becomes available, the question arises as to what mechanisms can be used to effectuate that shift. Perhaps precautionary federalism requires an equivalent to regulatory “sunset” provisions or some other form of regulatory review on a regular basis. While some scholars have debated the merits of sunset provisions in different substantive statutes,²⁵² it is worth exploring precisely how to ensure that allocations of authority can shift over time in the federalism context. Other questions that are worthy of further exploration include the role that private

²⁵¹ RAND, AUTONOMOUS VEHICLE TECHNOLOGY: A GUIDE FOR POLICYMAKERS (2014) (summarizing state rules and discussing potential of autonomous vehicles to reduce crashes); Rachel Abrams, *Self-Driving Cars May Get Here Before We're Ready*, N.Y. TIMES (Jan. 21, 2016).

²⁵² Rebecca M. Kysar, *The Sun Also Rises: The Political Economy of Sunset Provisions in the Tax Code*, 40 GA. L. REV. 335, 338 (2006) (discussing sunset provisions in tax law).

environmental governance should play in precautionary federalism.²⁵³ While it is beyond the scope of this Article to resolve all of these issues, I offer them as a preliminary research agenda on precautionary federalism.

Because firms like Uber and Lyft are facilitating and entrenching transportation by vehicle, they may have significant environmental impacts. However, we do not yet know for sure. Just as the precautionary principle counsels us that regulators need not wait for certainty about the magnitude of potentially significant harms, precautionary federalism offers an approach to the allocation of authority under conditions of uncertainty. We simply cannot know who the best regulator is, or whether a “best” regulator exists at all. Because precautionary federalism’s approach is time-bound, the potential of a shift from one allocation of authority to another can serve an information-forcing function about the significance of uncertain impacts. Precautionary federalism thus offers the best way to achieve the kind of rules called for by the precautionary principle.

²⁵³ See *supra*, note 33 and sources cited therein.