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ARTICLES

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2012–2013

CAN WE TEACH OLD LAWS A NEW RISK? FEDERAL ENVIRONMENTAL LAW, RISK MANAGEMENT THEORY, AND CONTAMINATION OF U.S. WATER SUPPLIES WITH PHARMACEUTICAL AND PERSONAL CARE PRODUCTS

JOHN WOOD*

This Article is prompted by the discovery of endocrine-disrupting compounds (EDCs) from pharmaceutical and personal care product (PPCP) chemicals introduced by countless sources into drinking water supplies and aquatic ecosystems throughout the United States. Exposure to these substances has been shown to adversely impact exposed aquatic flora and fauna, which provides some evidence that exposure could cause adverse human health impacts including birth defects, cancer, and obesity. While the proverbial canaries in the coal mine are showing worrying symptoms, PPCP contaminants remain largely unregulated.

This Article examines challenges presented to EPA's ongoing risk assessment processes and the potential role of the U.S. Food and Drug Administration (FDA); assesses risk-management theoretical frameworks for guidance on whether and, if so, to what extent, the PPCP problem should be addressed; and explores the potential application of certain federal environmental laws to the PPCP problem.

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The risk management theories discussed include market regulation, no-risk, precautionary principle, sustainability, technology-based standards, risk-risk tradeoff, risk-benefit assessment, cost-effectiveness, regulatory budget, and cost-benefit analysis. The federal laws discussed include the National Environmental Policy Act (NEPA); Food, Drug, and Cosmetic Act (FDCA); Safe Drinking Water Act (SDWA); Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA); Toxic Substances Control Act (TSCA); and Pollution Prevention Act (PPA). Reasoning through risk management theories and federal laws as applied to PPCPs (1) provides practical insights about how the PPCP problem would and should be addressed, and (2) serves as a case study to appraise the fitness of these laws and risk management theories.

With respect to risk management theory, this Article concludes that cost-benefit analysis, the precautionary principle, and sustainability should be applied to guide policy-makers in an appropriately comprehensive fashion; however, EPA and FDA currently apply the risk assessment and risk-risk approaches to the PPCP problem. With respect to federal environmental laws, this Article concludes that the main operational requirements of the laws discussed would not successfully protect against low-level, chronic, synergistic, and cumulative exposure to PPCPs. Moreover, if they otherwise would apply, they would not be enforced without substantial changes in regulatory initiative and risk-assessment strategies.

Whereas some laws grant insufficient authority to EPA and FDA to address the PPCP problem (e.g., NEPA and PPA do not impose mandatory substantive requirements on agencies), others are limited because of the nature of PPCPs (e.g., CWA, SDWA, and RCRA would not reach initially benign effluents that become hazardous only when they bioaccumulate), or because the statutory operational requirements are not triggered until science on the issue matures (e.g., where the law requires demonstrated harm, such as TSCA), or because of a lack of enforcement initiative (e.g., NEPA, SDWA, and TSCA).

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INTRODUCTION

A growing body of scientific and legal discussion at the state, federal, regional, and international levels has been dedicated to the emerging problem of chemical contaminants in drinking water supplies, particularly those resulting from pharmaceuticals and personal care products.[1] For over a decade, studies have revealed "pharmaceutical compounds in treated wastewater effluent, streams, lakes, seawater, and groundwater, as well as in sediments

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[1] *See*, *e.g.*, Jose Huizar, *Unintended Consequences: The Effects of Pharmaceuticals in the Water Supplies*, 11 CAL. WATER L. & POL'Y REP. 72, 73 (2000)*; see also* CANADIAN ENVTL. L. ASS'N & LOWELL CTR. FOR SUSTAINABLE PROD., THE CHALLENGE OF SUBSTANCES OF EMERGING CONCERN IN THE GREAT LAKES BASIN: A REVIEW OF CHEMICALS POLICIES AND PROGRAMS IN CANADA AND THE UNITED STATES (2009), *available at* http://www.sustainable production.org/downloads/Great LakesFullReport.pdf; SUSAN HOLTZ, CANADIAN INST. FOR ENVTL. L. & POL'Y, THERE IS NO "AWAY": PHARMACEUTICALS, PERSONAL CARE PRODUCTS, AND ENDOCRINE-DISRUPTING SUBSTANCES: EMERGING CONTAMINANTS DETECTED IN WATER (2006), *available at* http:// www.cielap.org/pdf/NoAway.pdf; WORLD HEALTH ORG., PHARMACEUTICALS IN DRINKING-WATER (2012), *available at* http://apps.who.int/iris/bitstream/ 10665/44630/1/9789241502085_eng.pdf; Holly V. Campbell, *Pharmaceuticals in the Environment: Regulatory and Nonregulatory Approaches*, 32 ENVTL. L. REP. 11200 (2002); John Fawell & Choon Nam Ong, *Emerging Contaminants and the Implications for Drinking Water*, 28 INT'L J. WATER RESOURCES DEV. 247 (2012); Joseph A. Gorman, *Drugs in Our Water: A Legal Proposal for Responsible Nationwide Pharmaceutical Consumption*, 26 J. LAND USE & ENVTL. L. 147 (2010); Edward G. Kehoe et al., *Emerging Contaminants in Rivers and Streams: Regulators Sharpen Focus on Effects of Pharmaceuticals and Personal Care Products,* N.Y. L.J., July 16, 2007, at 9, *available at* http://www.kslaw.com/Library/publication/NYLJ_EmergingContaminants.pdf; Katharina Kern, *Pharmaceuticals in the Water Cycle: Mechanisms for the Regulation of Environmentally Harmful Pharmaceutical Substances*, 8 J. FOR EUR. ENVTL. & PLAN. L. 3 (2011); Guillermo Cuevas, Student Article, *From Therapeutic Drugs to Toxic Contaminants: Pharmaceutical Pollution in the Water and Strategies to Regulate Its Impact*, 36 COLUM. J. ENVTL. L. FIELD REP. 1 (2011), http://www.columbiaenvironmentallaw.org/articles/from-therapeutic-drugs-to-toxic-contaminants-pharmaceutical-pollution-in-the-water-and-strategies-to-regulate-its-impact; Melanie Leitman, Student Comment, *Water R_x: The Problem of Pharmaceuticals in Our Nation's Waters*, 29 UCLA J. ENVTL. L. & POL'Y 395 (2011); Toby K. L. Morgan, Note, *Down the Drain: Pharmaceutical Waste Disposal in the United States*, 22 FORDHAM ENVTL. L. REV. 393 (2011); William Wombacher, Note, *There's Cologne in the Water: The Inadequacy of U.S. Environmental Statutes to Address Emerging Environmental Contaminants*, 21 COLO. J. INT'L ENVTL. L. & POL'Y 521 (2010); *IJC Consultation Chemicals of Emerging Concern to the Great Lakes*, EPA, http://www.epa.gov/bns/reports/march2009/IJCCon033109.pdf (last visited Apr. 19, 2014).

and fish tissue."[2] The chemical compounds used in PPCPs such as birth control and sunscreen have found their way into drinking water supplies throughout the United States. Some of these compounds are EDCs, which may cause significant adverse impacts to aquatic flora and fauna and human health. At a time when climate change imposes new constraints on water resources,[3] and as municipalities encourage wastewater recycling,[4] PPCPs constitute a potential human health hazard and environmental contamination problem of national scope and growing concern.[5] Risk management theories provide helpful guidance on issues where the law has yet to speak. Cost-benefit analysis, the precautionary principle, and sustainability should be applied to guide policy-makers in an appropriately comprehensive fashion; however government officials in EPA and FDA currently apply only risk assessment and risk-risk analysis to the PPCP problem.[6] Risk management theory matters because it determines, even if only implicitly, what issues an agency will prioritize and the extent to which a risk will be addressed. Several U.S. federal environmental laws apply, at least in principle, to the PPCP problem, but only two—the Safe Drinking Water Act and the Resource Conservation and Recovery Act—are currently being administered to address the issue.

In anticipation of pending action by policy-makers, this Article revisits Lester Lave's work on risk management theory, as well as the concepts of the precautionary principle and

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[2] EPA, HEALTH SERVICES INDUSTRY STUDY: MANAGEMENT AND DISPOSAL OF UNUSED PHARMACEUTICALS (INTERIM TECHNICAL REPORT) 3-1 (2008), *available at* http://www.epa.gov/nscep/index.html (access by entering "821R08013" under "Search Publications").

[3] *Climate Impacts on Water Resources*, EPA, http://www.epa.gov/climatechange/impacts-adaptation/water.html (last visited Apr. 19, 2014).

[4] Rachel Cernansky, *From Drain to Drink: Innovations in Wastewater Reuse*, GREENBIZ.COM (Dec. 16, 2013), http://www.greenbiz.com/blog/2013/12/16/drain-drink-innovations-wastewater-reuse ("California . . . is leading the way in a trend that's picking up around the world: municipal wastewater being treated, disinfected and reused near its source for a variety of purposes, from wetlands restoration to irrigation—and, yes, drinking.").

[5] To be sure, every nation which consumes pharmaceuticals and personal care products at rates similar to that of the U.S. is likely in the same situation as far as PPCP contamination is concerned, and while the science and risk management theory sections of this Article are germane internationally, the legal discussion here may be of limited relevance abroad.

[6] *See infra* Part II.K.

sustainability, as they apply to the PPCP problem. Although some environmental and health-based statutes have risk management built into their operational requirements, a theoretical discussion is worthwhile because of the awkward fit of these laws to the PPCP problem.[7]

EPA regulatory initiatives that address the PPCP issue currently revolve around the risk *assessment* stage of decision-making.[8] This Article's application of risk *management* theory highlights the relative usefulness of various risk management frameworks and illuminates the complicated social, environmental, and economic tradeoffs that risk management requires under conditions of uncertainty.

This Article then discusses the purposes of several major federal laws, their operational requirements, and ultimately their felicity in addressing the PPCP problem: the National Environmental Policy Act (NEPA); the Food, Drug, and Cosmetic Act (FDCA); the Safe Drinking Water Act (SDWA); the Clean Water Act (CWA); the Resource Conservation and Recovery Act (RCRA); the Toxic Substances Control Act (TSCA); and the Pollution Prevention Act (PPA). It turns out that the fit is not as neat as would be desired: the compounds of concern may slip through the cracks of major laws or fall into the gap between EPA and FDA regulations. Unlike with traditional pollutants, a patchwork of creative regulatory approaches would likely be more effective than the direct application of federal environmental law.

I. THE PROBLEM

A. *The Context for PPCP Risk Assessment*

Trace amounts of organic wastewater contaminants associated with PPCPs have been found in the waters of the United States,[9]

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[7] *See infra* Part III.A–F.

[8] *See infra* Part I.B.

[9] *See* Dana W. Kolpin et al., *Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000: A National Reconnaissance*, 36 ENVTL. SCI. & TECH. 1202, 1202 (2002); Kimberlee K. Barnes et al., *Water-Quality Data for Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000*, U.S. GEOLOGICAL SURVEY, http://toxics.usgs.gov/pubs/OFR-02-94/ (last visited Apr. 15, 2014) ("One or more OWCs [organic wastewater contaminants] were found in 80% of the stream samples.").

including the watersheds of major cities throughout the country.[10] PPCPs detected in aquatic environs include substances found in *pharmaceuticals* (prescription and over-the-counter drugs, antibiotics, veterinary drugs, steroids, and diagnostic agents), *personal care products* (soaps, fragrances, lotions, cosmetics, and nutritional supplements), and EDCs related to the sundry byproducts of these chemicals.[11] These substances are biologically active by design, and have been released into the nation's aquatic environments to a troubling extent and with pervasiveness.

The origin of PPCPs in the water is a relevant factor when deciding among policy responses.[12] Different statutory and regulatory frameworks will apply to different sources, and non-legal strategies to reduce or eliminate PPCPs from water are source-dependent. Importantly, the vast majority of environmental pathways for PPCPs come from nonpoint sources, which will be discussed at greater length in the section on the Clean Water Act in Part III. The myriad nonpoint sources of PPCPs include: usage by individuals, pets, and livestock; excretion of un-metabolized drugs; drain disposal of unused medication; sewage system infrastructure leakage; land application of biosolid waste; agricultural releases; dung from confined animal feeding operations (CAFOs); and direct releases from bathing and swimming.[13]

The diverse pathways of PPCPs in the environment make PPCPs harder to regulate than many of the pollutants subject to environmental law—such as nuclear waste or tailpipe emissions—

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[10] Jeff Donn et al., *Pharmawater I*, ASSOCIATED PRESS, http://hosted.ap.org/specials/interactives/pharmawater_site/day1_01.html (last visited Apr. 19, 2014) ("A vast array of pharmaceuticals including antibiotics, anticonvulsants, mood stabilizers and sex hormones have been found in the drinking water supplies of at least 41 million Americans . . . [including] in the drinking water supplies of 24 major metropolitan areas.").

[11] *See* GABRIEL ECKSTEIN & GEORGE WILLIAM SHERK, ALTERNATIVE STRATEGIES FOR MANAGING PHARMACEUTICAL AND PERSONAL CARE PRODUCTS IN WATER RESOURCES, TEX. TECH UNIV. CTR. FOR WATER LAW & POLICY 5–8 (2011), *available at* http://www.micropollutants.org/images/PPCP_Report_Final.pdf (summarizing the scientific research); *see also Pharmaceuticals and Personal Care Products*, EPA, http://www.epa.gov/ppcp/ (last visited Apr. 19, 2014).

[12] For the seminal article examining where, why, and how drugs accumulate unused in society, see generally I.S. Ruhoy & C.G. Daughton, *Beyond the Medicine Cabinet: An Analysis of Where and Why Medications Accumulate*, 34 ENV'T INT'L 1157 (2008).

[13] Christian G. Daughton, *Origins and Fate of PPCPs in the Environment*, EPA, http://www.epa.gov/ppcp/pdf/drawing.pdf (last visited Apr. 19, 2014).

which tend to have discrete and readily identifiable sources. The sources of PPCPs may change with the regulatory environment. For instance, releases from agricultural uses of pharmaceuticals may be modified in the coming years. A lawsuit filed by the Natural Resources Defense Council against FDA and other federal agencies under § 360b(e)(1) of the Food, Drug, and Cosmetic Act[14] convinced a federal judge that the agency had acted arbitrarily and capriciously in failing to consider withdrawing approval of the use of important antibiotics as animal drugs because they were not shown to be safe for the uses for which they were approved.[15] The FDA released *voluntary* industry guidelines for phasing out certain uses of antibiotics in farm animals.[16] For now, however, use of antibiotics in animal feedstock remains a source of PPCP contamination. It would be onerous, if not impossible, to mitigate PPCP release from all sources, so policy-makers may have to choose the source that offers the most efficient impact reduction—if these substances are indeed going to be regulated.

Regarding exposure, the issue is not therapeutic dosage, but rather long-term or continual low-dose exposure, which poses "challenges for the outer envelope of toxicology—especially the many unknowns associated with effects from simultaneous exposure to multiple chemical stressors over long periods of time."[17] Regarding toxicological significance, the critical issues that frustrate traditional toxicity assays are synergistic effects; effects below the purported No Observable Effect Level resulting from paradoxical U-shaped dosage-response curves; and dynamic dosage-responses where symptoms not shown at initial exposure are triggered after subsequent exposure.[18]

It may be premature to dismiss PPCP contamination of water

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[14] *See* Complaint, NRDC v. FDA, No. 11 Civ. 3562 (S.D.N.Y. filed May 25, 2011), *available at* http://cspinet.org/new/pdf/nrdc_complaint.pdf.

[15] *See* NRDC v. FDA, 872 F. Supp. 2d 318 (2012).

[16] *See Phasing Out Certain Antibiotic Use in Farm Animals*, FDA, http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm378100.htm (last visited Apr. 19, 2014).

[17] Christian G. Daughton, *PPCPs in the Environment: An Overview of the Science,* CAL. DEP'T OF TOXIC SUBSTANCES & CONTROL, http://www.dtsc.ca.gov/AssessingRisk/PPCP/upload/01_Daughton.pdf (last visited Oct. 23, 2012) [hereinafter Daughton, *An Overview of the Science*].

[18] *Id.* at 29–31.

supplies as a public health concern.[19] The fact that low levels of these contaminants can cause adverse impacts may complicate statutory efforts to address PPCP contamination since health and safety standards would only be violated by the presence of contaminants at relatively higher levels. This complication will be discussed at greater length in Part III, *infra*, and in the following subsections.

Regarding potential risks to human health posed by PPCPs, it is important to note that exposure to PPCP contamination through drinking water supplies is cumulative, not limited to isolated PPCP chemicals. Until the risks of long-term, cumulative exposure to PPCP contamination are understood, it may be too soon to conclude that the environmental occurrence of PPCPs does not pose human health risks.[20] That said, PPCP contamination of water supplies poses challenging risk assessment issues.[21] To be sure, the problem of cumulative or synergistic risks posed by contaminants has always existed in the context of environmental and health regulation, leading to systemic under-regulation of toxic interactions. Nonetheless, this concern is particularly crippling in the PPCP context since it is the synergies that cause the risk of concern here—the individual compounds themselves are bought and sold for consumption and not typically regulated as pollutants. Methods for cumulative risk assessment are still nascent and it is not clear whether EPA is authorized to regulate a substance based solely on its potential adverse *cumulative* effects when combined with other substances, if neither substance is intrinsically hazardous.[22]

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[19] *See, e.g.*, N.Y.C. DEP'T OF ENVTL. PROT., OCCURRENCE OF PHARMACEUTICAL AND PERSONAL CARE PRODUCTS (PPCPS) IN SOURCE WATER OF THE NEW YORK CITY WATER SUPPLY 20 (2010) (deeming PPCP levels in drinking water too low to pose a risk to consumers).

[20] *But cf.* ALISTAIR BOXALL ET AL., TARGETED MONITORING FOR HUMAN PHARMACEUTICALS IN VULNERABLE SOURCE AND FINAL WATERS 44–45 (2011), *available at* http://dwi.defra.gov.uk/research/completed-research/reports/DWI70_2_231.pdf (concluding that individual occurrence of pharmaceutical compounds at orders of magnitude below therapeutic dosage levels does not appear to pose a human health risk).

[21] *E.g.*, Arun Kumar et al., *Human Health Risk Assessment of Pharmaceuticals in Water: Issues and Challenges Ahead*, 7 INT'L J. ENVTL. RES. & PUB. HEALTH 3929 (2010); Hans Sanderson, *Presence and Risk Assessment of Pharmaceuticals in Surface Water and Drinking Water*, 64 WATER SCI. & TECH. 2143 (2011).

[22] *See*, *e.g.*, LINDA-JO SCHIEROW, CONG. RESEARCH SERV., THE TOXIC

EPA and the New York City Department of Environmental Protection, among other municipal environmental agencies, continue to apply chemical-specific risk-screening methods in studies of the potential health impacts of PPCP contamination in water supplies:

> USEPA has summarized the different approaches that have been used to screen for human health risk from pharmaceuticals in drinking water. In general, these approaches utilize existing toxicological data on acceptable therapeutic doses, or toxicological thresholds such as Acceptable Daily Intakes (ADIs), or Lowest or No Adverse Effect Levels (LOAELs or NOAELs), to establish some type of reference dose or point of departure[23] to compare with screening level exposure estimates.

This screening methodology fails to deliver useful information on toxicological significance of PPCP exposure to humans because it proceeds on a substance-specific basis. EPA acknowledges that risk assessment conducted on animals in the controlled setting of a laboratory leaves us in a state of uncertainty with respect to potential human health impacts.[24] This may be particularly true in the context of PPCPs and endocrine-disrupting compounds. We cannot make appropriate risk management decisions without adequate risk assessment; without an investigation of the long-term, cumulative, and synergistic effects of PPCPs, it is premature, if not incorrect, for government officials to conclude that PPCPs do not pose a significant threat to

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SUBSTANCES CONTROL ACT (TSCA): IMPLEMENTATION AND NEW CHALLENGES 24 (2009), *available at* http://www.fas.org/sgp/crs/misc/RL31905.pdf ("TSCA does not prevent consideration of aggregate or cumulative exposure or of its timing, but neither does it require them. TSCA also does not provide guidance with respect to the use of such information in regulatory decisions. For example, if an unreasonable risk results from exposure to two or more chemicals, it is not clear whether TSCA authorizes EPA to control the individual chemicals contributing to the risk.").

[23] N.Y.C. DEP'T OF ENVTL. PROT., *supra* note 19, at 17 (citation omitted).

[24] *Role of Science at EPA*, EPA, http://www.epa.gov/epahome/science.htm (last visited Apr. 19, 2014) ("Scientific information . . . always includes some degree of uncertainty and is subject to varying interpretations. For example, assessments of risks to humans from exposure to chemicals are often based on tests in which laboratory animals are given high doses of a chemical. Effects seen in the animals may or may not appear in humans, who are typically exposed to much lower doses and whose bodies may metabolize the chemicals differently.").

humans.[25]

B. *EPA Efforts to Date*

This section will provide a snapshot of actions taken by EPA to identify and address risks associated with PPCP contamination of water supplies. EPA has only recently been able to take steps to address the problem by initiating risk assessment processes.[26] Concern arose regarding PPCPs because of possible effects on aquatic life and human health, and because neither filtration technology nor other water purification techniques at Publicly Owned Treatment Works (POTWs) necessarily remove these substances.[27] Now, EPA's goal is to improve science and public understanding, identify partnerships and stewardship opportunities, and propose appropriate regulatory action.[28] The Agency has expressed:

> concern[] about the detection of pharmaceuticals and personal care products in our water. EPA has been actively working with federal agencies and state and local partners to better understand the implications of emerging contaminants such as pharmaceuticals, endocrine disrupting chemicals, and personal care products detected in drinking water, wastewater, surface water and ground water. We continue to evaluate routes of exposure, levels of exposure, and potential effects on public health and aquatic life.[29]

Notably, EPA is still in an information-gathering phase of risk assessment. "Risk assessment is a process in which information is analyzed to determine if an environmental hazard might cause

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[25] For examples of government officials drawing such conclusions, see N.Y.C. DEP'T OF ENVTL. PROT., *supra* note 19; *Pharmaceuticals and Personal Care Products (PPCPs)*, EPA, http://www.epa.gov/ppcp/ (last visited Mar. 11, 2014) ("To date, scientists have found no evidence of adverse human health effects from PPCPs in the environment.").

[26] *See* EPA, *supra* note 25 ("With advances in technology that improved the ability to detect and quantify these chemicals, we can now *begin* to identify what effects, if any, these chemicals have on human and environmental health.") (emphasis added).

[27] *See* EPA, *supra* note 2, at 32.

[28] *See Pharmaceuticals and Personal Care Products (PPCPs) in Water*, EPA, http://water.epa.gov/scitech/swguidance/ppcp/index.cfm (last visited Apr. 19, 2014).

[29] Benjamin H. Grumbles, *Foreword* to EPA, UNUSED PHARMACEUTICALS IN THE HEALTH CARE INDUSTRY: INTERIM REPORT (2008), *available at* http://water.epa.gov/scitech/swguidance/ppcp/upload/2010_1_11_ppcp_hci outreach.pdf.

harm to exposed persons and ecosystems."[30] Arguably, advanced analytical methods, rather than any other cause, are responsible for EPA's growing concern over PPCPs, because they enable chemical presence, origins, and pathways to be detected at ever-lower levels in the environment.[31]

Breakthroughs in analytical chemistry technology have enabled superior risk assessment in a variety of environmental media.[32] Risk assessment is interdisciplinary, and draws from biology, toxicology, ecology, engineering, geology, statistics, and social sciences in order to develop a holistic, objective, and rational framework for evaluating environmental hazards.[33]

For an example of ongoing risk assessment in the PPCP context, consider EPA's response to the discovery that waste from poultry houses contains arsenic, which is a known threat to environmental and human health. Scientists at EPA suspect that the veterinary drug Roxarsone (which is added to U.S.-raised broiler chicken feed for the purpose of curbing disease and increasing weight gain) may be responsible for this arsenic contamination.[34] However, they are unable to confirm unequivocally the source of arsenic in poultry house waste without developing breakthrough "analytical methods for determining [R]oxarsone and suspected transformation products . . . in aqueous extracts," via an ongoing study.[35]

EPA is taking practical steps short of regulating PPCPs under traditional environmental laws, including studying the extent of unused pharmaceutical disposal by the healthcare industry[36] and

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[30] EPA, AN EXAMINATION OF EPA RISK MANAGEMENT PRACTICES 2 (2004), *available at* http://www.epa.gov/OSA/pdfs/ratf-final.pdf.

[31] *See* EPA, *supra* note 2.

[32] *See, e.g.*, Michele F. Sipin et al., *Recent Advances and Some Remaining Challenges in Analytical Chemistry of the Atmosphere*, 75 ANALYTICAL CHEMISTRY 2929, 2929 (2003) ("To characterize the chemical composition of the complex atmosphere, a complementary collection of different analytical methodologies is typically used.); *Analytical Chemistry Equipment*, EPA, http://www.epa.gov/ada/ace.html (last visited Apr. 19, 2014).

[33] RICHARD L. REVESZ, ENVIRONMENTAL LAW AND POLICY 50 (2008); *see also* EPA, *supra* note 2, at 3-2.

[34] *Development of Analytical Methods for Studying the Environmental Fate of the Veterinary Drug Roxarsone: Part II - Determination of Volatile Arsenic in Chicken Litter Contaminated with Roxarsone*, EPA, http://www.epa.gov/ppcp/projects/methods2.html (last visited Apr. 19, 2014).

[35] *Id.*

[36] *See* HEALTH CARE INDUSTRY UNUSED PHARMACEUTICALS DETAILED

recommending best management practices,[37] partnering with the National Academy of Sciences[38] and the World Health Organization,[39] studying PPCPs in fish tissue[40] and aquatic life,[41] analyzing constituents of sewage sludge from POTWs,[42] developing analytical methods,[43] compiling a literature review about treatment methods,[44] sampling wastewater from POTWs,[45] offering grants for unused pharmaceutical take-back programs,[46] and awarding cooperative agreements to universities to study PPCPs in biosolids and wastewater.[47]

The only relevant regulatory (as opposed to scientific) action

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STUDY 2007–2009 DATA COLLECTION AND OUTREACH, EPA (2009), *available at* http://water.epa.gov/lawsregs/guidance/cwa/304m/archive/upload/2009_10_21_guide_304m_hcioutreach.pdf; Grumbles, *supra* note 29.

[37] *See generally* EPA, GUIDANCE DOCUMENT: BEST MANAGEMENT PRACTICES FOR UNUSED PHARMACEUTICALS AT HEALTH CARE FACILITIES (DRAFT) (2010), http://water.epa.gov/scitech/wastetech/guide/upload/unuseddraft.pdf.

[38] *See Workshop on Approaches to Screening for Risk from Pharmaceuticals in Drinking Water*, EPA, http://water.epa.gov/scitech/swguidance/ppcp/nas-risk.cfm (last visited Apr. 19, 2014).

[39] *See World Health Organization (WHO) Working Group Regarding Pharmaceuticals in Drinking Water*, EPA, http://water.epa.gov/scitech/swguidance/ppcp/who.cfm (last visited Apr. 19, 2014).

[40] *See* Alejandro J. Ramirez et al., *Occurrence of Pharmaceuticals and Personal Care Products in Fish: Results of a National Pilot Study in the United States*, 28 ENVTL. TOXICOLOGY & CHEMISTRY 2587, 2588 (2009).

[41] *See White Paper: Aquatic Life Criteria for Contaminants of Emerging Concern: General Challenges and Recommendations,* EPA, http://water.epa.gov/scitech/swguidance/standards/upload/2008_06_03_criteria_sab-emergingconcerns.pdf (last visited Apr. 19, 2014).

[42] *See Biosolids: Targeted National Sewage Sludge Survey Report*, EPA, http://water.epa.gov/scitech/wastetech/biosolids/tnsss-fs.cfm (last visited Apr. 19, 2014).

[43] *See Analytical Methods: Contaminants of Emerging Concern*, EPA, http://water.epa.gov/scitech/methods/cwa/ppcp/index.cfm (last visited Apr. 19, 2014).

[44] *See Treating Contaminants of Emerging Concern - A Literature Review Database*, EPA, http://water.epa.gov/scitech/swguidance/ppcp/results.cfm (last visited Apr. 19, 2014).

[45] *See Publicly Owned Treatment Works (POTW) Wastewater Sampling Study*, EPA, http://water.epa.gov/scitech/swguidance/ppcp/potw.cfm (last visited Apr. 19, 2014).

[46] *See Take-Back Programs or Events for Unneeded or Expired Pharmaceuticals*, EPA, http://water.epa.gov/scitech/swguidance/ppcp/take-back.cfm (last visited Apr. 19, 2014).

[47] *See Water Quality Cooperative Agreements*, EPA, http://water.epa.gov/scitech/swguidance/ppcp/wqca.cfm (last visited Apr. 19, 2014).

taken by EPA to date on this issue is the proposed, but never finalized, addition of hazardous pharmaceuticals to the Universal Waste Rule.[48] This development will be discussed in Part III's section on the Resource Conservation and Recovery Act. In general, the proposal is designed to achieve pharmaceutical waste source reduction by facilitating appropriate disposal at a broad range of healthcare facilities. While the technological aspects of the PPCP contamination remedies are beyond the scope of this Article, future research could pursue the policy aspects involved in the development of primary research into filtering and treatment technologies for POTWs. There are several methods for removing organic micro-pollutants, such as broken-down PPCPs, from water, which could supplement existing POTW treatment processes: membrane bioreactors, reverse osmosis, activated carbon, oxidation, and advanced oxidation processes can be used independently or in conjunction, in a multi-barrier approach, to maximize removal of organic wastewater contaminants from POTW effluent.[49] Future research could assess whether these methods are cost-effective or otherwise worth their capital investment.

C. *The Role of the U.S. Food and Drug Administration*

Although FDA oversees the health effects of pharmaceuticals at therapeutic doses and approves the substances used for cosmetics and food additives, the impact of the residuum of these chemicals in the environment remains uncertain,[50] and FDA does not require preparation of an environmental impact statement for

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[48] *See Universal Waste Rule*, EPA, http://water.epa.gov/scitech/swguidance/ppcp/universal.cfm (last visited Apr. 19, 2014).

[49] *See* CARSON LEE ET AL., STATE OF KNOWLEDGE OF PHARMACEUTICAL, PERSONAL CARE PRODUCT, AND ENDOCRINE DISRUPTING COMPOUND REMOVAL DURING MUNICIPAL WASTEWATER TREATMENT ES-2 to ES-4 (2009), *available at* http://www.unm.edu/~howe/UNM%20Howe%20PPCP%20Final%20Report.pdf. These technologies include membrane bioreactors (MBR) combined with conventional activated sludge (CAS) (which removes micropollutants by biological degradation and sludge absorption), *id.* at ES-2; reverse osmosis (which separates contaminants from water by forcing water through the membrane under pressure), *id.*; activated carbon (which absorbs dissolved compounds from water), *id.* at ES-3; and advanced oxidation processes (AOPs) (which can mineralize organic chemicals into carbon dioxide and water), *id.* at ES-4.

[50] EPA, *supra* note 2, at 3-2.

PPCPs.[51] This comes despite the plausible consequences of unintended exposure to FDA-approved drugs in the environment, including human hormone disruption, increased antibiotic resistance, and possibly undesirable but unknown "synergistic effects."[52] FDA's decision that prescription-level doses of certain drugs are safe and effective for human consumption fails to address pervasive, low-dose, cumulative, and chronic exposure to these chemicals as they persist in drinking water supplies.

Since EPA defers to FDA on the regulation of PPCP chemical ingredients, and FDA fails to consider the environmental impacts of these substances once they accumulate and persist in the environment, there exists a chink in the armor of U.S. regulatory regimes with respect to PPCP chemical ingredients as environmental contaminants. The potential for interagency collaboration on PPCPs will be discussed in Part III.

Concentrations of PPCPs in water supplies are bound to rise at a steady pace given annual increases in consumption and a constant influx of new drugs to the market:

> Prescription drug sales rose by an annual average of 11 percent between 2000 and 2005. [As of 2009,] Americans now fill more than three billion prescriptions a year; nationwide, more than 10 million women take birth-control pills, and about the same number are on hormone-replacement therapy . . . . [M]ore than 100 new drugs—both prescription and over-the-counter—are introduced each year.[53]

Pharmaceuticals consumed by humans account for only a portion of total drugs consumed in the U.S. and therefore released into aquatic environs. Over eighty percent of pharmaceuticals used in the United States are given to animals.[54]

The current role of FDA in the PPCP problem is to approve the chemicals that are used in PPCPs without regard to the cumulative impact of those chemicals in the natural environment and in drinking water supplies.

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[51] This Article discusses the U.S. FDA approval process and environmental impact review in the section on the National Environmental Policy Act, *infra* Part III.A.

[52] EPA, *supra* note 2, at 3-2, 3-3.

[53] Elizabeth Royte, *Drugging Our Waters*, ONEARTH MAG. (Dec. 23, 2009), http://onearth.org/article/drugging-our-waters.

[54] Gardiner Harris, *New Prescription Requirement Will Cut Use of Antibiotics in Livestock*, N.Y. TIMES, Apr. 12, 2012, at A19.

D. *Conclusion to This Section*

We lack information about health impacts resulting from long-term, subtherapeutic, and synergistic effects of PPCPs. Yet the risk of adverse environmental and public health impacts is real, based on the bioactive and endocrine-disrupting potential of PPCPs. EPA's efforts to date are primarily in the development of science around PPCPs as environmental contaminants and in risk assessment. Further delaying a response to the PPCP problem may be costly because of the widespread and growing occurrence of these contaminants in the natural and human environments. However, it is not readily apparent which law, if any, applies to the problem. It is another matter to determine whether there is a good fit between the applicable law and the nature of the risk. Before reaching legal frameworks for pollution management, we will dive into theories of risk management in order to better come to grips with the PPCP problem.

II. RISK MANAGEMENT THEORIES

Before asking whether PPCP contamination is a risk subject to regulation under federal law (to be surveyed in the following Part), we first ask whether PPCP contamination ought to be addressed within any particular risk management framework. Similar to the following Part, this survey of risk management theory provides a dual benefit: not only will we learn something about how to approach this unique risk situation, we will have a better understanding of the strengths, weaknesses, and differences of the various risk management frameworks. Risk management theory has generated a substantial amount of scholarship. Because this section is intended as an overview of these frameworks, it will not dig too deeply into the nuances of the debate between, for example, cost-benefit analysis and the precautionary principle,[55] but will rather highlight the limitations and differences of each theory in a general, introductory way by applying each framework to the PPCP problem. Each section identifies whether the risk management framework under discussion is incorporated into federal laws discussed in this Article, namely those pertaining to PPCPs as an environmental contaminant.

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[55] Gregory N. Mandel & James Thuo Gathii, *Cost-Benefit Analysis Versus the Precautionary Principle: Beyond Cass Sunstein's* Laws of Fear, 5 U. ILL. L. REV. 1037 (2006).

Legal procedures notwithstanding, from an abstract point of view, the first step in the regulatory process is to assess the risks involved to determine the magnitude of potential environmental and public health harms. With these risks in mind, risk assessment gives way to the second step, risk management. *Risk assessment* is an analytic device used in situations of uncertainty "to quantify the degree of hazard that might result from human activities."[56] On the other hand, the *risk management* stage of decision-making "is the process by which a protective agency decides what action to take in the face of such estimates."[57] These frameworks are indispensable to rational government because we have finite resources available to allocate toward risk mitigation. We need some way to reasonably, consistently, and with limited information, prioritize certain risks over others and choose among available policy instruments. There are at least ten distinct theoretical frameworks for risk management, all of which are predicated on some antecedent risk assessment, ranging loosely "from those requiring the least theory, data, and analysis and offering the least flexibility" to those with the greatest informational and analytical requirements and the greatest range of regulatory options.[58] This Part discusses these risk management decision frameworks as they apply to the PPCP problem. In the PPCP context, the precautionary principle, cost-benefit analysis,

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[56] William D. Ruckelshaus, *Risk, Science, and Democracy*, 1 ISSUES SCI. & TECH. 19, 26 (1985). Put another way, "[r]isk assessment is an exercise that combines available data on a substance's potency in causing adverse health effects with information about likely human exposure, and through the use of plausible assumptions, it generates an estimate of human health risk." *Id.* at 28.

[57] *Id.*

[58] With the exceptions of the precautionary principle and sustainability, these frameworks are listed and ordered in LESTER B. LAVE, THE STRATEGY OF SOCIAL REGULATION: DECISION FRAMEWORKS FOR POLICY 9–27 (1981). *See generally* DOUGLAS KYSAR, REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY (2010) (discussing the precautionary principle); RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND HUMAN HEALTH (2008) (discussing cost-benefit analysis). The discussion of sustainability draws from Christian G Daughton & Illene S Ruhoy, *Green Pharmacy and PharmEcovigilance: Prescribing and the Planet*, 4 EXPERT REV. CLINICAL PHARMACOLOGY 211 (2011). Lave's book provides an excellent exposition of these frameworks and weighs their economic and practical aptitude as decision-making tools. Here, the relative value of the frameworks is appraised according to their fitness to address the issue of PPCPs in particular.

and sustainability withstand scrutiny better than the other risk management frameworks.

A. *Market Regulation*

Under the stringent assumptions of "complete information, no transaction costs, rational consumers and producers, no economies of scale in production, and no externalities . . . a competitive market produces an efficient (or Pareto optimal) equilibrium in the sense that no one can be made better off without making at least one person worse off."[59] Under these hypothetical economic conditions, there would be no need for government involvement through regulation.[60] Consumers would gradually cease to purchase products that contained ingredients or used processes that created unreasonable risks. With diminished demand, producers would lose the incentive to produce those products in ways that generated risks that outweighed their benefits. Products would be discontinued or formulas would be redesigned accordingly, all because of the competitive nature of the market, where informed consumers make shrewd and prudent decisions that incentivize environmentally sound corporate performance. This framework does not exist in pure form[61] in any government regulation because, by definition, it operates sans government regulation. There is no need for the government to determine what degree of risk is acceptable or how much is reasonable to spend on avoiding those risks: the market will decide. Where regulatory options would be unduly restrictive, would challenge administrative capacity, or would be inefficient, market-based solutions become more appealing. Imperfect market equilibrium may be tolerable where regulating under uncertain risk conditions is not.

The most obvious objection to market-based regulation of PPCPs is that consumers, industry, and regulators alike have incomplete information about the health and safety risks associated with residual pharmaceuticals and personal care products in aquatic environs. Additionally, the collective action problem involved in getting enough consumers to properly dispose of PPCP

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59 LAVE, *supra* note 58, at 9.

60 *Id. at* 10.

61 The Title IV Acid Deposition Control amendments to the Clean Air Act (not discussed in this Article) incorporated market-based regulatory principles by creating a permit-trading scheme to reduce acid rain precursors. *See* Clean Air Act § 403(b), 42 U.S.C. § 7651b(b) (2006).

waste would stymie efforts of the most informed, rational people. Why expend time, money, and effort to properly dispose of PPCP waste if not enough other people take sufficient care to reduce the first mover's exposure? If PPCP contamination of drinking water supplies is a genuine public health and environmental threat, then the market equilibrium is less than optimal. This is likely because regulators, industry, and consumers alike do not yet see the full cost (end-of-life contamination of water supplies leading to aquatic ecosystem impairment and possible endocrine disruption) of pharmaceuticals and personal care products when these parties make decisions regarding their safety, ingredients, or desirability. This casts a pall over the efficacy of market regulation in the PPCP context.

B. *No-Risk*

The no-risk framework prohibits exposure to identified risks with virtually no questions asked.[62] This framework is an extension of the premise that the public should never be exposed to identified, avoidable risks, which is a morally and rhetorically strong premise.[63] The no-risk framework requires only that the risk be identified, and if a certain conduct or ingredient is established as bringing that risk about, that conduct or ingredient should be prohibited. For instance, in order to ensure a reasonable certainty of no harm to consumers, the so-called Delaney Clause of the Food, Drug, and Cosmetic Act provides that "no [food] additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal."[64] This Clause does not ask whether the additive was otherwise nutritional or beneficial and does not leave open the possibility that a useful additive that caused incidences of cancer occurring at a rate of only one in one billion

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[62] *See* LAVE, *supra* note 58, at 11.

[63] That is, there are few, if any, circumstances in which it would be moral, under teleological or deontological moral theory, to gratuitously expose the public to risks that could reasonably be avoided. There are few, if any, circumstances in which it would not be rhetorically effective for a politician to espouse the no-risk perspective. *See id.* ("This approach has great appeal as rhetoric.").

[64] Federal Food, Drug, and Cosmetic Act of 1938 § 409(c)(3)(A), 21 U.S.C. § 348(c)(3)(A) (including the Food Additives Amendment). In addition to food additives, the Delaney Clause applies to animal drugs in meat and poultry, *id.* § 512(d)(1)(i), 21 U.S.C. § 360b(d)(1)(i), and food color additives, *id.* § 721(b)(5)(B), 21 U.S.C § 379e(b)(5)(B).

might be desirable.

A global criticism of the no-risk framework is that it is based on an implausible view of the capacity of government to mitigate risks. The world can be a dangerous place, and this framework is virtually impossible to implement as a general theory because there are too many risks and not enough resources (in terms of money, staff, and political will) to mitigate them all. Lave considers the no-risk framework a "straw man unworthy of serious consideration"[65] as it suffers from deep flaws—notably, the inconsistency of government policy which it would create as well as the effect of closing the door on future solutions.[66] Specifically in the PPCP context, implementing the no-risk framework would lead to undesirable results.[67] Further, a risk management theory should facilitate the prioritization of risks. Prohibiting any additional risk would put a minute increment of risk associated with an uncommon drug in the same category (that is, in the "impermissible" category) as a larger danger to the public associated with a widely used pharmaceutical. An adequate risk management framework would sensibly prioritize the regulation of the latter.

C. *Precautionary Principle*

The precautionary principle serves as a broad guideline by which affirmative risk management decisions are justified in the face of uncertainty. The most famous articulation of this principle is the admonition that, "[w]here an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."[68] This principle consists of four dimensions—threat, uncertainty, action, and prescription—captured by this conditional statement: "*If* there is (1) a threat, which is (2) uncertain, *then* (3) some kind of action (4) is

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[65] *See* LAVE, *supra* note 58, at 13.

[66] *See id.*

[67] Indeed, even relatively benign drugs, such as Advil, have risks in the form of side effects or unintended consequences if taken with alcohol or in excessive dosages, which would lead to their prohibition under this framework, resulting in a general decrease in social welfare due to untreated aches and pains.

[68] *Wingspread Statement on the Precautionary Principle*, GLOBAL RESEARCH DEV. CTR., http://www.gdrc.org/u-gov/precaution-3.html (last visited Apr. 20, 2014).

mandatory."[69] It can also be formulated as: "Where there are possibilities of large or irreversible serious effects, scientific uncertainty should not prevent protective actions from being taken."[70] "Under this approach, regulators are to adopt measures that are proportionate to the threat perceived and that are open to revision as knowledge develops, but they are not to be hampered by a default assumption against government regulation in advance of complete scientific demonstration of harm."[71] Because regulation under federal environmental law is typically predicated on risk assessment demonstrating actual harm, and since EPA generally proceeds conservatively—that is, only upon the basis of knowledge generally accepted by the scientific community[72]—the precautionary principle is not the operative risk management framework of any of the laws surveyed in this Article.

The limitation of the precautionary principle is that it does not provide direction on *how* to regulate or prioritize specific risks. Rather, it serves to stir us to action when threats are perceived and not wait until the harm has accrued to take mitigating steps. We might suspect that the PPCP problem deserves regulatory attention, but the precautionary principle does not tell us what to do about it. While the precautionary principle is intuitively appealing, it "needs to be made concrete if the principle is to be useful in policy-making";[73] specifically, the precautionary principle needs to be developed through the adoption of specific descriptions of the kinds of threats that are relevant, the kinds of uncertainty to which the principle should respond, and the kinds of responses the principle envisages as appropriate given those threats and uncertainties.[74] Without undertaking to provide such a serious

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[69] SVEN OVE HANSSON & PER SANDIN, PERSISTENCE, LIABILITY TO BIOACCUMULATE, AND THE PRECAUTIONARY PRINCIPLE 26 (2001).

[70] Nicholas A. Ashford, *The Legacy of the Precautionary Principle in US Law: The Rise of Cost-Benefit Analysis and Risk Assessment as Undermining Factors in Health, Safety and Environmental Protection*, *in* IMPLEMENTATION OF THE PRECAUTIONARY PRINCIPLE: APPROACHES FROM THE NORDIC COUNTRIES, THE EU AND USA 352, 354 (Nicolas de Sadeleer ed., 2007).

[71] KYSAR, *supra* note 58, at 9.

[72] *See Science Policy*, EPA, http://www.epa.gov/osp/ (last updated June 12, 2012) ("EPA and the scientific community at large use this [laboratory-based scientific] information to ensure that EPA's decisions and environmental policies are informed by sound science.").

[73] Stephen Gardiner, *A Core Precautionary Principle*, 14 J. POL. PHIL. 33, 38 (2006).

[74] *Id.* at 38–39.

theoretical development here, this Article does contend that the precautionary principle can be useful to environmental policy-making, particularly the PPCP problem.

The precautionary principle fits the PPCP problem because endocrine disruptors, antibiotics, and other chemicals in our drinking water pose a threat to human health and the environment, though precise causal linkages have yet to be established with respect to human health. It would appear EPA is informally adhering to this principle with respect to PPCPs, as efforts to encourage responsible PPCP disposal are underway even in advance of a thoroughgoing demonstration that PPCPs in the environment cause adverse human health impacts.[75]

D. *Sustainability*

EPA defines sustainability as the condition of productive harmony between humans and nature, which permits present and future generations to fulfill social, economic, and environmental requirements for survival and well-being.[76] Although sustainability is a guiding principle at EPA, it is not the operative risk management framework for any particular policy area. This section discusses sustainability as a framework for addressing the pharmaceutical aspect of the PPCP problem at a critical juncture in the product lifecycle—where pharmaceuticals are prescribed. Insofar as the system-based perspective of sustainability addresses the underlying causes of environmental contamination through source reduction,[77] the Pollution Prevention Act recommends a policy that is consistent with this framework.

In recognition of the interconnected, and intergenerational, implications of certain risks, the medical community can prescribe pharmaceuticals sustainably by treating the environment and

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[75] It is generally understood that PPCPs in the environment are not considered a human health threat at this time. The EPA's boilerplate statement on the PPCP home-page: "To date, scientists have found no evidence of adverse human health effects from PPCPs in the environment." *See Pharmaceuticals and Personal Care Products*, EPA, http://www.epa.gov/ppcp/ (last visited Apr. 20, 2014). *See also* EPA, *supra* note 25.

[76] *See Sustainability Basic Information*, EPA, http://www.epa.gov/sustainability/basicinfo.htm (last visited Mar. 11, 2014).

[77] *See generally* Shinichi Kitazawa & Joseph Sarkis, *The Relationship Between ISO 14001 and Continuous Source Reduction Programs*, 20 INT'L J. OF OPERATIONS & PROD. MGMT. 225, 225 (2000).

human subjects as an integral whole.[78] This approach, like that prioritized by pollution prevention, contrasts with end-of-pipe pollution controls. Using concepts that Daughton and Ruhoy refer to as the "green pharmacy" and "pharmEcovigilance holistic assessment system," the medical community—particularly prescribers and dispensers—can take steps to (1) reduce the entry of active pharmaceutical ingredients into the environment; (2) improve the efficiency and effectiveness of healthcare; (3) lower costs for the consumer; (4) improve therapeutic outcomes; and (5) reduce incidence of unintended poisonings and drug diversion.[79] A related concept, "ecopharmacology," is the practice of minimizing pharmaceutical pollution in clinical care.[80] Ultimately, minimizing cumulative, synergistic, chronic, and low-dose exposure to pharmaceuticals in water supplies may require raising awareness within the medical community of the environmental impacts of these substances.

Sustainability requires reducing waste. "Leftover drugs"—including those improperly disposed—"are an overt symptom of numerous inefficiencies and imprudence in the conduct and administration of healthcare. They can be a direct measure of wasted healthcare resources."[81] Sustainability also requires striking a balance between short- and long-term goals. The physician's obligation to protect the patient, perhaps by prescribing an antibiotic drug, must be balanced with the manufacturer's prerogative to ensure the regional rate of drug use does not lead to bacterial resistance in the environment.[82] Sustainability in the drug context may require redesigning key aspects not of a medicine's ingredients but rather of the medicine's lifecycle in order to reduce the incidence of unused drugs, which in turn reduces improper disposal and entry into the environment.[83] "Significantly, redesign of key places in this lifecycle holds great potential for not only reducing the incidence of leftovers, but also for improving the quality and cost-effectiveness of healthcare."[84]

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78 *See* Daughton & Ruhoy, *supra* note 58, at 211.

79 *Id.* at 215.

80 *See Clean Med 2010, Baltimore*, MD. HOSP. FOR HEALTHY ENV'T, http://mdh2e.org/tag/eco-pharmacology/ (last visited Apr. 20, 2014).

81 Daughton & Ruhoy, *supra* note 58, at 219.

82 *Id.* at 227.

83 *Id.* at 228.

84 *Id.*

"The control and optimization of drug selection and usage holds [sic] great potential for reducing overall entry of [active pharmaceutical ingredients] into the environment, as it can reduce the need for disposal while also minimize [sic] the residues released to sewers by excretion and bathing."[85] Sustainable PPCP management in the healthcare industry would require increased vigilance on the part of prescribing doctors, and leadership from drug manufacturers. Perhaps environmentally friendly product alternatives will be forthcoming.

E. *Technology-Based Standards*

Technology-based risk management standards require only the determination of the best available technical processes that would mitigate an identifiable hazard.[86] Technology-based risk management standards are incorporated in different respects into the Safe Drinking Water Act, the Clean Water Act, and the Resource Conservation and Recovery Act (and other federal laws that are not relevant to addressing PPCPs as environmental contaminants). By simply requiring adoption of the best available pollution control technology determined by sound engineering judgment, regulators need not conduct a formal cost-benefit analysis of any specific safety standard.[87] Administrators of these standards need not make difficult judgments balancing health and economics because the regulatory standards borne by industry are determined by engineering solutions to environmental problems.[88] A notable aspect of this framework is the one-way ratchet toward increasing technological stringency that it would create if it were not for the implicit discretion that is involved in the determination of what is "best" and the limited scope of statutory authority to regulate. Pursuant to this framework, EPA could engage in primary research into wastewater filtration to explore and encourage advances in water treatment to remove PPCPs from municipal sewage in a way that municipalities and water consumers could afford. This could spur new technological developments and create a market for water filtration technologies scalable to address municipal wastewater.

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85 *Id.*
86 *See* LAVE, *supra* note 58, at 14.
87 *Id.*
88 *Id.*

A global criticism of the technology-based risk management framework is that requiring the adoption of commercially available technology to mitigate every identifiable hazard could drive firms into bankruptcy. According to Lave, the operation of technology-based standards is invidious: they are a pretext for "regulating economic activity through imposing costs arbitrarily among industries until all are at the same minimal level of profit."[89] Aside from the bankruptcy and arbitrariness critiques, in the PPCP context, the main problem with technology-based standards appears to be the unavailability of existing wastewater filtration technology and infrastructure that could effectively remove PPCPs from drinking water.[90] There is no "best" member of an empty set. However, membrane bioreactors, reverse osmosis, activated carbon, oxidation, and advanced oxidation processes have been demonstrated as effective in independently (or in conjunction with a multi-barrier approach) removing organic wastewater contaminants from POTW effluent,[91] so EPA's determination that no technology is available to remove PPCPs from wastewater may no longer be correct. Nonetheless, this decision framework does not offer much guidance in an area of limited technological availability, or when the technology that would be most effective at removing PPCPs would be prohibitively expensive.

F. *Risk-Risk*

The risk-risk framework is most apt for situations where a potentially harmful substance possesses countervailing valuable characteristics.[92] This risk management framework is employed by FDA in the New Drug Approval process under the Food, Drug, and Cosmetic Act discussed in Part III. Where risks must be traded off against each other, one problem unfortunately may be replaced with another unless regulators conduct some "balancing [of] the risk to the consumer of the additive against the direct health

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89 *Id.* at 15.

90 POTWs are not designed to remove PPCPs. For technical details of the limited PPCP-removal capacity of POTWs, see EPA, *supra* note 2, at 3-2, 6-1 to 6-3.

91 LEE ET AL., *supra* note 49.

92 LAVE, *supra* note 58, at 15 ("Since the risk-risk framework allows beneficial health effects to be considered along with adverse health effects, it is more flexible than no-risk."). The risk-risk framework "still precludes consideration of nonhealth effects." *Id.* at 16.

benefits" (the direct risk-risk framework), or unless regulators "tak[e] account of both producers and consumers" in this balancing (the indirect risk-risk framework).[93]

The *direct* risk-risk framework in the pharmaceutical approval context would typically compare the risk from the drug's side effects to the risk from the disease it treats.[94] The more grave the disease, the more tolerable the risk of side effects. In the PPCP context, the risk-risk framework would ask whether the risks from a contaminated water supply—such as development of abnormal physiological processes, reproductive impairment, the development of antibiotic-resistant bacteria,[95] increased incidences of breast and prostate cancer, impaired metabolism and increased obesity, and other effects on neuroendocrinology[96]—exceed the risks from giving up certain classes of drugs or personal care products. The answer, moreover, would likely be different for drugs than for personal care products (such as sunscreen and bug spray), and could rapidly become incredibly complicated. For instance, we know that birth control pills lead to estrogenic compounds in drinking water supplies that cause adverse impacts to aquatic fauna and possibly humans. But, what exactly counts as a "risk" from banning birth control pills? Do we factor in the risk of increased abortions (legal and illegal), increased poverty and its attendant health costs because of unplanned pregnancy, or any other complicated socioeconomic consequences resulting from the unavailability of birth control pills? These questions can also be posed in the situation where use of a drug is compared with regulations on its disposal rather than a flat ban: would voluntary drug return rules lead to increased risk of drug misuse by accumulating unused drugs in drop-off locations? Such non-health issues are not resolved by the direct risk-risk framework.

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93 *Id.* at 15.

94 This comparison requires that the risks be quantified. *Id.* ("If quantification [of risk] were impossible, this framework could not be implemented because there would be no method for balancing unmatched risks.").

95 Kolpin et al., *supra* note 9.

96 *See* Evanthia Diamanti-Kandarakis et al., *Endocrine-Disrupting Chemicals: An Endocrine Society Scientific Statement*, 30 ENDOCRINE REV. 293, 305–08 (2009), *available at* http://www.endo-society.org/journals/ScientificStatements/upload/EDC_Scientific_Statement.pdf (illustrating effects on breast cancer); *id.* at 311–14 (prostate cancer); *id.* at 315–18 (neuroendocrinology); *id.* at 322–25 (metabolism and obesity).

As an example of applying the *indirect* risk-risk framework to a personal care product, consider that a chemical additive to sunscreen may be toxic when handled at the manufacturing plant, but when properly applied by end users it provides enhanced protection from ultraviolet radiation, minimizing the risk of skin cancer. The risk to the producer of the chemical is weighed against the benefit to the consumer.[97]

If our knowledge of adverse impacts from PPCPs, whether direct or indirect, is inchoate, delayed, and incremental, the risk-risk framework might suggest utilizing PPCPs in spite of the risks they pose to the environment and human population. In the PPCP context, this means that the benefits of using pharmaceuticals and personal care products appear to exceed the risks they pose as water contaminants. The health benefits of pharmaceutical consumption are likely to be tangible, immediate, and long-lasting, whereas the risks of side effects may be small and temporary, and occurrence in aquatic environments is de minimis. If that were true, the direct risk-risk framework would not require a response to the PPCP problem. Further, the manufacture and production of pharmaceutical and personal care products has not been documented to pose an occupational risk to workers, so the indirect risk-risk framework does not prescribe any particular response to the PPCP problem. Indeed, according to both versions of the risk-risk framework, it may not really be a problem at all.

The risk-risk framework does not appear to apply in a meaningful way to other contexts outside of the all-or-nothing initial substance approval stage. For example, the risk-risk framework is inapposite to situations in which the regulatory proposal is not to ban a substance used in pharmaceuticals, but rather to provide for improved unused drug disposal methods or wastewater treatment processes that remove more of these substances from the waste stream. For that reason, the risk-risk framework is limited in its utility to situations faced by FDA or U.S. Occupational Safety and Health Administration.

G. *Risk-Benefit*

The risk-benefit framework provides for all-things-considered assessment of the general benefits of a proposed regulation, and

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[97] LAVE, *supra* note 58, at 17.

these benefits are to be balanced against the general risks.[98] Unlike in cost-benefit analysis, these factors are not reduced to numbers through monetization but are appreciated qualitatively.[99] This framework is different from those previously discussed (aside from the precautionary principle) because it considers effects beyond health impacts, such as ecosystem services, the existence value of endangered species, and civil liberties.[100]

The virtue of this framework is its capaciousness, and this too is its flaw. Appealing to decision-makers because of its open-ended nature, this framework does not provide for any objective way of weighing these considerations or navigating incommensurable risks.[101] Further, the uncertainty surrounding various risks may render the risk-benefit framework an unhelpful tool: this framework does not help determine whether the economic and social benefits of the pharmaceutical and personal care product markets outweigh the adverse effects on the environment and public health of long-term, low-dose, cumulative exposure to bioactive and endocrine-disrupting chemicals because we do not yet know what those effects are.

The paradigmatic example of the application of the risk-benefit framework is in FDA's approval of drugs and food additives. The Delaney Clause's no-risk framework applies only to carcinogenic substances[102]—otherwise, the risk-benefit framework applies to food and drug additives.[103] The risk-benefit framework asks whether the benefit of the substance exceeds any adverse side effects it may cause. A population-sensitive variation of the risk-benefit framework applied to the PPCP problem would ask whether the benefits of consuming these substances at a mass scale exceed the adverse impacts resulting from the contamination of drinking water supplies by these chemicals. Unfortunately, the information before FDA is so restricted (because applicants are not required to submit an environmental impact statement)[104] that a

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98 *Id. at* 18.

99 *Id.* at 19 ("Insofar as decisionmakers are suspicious of quantification or do not believe that it can be done with confidence, this framework serves to broaden their consideration, but it still relies on intuitive judgments.").

100 *Id.* at 18.

101 *Id.*

102 Federal Food, Drug, and Cosmetic Act of 1938 § 409(c)(3)(A), 21 U.S.C. § 348(c)(3)(A).

103 Federal Food, Drug, and Cosmetic Act, 21 U.S.C. §§ 301–399f (2006).

104 *See infra* Part III.A.1.

thoroughgoing risk-benefit analysis is not conducted under this framework. The section on the National Environmental Policy Act and the Food, Drug, and Cosmetic Act in Part III will explore this shortcoming in greater depth.

H. *Cost-Effectiveness*

The cost-effectiveness risk management framework aims to accomplish a general objective at the lowest cost given a fixed budget.[105] This framework is referenced by the Clean Water Act's Subchapter II discussion of grants for the construction of treatment works[106] and in the Pollution Prevention Act's Findings and Policy section.[107] With the cost-effectiveness framework, risk managers aim to maximize the abatement of risk under various constraints—institutional, economic, political, scientific, or otherwise. Accomplishing the general goal of, say, eliminating PPCP contamination of drinking water might involve a suite of programs, the administration of which would demand different resource commitments. Funding primary research into contamination occurrence and pathways of exposure, incentivizing development of wastewater treatment technology, providing grants for innovative product take-back programs, and engaging with industry to develop product design standards would each involve different total budgetary outlays and would accomplish different increments of the overall objective.

The cost-effectiveness framework helps determine how resources should be allocated between these various regulatory ambitions. The first increment of funds (or staffing) should go to the program that is estimated to remove the largest portion of the PPCP waste stream entering aquatic environs. Subsequent allocations should be apportioned to each program by this criterion, like filling a tray of ice cubes in a continuous sweeping motion rather than one slot at a time. The effectiveness of each subsequent unit of resource allocated to the problem decreases over time as the total residuum of PPCP contamination diminishes. The ratio between the volume of PPCP reduction achieved and the unit of resource allocated to achieve it should eventually be equal across all programs when all resources in the budget have been

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105 LAVE, *supra* note 58, at 19.

106 *See* Clean Water Act, 33 U.S.C. §§ 1297–98 (2006).

107 *See* Pollution Prevention Act of 1990, 42 U.S.C. § 13101(a)(2) (2006).

allocated.[108] This framework is useful as a way of prioritizing projects that have already been determined to address a particular risk, but not so much as a means of selecting which risks to mitigate in the first place. Once a risk is identified, the framework applies to determine how to fund the various initiatives that could address that risk.

This framework answers the "how," but not the "whether," aspect of the risk management dilemma. It would not be unfair to object to the reductive tendency of any decision framework that depends on reducing social values to monetary units. But in situations where the relevant costs are readily identifiable, cost-effectiveness is a useful tool. The chief flaw with the cost-effectiveness risk management framework is that the costs considered are those of the agency alone. A more thoroughgoing consideration of costs would look outside of the regulatory body, or the regulatory agencies as a whole, to the anticipated costs that these regulatory programs would impose on the overall economy, or at least the directly affected parties. But even that cost-oriented approach can be myopic, as will be discussed in the cost-benefit analysis section.

I. *Regulatory Budget*

Regulatory budgeting is a risk management framework that establishes a limit for the total annual costs that risk-mitigation requirements can impose on the regulated community.[109] While not incorporated into any particular environmental statute, this framework gets traction within the President's Office of Management and Budget, which oversees the cost of agency regulations.[110] This framework counteracts the single-mindedness of the cost-effectiveness framework by considering costs outside of the agency's needs.[111] The cost of a risk management program to the regulated actors can be as important as the risk such program

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[108] LAVE, *supra* note 58, at 20 ("Mathematically, this is a problem of maximization under constraints; the solution is to equate the effectiveness of the last dollar spent on each activity.").

[109] *Id.* at 21.

[110] *See* Exec. Order No. 12,866, 58 Fed. Reg. 190 (Oct. 4, 1993). The EO, titled Regulatory Planning and Review, was issued by President Clinton to give the Office of Information and Regulatory Affairs within the Office of Management and Budget the responsibility to review agencies' draft proposed and final regulatory actions.

[111] *See* LAVE, *supra* note 58, at 21.

is designed to prevent. Under an administrator chiefly concerned with keeping industry compliance costs low, a regulatory budget can be used to limit the total annual cost that regulations may impose, almost arbitrarily. That is, if an agency were at the end of its regulatory budget when an opportunity to prevent grave social danger presented itself, the agency could take no action regardless of the desirability of doing so. The logical antecedent to the cost-effectiveness framework (where resources are allocated between established programs), the regulatory budget framework determines how big the purse should be in the first instance. Requests for a regulatory or "implementation" budget could be submitted like operational budget requests, and the person who controls the regulatory budget determines the overall size of the agency.[112] The process of establishing the budget would at least in theory force the articulation and justification of various regulatory priorities, which to some measure ensures the integrity and accountability of the agency seeking to impose mandates on various economic actors. The budgeting process also encourages agencies to make their regulations count; to use resources wisely and intelligently because they were hard-won. But the virtues of this framework—administrative constraint and oversight—are also its weaknesses. When determining the overall budget, failure to determine to a reasonable degree of accuracy the costs and benefits of various measures could lead to misallocating resources among various social objectives.[113] Regulatory budgets can lead to suboptimal results, as in the case that an additional ten thousand dollars spent on a regulatory program would lead to one million dollars in public benefits, yet that step is not taken because it would exceed the regulatory budget, and some less efficient step is taken instead.

In the PPCP context, the cost of compliance with a waste treatment rule, a product-disposal requirement, and other potential regulations would have to be estimated *ex ante* and a total amount allocated all at once to fund these programs on the basis of estimated effectiveness.[114] Application of the regulatory budget risk management framework to the PPCP problem would be to

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[112] *Id.* ("The administration would coordinate and impose priorities on the agencies, and then Congress would react to these [budget] requests, modifying them as necessary.").

[113] *Id.* at 22.

[114] *See id.*

prohibit total compliance cost of all PPCP-related programs from exceeding a certain amount. Although in practice the regulatory budget amount would presumably be set by the director of the Office of Management and Budget, it is not clear as a theoretical matter who should bear this responsibility.

J. *Cost-Benefit Analysis*

Cost-benefit analysis is used to maximize the net benefits of risk regulation. The net benefits of a regulatory proposal are determined by subtracting regulation costs (i.e., compliance costs, furloughed workers, increased price of goods) from regulation benefits (i.e., wildlife preservation, avoided healthcare costs, saved lives).[115] This approach is used in part under the Safe Drinking Water Act's provision for setting Maximum Contaminant Level standards—at least to the extent that the 1996 Amendments require EPA, when setting standards, to publish a determination whether the benefits of a standard justify its costs.[116] Further, any economically significant regulatory actions taken by EPA—those that have a projected annual effect on the economy in excess of $100 million[117]—must be subject to cost-benefit analysis before implementation pursuant to Executive Order 12,866.[118] While the specific assumptions and economic considerations that go into cost-benefit analysis are open for debate, there are a few essential steps to this risk management framework.[119]

The cost-benefit analysis framework is especially suitable for a problem as complex as PPCPs, as it can be used both *ex ante* and *ex post*: to evaluate the costs and benefits of new drugs and other environmental contaminants subject to scrutiny before being introduced to the market, and to evaluate various remediation

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115 REVESZ & LIVERMORE, *supra* note 58, at 10. Lave and others describe this framework as benefit-cost analysis, but the method is the same. *See* LAVE, *supra* note 58 at 24.

116 *See* DAVID M. BEARDEN ET AL., CONG. RESEARCH SERV., ENVIRONMENTAL LAWS: SUMMARIES OF MAJOR STATUTES ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY 41 (2011).

117 Exec. Order No. 12,866 § 3(f)(1), 58 Fed. Reg. 51,735, 51,738 (Oct. 4, 1993).

118 *Id.* § 6(a)(3)(C).

119 *See, e.g.*, NICK HANLEY & CLIVE L. SPASH, COST-BENEFIT ANALYSIS AND THE ENVIRONMENT 8–21 (1993), *available at* http://www.ima.kth.se/utb/mj2694/pdf/CBA.pdf. These steps include defining the project, identifying the impacts, calculating a monetary valuation, discounting the values, weighting the outcomes, and performing a sensitivity analysis.

proposals to address existing PPCP contamination.

Of all risk management theories surveyed here, cost-benefit analysis accommodates the most thoroughgoing elaboration of concerns and provides the most objective way to determine whether and how to regulate a risk.[120] An improvement over cost-effectiveness, cost-benefit analysis can help set the regulatory agenda as well as determine how resources can be optimally distributed across regulatory programs. Indeed, it is necessary to perform some sort of implicit weighing of costs and benefits when setting regulatory budgets and when trading risks against benefits. Cost-benefit analysis has the advantage of making these valuations explicit in risk management decision-making.

Similar to a regulatory budget, "cost-benefit analysis has an important role to play in centralized review"; unlike a regulatory budget, cost-benefit analysis is "not exclusively to check agencies."[121] Sometimes action is justified because the benefits of increased protections from pollutants significantly outweigh the costs associated with failing to act.

A rough sketch applying cost-benefit analysis to the PPCP problem is as follows. As a partial list, some costs of PPCP pollution enumerated in Part I include endocrine disruption and congenital birth defects in aquatic species and possible links to adverse human health impacts. However, the social benefits associated with PPCP usage, from sunscreen to pain relievers, are clearly great. Because some environmental and social consequences are facially incommensurable (the gender of a tadpole versus the benefits of a drug), economists may have trouble assigning monetary value to sundry ends in ways that are generally acceptable. This framework would apply most helpfully in the context of determining whether any particular mitigation effort is worthwhile—whether it is wastewater effluent standards, wastewater treatment technology, product disposal requirements, or even a product ban, each of these would receive a thorough

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120 *See* LAVE, *supra* note 58, at 24 ("Benefit-cost analysis is a sufficiently broad framework to be adapted to consider virtually any aspect of a regulation or public decision. The implications for those who gain or lose can be folded into the analysis."). Lave was even-handed in assessing this framework by highlighting the problem of discounting and intergenerational equity. Benefit-cost analysis "focuses on the present, giving short shrift to even the near-term future with no importance for events more than a few decades into the future." *Id.*

121 REVESZ & LIVERMORE, *supra* note 58, at 173.

weighing of compliance costs for the treatment industry and potential costs on end users against the benefits of reducing PPCP exposure and bioaccumulation.

Risk management under the cost-benefit analysis framework is typically contrasted with approaches under the precautionary principle. "The widespread endorsement of the precautionary principle is motivated in large part by the idea that orthodox approaches to environmental management—based heavily on risk assessment and cost-benefit analysis (CBA)—are deeply flawed" both practically and theoretically.[122] Practically, "they are said to have produced and promoted ineffectual environmental policies . . . because they set the burden of proof for regulation too high and in the wrong place: they assume that a new product or process is 'innocent-until-proven-guilty.'"[123] Theoretically, cost-benefit analysis tends to "presuppose that humans are presently in a position to fully understand the impacts of their activities on the environment and establish levels of insult at which the environment or humans [can] rebound from harm," which is false, "given the extreme complexity of ecological systems."[124]

Without wishing to wade too deeply into these profound issues, there are epistemological and moral challenges to the cost-benefit analysis framework that flare up particularly in the context of setting environmental policy.[125] There are both economic and moral challenges associated with assigning value to non-market goods like wildlife or a landscape—how are these things to be priced, or are they priceless?[126] The complexity of ecosystems and uncertain causal chains can stymie best efforts to predict the ultimate consequences of effluent pollution into an aquatic environment. The intergenerational implications of discounting are profound since the practice builds into the framework a bias toward present generations when most costs will not accrue until the future. It is not clear how cost-benefit analysis should proceed in the face of intractable uncertainty over impacts or costs, or how much value should be assigned to foregone options when

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122 Gardiner, *supra* note 73, at 35.

123 *Id.*

124 *Id.* (internal quotation marks omitted).

125 *See* HANLEY & SPASH, *supra* note 119, at 21–22.

126 George Manbiot, *The Downside of Valuing Nature*, CORPORATE KNIGHTS (July 15, 2013), http://www.corporateknights.com/article/downside-valuing-nature.

irreversible decisions are proposed.

K. *Conclusion to This Section*

Every risk management theory has unique virtues and vices. The commonality lies in their purpose, which is to provide insight into whether and how much risk should be mitigated. Despite individual limitations, the precautionary principle, sustainability, and cost-benefit analysis appear to best fit the PPCP problem. Given the uncertainty involved in the science around risk assessment in the PPCP context, the precautionary principle is a salient risk management framework here. Given the cost of new wastewater filtration infrastructure and environmental remediation, source reduction may be the most effective solution to the PPCP problem, lending support to the sustainability framework. Cost-benefit analysis offers the thoroughgoing methodology needed to at least attempt to factor in the myriad social, economic, and environmental factors at play in the PPCP problem. If conceptual conflicts are downplayed, each of these three frameworks supplements the others. Where the precautionary principle tells us to do something, rather than nothing, to limit PPCP pollution, cost-benefit analysis can help us decide what specific policy instruments would cost and for what gains. Sustainability adds to this brace of frameworks an intergenerational counterweight to the potentially questionable discounting of future generations under cost-benefit analysis.

III. FEDERAL LEGAL FRAMEWORKS

By examining the fitness of these laws to address PPCPs as a unique environmental problem, this Part does not always follow the standard introduction to these statutes, but rather emphasizes those aspects of the laws that might apply to PPCPs in aquatic ecosystems and water supplies.

A. *National Environmental Policy Act and the Food, Drug, and Cosmetic Act*

The National Environmental Policy Act (NEPA)[127] is the United States' "basic national charter" for environmental

[127] *See* National Environmental Policy Act, 42 U.S.C. §§ 4321–4370h (2006).

protection.[128] Under NEPA, environmental protection is accomplished by *ex ante* assessment of the environmental impacts of major agency actions, prepared in an environmental impact statement (EIS).[129]

Authorized by the Food, Drug, and Cosmetic Act (FDCA),[130] FDA ensures the safety and effectiveness of pharmaceuticals and veterinary drugs, food additives, and cosmetics sold in the United States.[131] The FDCA empowers FDA to regulate drugs sold in interstate commerce.[132] In conjunction with this authority, FDA is required to "promote the public health" and to ensure that "human and veterinary drugs are safe and effective."[133] FDA, like all federal agencies, must comply with NEPA,[134] although FDA routinely does not fulfill this obligation. FDA's one part per billion threshold for preparing an EIS, and their policy of not enforcing NEPA's requirement to analyze cumulative impacts, allows the agency to ignore the environmental impacts of PPCP pollution. FDA has typically avoided the problems of downstream effects of, and cumulative exposure to, the substances it regulates. The agency's inquiry toward assessment of drug safety and efficacy in general is limited to the clinical endpoints of a drug when tested in a controlled experimental setting and does not include assessment of the cumulative downstream risks.

As this Part will show, FDA should, but does not, analyze environmental impacts when approving new substances.[135] Because of the nature of PPCP pollution, FDA should, but does not, analyze cumulative impacts when preparing environmental

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128 40 C.F.R. § 1500.1(a) (2011).

129 *See* 42 U.S.C. § 4332(2)(C)(i) ("The Congress authorizes and directs that . . . all agencies of the Federal Government shall . . . include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on . . . the environmental impact of the proposed action.").

130 *See* Food, Drug, and Cosmetic Act, 21 U.S.C. §§ 301–399f (2006).

131 *See Regulatory Information*, FDA, http://www.fda.gov/RegulatoryInformation/Legislation/default.htm (last visited Mar. 11, 2014).

132 *See* 21 U.S.C. 331(c); 21 U.S.C. 331(k).

133 *Id.* § 393(b)(1), (b)(2)(B).

134 42 U.S.C. § 4332(2) ("*[A]ll agencies* of the Federal government *shall*" comply with NEPA.) (emphasis added).

135 The basic argument for FDA to comply with NEPA to address PPCPs can be found in Christopher T. Nidel, *Regulating the Fate of Pharmaceutical Drugs: A New Prescription for the Environment*, 58 FOOD & DRUG L.J. 81 (2003).

impact statements. Extraordinary circumstances could override FDA's basis for the categorical exclusion to environmental review for PPCPs. Nonetheless, even if FDA complied with NEPA, that statute is procedural only and imposes no substantive requirements for agency action.

1. *Consistent with the Risk-Benefit Framework, FDA Should Comply with NEPA's Environmental Impact Review Process when Approving New Substances*

In the context of FDA's approval of new pharmaceutical and personal care products, the risk-risk framework would typically compare the risk from a substance's side effects to the risk from the disease or condition it treats.[136] Unless the operative concept of "side effects" of drugs was expanded to include downstream environmental contamination resulting from aggregate drug use in a given population, this framework fails to appreciate PPCPs as environmental contaminants. For that reason, the risk-risk framework is inapposite to the PPCP problem under NEPA and should be supplanted with the risk-benefit framework. The risk-benefit framework compares the general benefits (including non-health consequences) of a proposed action against the general risks.[137] This framework would seem to accommodate consideration of downstream environmental effects of approving new PPCP chemicals.

If approval of a new drug or substance by FDA falls within NEPA's trigger of "major Federal actions significantly affecting the quality of the human environment," FDA would have to apply the information-forcing requirements of NEPA—namely, that new drug approval (NDA) applicants for a pharmaceutical or personal care product would be required to identify the environmental impacts of these products on U.S. drinking water in an environmental assessment (EA).[138]

In general, any industry-initiated action that is subject to NEPA must contain an adequate EA.[139] An EA addresses realistic

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136 *See* LAVE, *supra* note 58, at 15.

137 *See id.* at 18.

138 That is, NEPA could require FDA to require applicants for a new drug approval to prepare an environmental impact statement, purely from a facial reading of the statute. *See* 42 U.S.C. § 4332(2)(C)(i). No court has held such, and whether FDA would do so depends on a host of factors.

139 *See* 21 C.F.R. § 25.40; *see generally* John C. Matheson, III, *The Nuts and*

environmental issues that could result from an action and provides the agency with enough information to determine whether the action would significantly affect the quality of the human environment. In the PPCP context, an EA would include a discussion of "1) the need for the proposed action; 2) introductions, fate, and effects of the substances in the environment; 3) alternatives to the proposed action; and 4) the environmental impact of the proposed use as a result of use and disposal of the substance."[140] If the information submitted by the applicant and otherwise available to the agency is not sufficient to support a Finding of No Significant Impact (FONSI) and does not fit other specified exceptions, then the agency must prepare an EIS.[141] The NDA process[142] is the main regulatory hook for mediating the impacts of pharmaceutical company products in the United States. And, indeed, "[p]ursuant to NEPA, all NDAs must contain either a claim for categorical exclusion or an environmental assessment, including submission of data providing the concentration of the active ingredient at its point of entry (i.e., concentration of the influent to the wastewater treatment facility) into the aquatic environment."[143]

Despite this generalization, despite that the Delaney Clause amendment to the Food, Drug, and Cosmetic Act provides for a no-risk framework for carcinogenic additives ("no [food] additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal"),[144] and despite that FDA generally scrutinizes drugs using the risk-benefit framework before they are commercially available,[145] the environmental and human health impacts of concern here are currently categorically excluded from

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Bolts of Preparing an Environmental Assessment, 43 FOOD DRUG COSM. L.J. 831 (1988).

[140] Layla I. Batarseh, *Regulatory Report: FDA's Responsibilities Under the National Environmental Policy Act*, FOOD SAFETY MAG., Apr./May 2007, at 30, *available at* http://www.foodsafetymagazine.com/article.asp?id=1888&sub=sub1.

[141] *See* 40 C.F.R. § 1501.4 (2011).

[142] *See* 21 C.F.R. § 314.50 (2011).

[143] Shawna Bligh, *Pharmaceuticals in Surface Waters: Use of NEPA*, 24 NAT. RES. & ENV'T 56, 57 (2009); *see also* 21 C.F.R. § 25.15(a); Jeffrey N. Gibbs & Bruce F. Mackler, *Food & Drug Administration Regulation & Products Liability: Strong Sword, Weak Shield*, 22 TORT & INS. L.J. 205, 216 (1987).

[144] Federal Food, Drug, and Cosmetic Act of 1938 § 409(c)(3)(A), 21 U.S.C. § 348(c)(3)(A) (2006) (including the Food Additives Amendment).

[145] *See infra* Part II.G.

consideration in the approval process. FDA provides a blanket categorical exclusion to substantive environmental review when drug residues, at their point of entry into the environment, fall below concentrations of one part per billion.[146] Under NEPA:

> Categorical exclusion means a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of these regulations (§ 1507.3) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required. An agency may decide in its procedures or otherwise, to prepare environmental assessments for the reasons stated in § 1508.9 even though it is not required to do so. Any procedures under this section shall provide for extraordinary circumstances in which a normally excluded action may have a significant environmental effect.[147]

FDA's one part per billion approach is under-inclusive in two ways. The concentration or dosage level at which pharmaceuticals are biologically efficacious is sometimes below one part per billion, and bioaccumulation can occur even when contaminants enter the environment below that level.[148] Scientific evidence confirms that adverse impacts to microorganisms, plants, fish, insects, phytoplankton, and crustaceans can be caused by exposure to pharmaceuticals with an affinity for estrogen receptors at levels below one part per billion.[149] Absent extraordinary circumstances (as discussed later), chemicals in a new drug application would

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[146] 21 C.F.R. § 25.31(b) ("The classes of actions listed in this section [addressing human drugs and biologics] are categorically excluded and, therefore, ordinarily do not require the preparation of an EA or an EIS: . . . Action on an NDA . . . if the action increases the use of the active moiety, but the estimated concentration of the substance at the point of entry into the aquatic environment will be below 1 part per billion.").

[147] 40 C.F.R. § 1508.4 (2011).

[148] MAE WU ET AL., NRDC, DOSED WITHOUT PRESCRIPTION: PREVENTING PHARMACEUTICAL CONTAMINATION OF OUR NATION'S DRINKING WATER 3 (2009), *available at* http://docs.nrdc.org/health/files/hea_10012001a.pdf. The synthetic hormone ethinylestradiol can concentrate in aquatic species to a level one million times greater than observed in the surrounding waters. *Id.*

[149] *See* B. Halling-Sorensen et al., *Occurrence, Fate and Effects of Pharmaceutical Substances in the Environment—A Review*, 36 CHEMOSPHERE 357, 372–82 (1998); Kolpin et al., *supra* note 9, at 1204–08 (noting adverse impacts associated with exposure to Estrone (E1), 17β-estradiol (E2), estriol (E3), and synthetic estrogen, 17α ethinylestradiol, at levels below one part per billion).

have to enter the aquatic environment at concentrations above one part per billion in order to trigger the need for an environmental assessment. The one part per billion threshold appears to be shorthand for "below the level of environmental concern." Although the threshold may be appropriate in the context of traditional pollutants, it is particularly unsatisfying in the context of PPCPs that are bioactive by design, that may cause adverse impacts at extremely low levels, and that are persistent and bioaccumulative. Public interest environmental organizations have filed a rulemaking petition to revoke the exemption and conduct a full environmental review of new drugs that enter the environment, on the grounds that the categorical exclusion is arbitrary and contrary to scientific evidence.[150]

2. *Because of the Nature of PPCP Pollution, FDA Should Analyze Cumulative Impacts when Preparing Environmental Impact Statements*

Despite the low level of contamination that any one new drug would add to the human environment, drug and personal care product chemicals can bioaccumulate and persist in the environment.[151] FDA is obligated to consider the cumulative impact of its actions, which means "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions . . . [including impacts that] result from individually minor but collectively significant actions taking place over a period of time."[152] At present, FDA has not attempted to satisfy what appears to be a statutory mandate to consider the cumulative

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[150] *See* Great Lakes Envtl. Law Ctr. & NRDC, Citizen Petition to FDA Commissioner Under the National Environmental Policy Act Requesting an Amendment to a FDA Rule Regarding Human Drugs and Biologics (July 7, 2010), *available at* http://www.glelc.org/glelc/GLELC_FDA_Petition.pdf. To date, this petition has not been granted a substantive response by FDA, which may be exposing itself to an unreasonable delay lawsuit not unlike the Natural Resources Defense Council's recent litigation, discussed in Part I.A. of this Article, against FDA for failing to respond to a petition over antibiotics used in animal feed. It appears the categorical exclusion for pharmaceuticals that enter the environment below one part per billion has never been subject to litigation and therefore has never been required to withstand judicial review. *See* E-mail from Thom Cmar, Attorney, NRDC, to author (June 22, 2012, 8:29 CST) (on file with author).

[151] MAE WU ET AL., *supra* note 148, at 4.

[152] 40 C.F.R. § 1508.7 (2011).

environmental impacts of PPCPs.

To be sure, PPCPs are not the only substances for which FDA has failed to consider cumulative impacts when approving their use. For example, BPA, or bisphenol A, is a controversial ingredient in plastic used to line food cans, among other consumer products. "Evidence from animal studies indicates BPA may cause adverse effects such as obesity, behavioral changes, diabetes, early onset puberty, asthma, cardiovascular diseases, reproductive disorders, development of prostate, breast and uterine cancer, and transgenerational or epigenetic effects."[153] While FDA promises the public that BPA is safe, "[a] scientific panel . . . issued a blistering report against the [FDA], saying the agency ignored important evidence in reassuring consumers about the safety of the controversial chemical bisphenol-A."[154] Specifically with regard to cumulative impacts, the panel concluded that "[t]he exposure assessment is focused on food contact applications only and does not consider the potential cumulative and interactive effects of non-food contact exposures to BPA."[155] Similarly, FDA has an unfulfilled duty to consider the cumulative impacts of PPCPs, perhaps relying on the categorical exclusion provision.

3. *Extraordinary Circumstances Could Override FDA's Basis for the Categorical Eexclusion to Environmental Review for PPCPs*

"Extraordinary circumstances" may override the categorical exclusion such that FDA will require an environmental assessment if the facts indicate that, despite the low concentration at point of entry into the environment, the specific proposed action could nonetheless "significantly affect the quality of the human environment."[156] The key word here is "significantly." One might argue that trace amounts of PPCPs have yet to cause demonstrable

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153 *Bisphenol A (BPA): Expanding Research to Impact Human Health*, NAT'L INST. OF ENVTL. HEALTH SCIS., http://www.niehs.nih.gov/research/supported/recovery/critical/bpa/ (last visited Mar. 11, 2014).

154 Tara Parker-Pope, *Panel Rebukes F.D.A. on Plastic Safety*, N.Y. TIMES WELL BLOG (Oct. 29, 2008, 12:55 PM), http://well.blogs.nytimes.com/2008/10/29/panel-rebukes-fda-on-plastic-safety/.

155 FDA, SCIENTIFIC PEER-REVIEW OF THE DRAFT ASSESSMENT OF BISPHENOL A FOR USE IN FOOD CONTACT APPLICATIONS 5 (2008), *available at* http://www.fda.gov/ohrms/dockets/ac/08/briefing/2008-4386b1-05.pdf.

156 21 C.F.R. § 25.21 (2011) (FDCA regulation); *see also* 40 C.F.R. § 1508.4 (NEPA regulation).

significant effects on environmental quality when compared with traditional pollutants such as acid rain precursors. However, the definition of "significantly" makes room for context, intensity, uncertainty, controversy, and more:

> Significance varies with the setting of the proposed action . . . . Both short- and long-term effects are relevant . . . . The following should be considered in evaluating intensity: . . . . The degree to which the effects on the quality of the human environment are likely to be highly controversial. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.[157]

A strong argument could be made that the long-term, cumulative, synergistic effects of PPCPs in drinking water on the development of cancer and birth defects are highly controversial and involve unique and unknown risks. The PPCP problem may then justify an extraordinary circumstances exception to the categorical exclusion for environmental review by FDA of food, drug, and cosmetic ingredients.[158] Short of regulating PPCP contamination, at least "the FDA could require new drug applicants to prepare an environmental assessment on the basis that the presence of these drug residues in surface waters and their adverse impacts to the aquatic environment constitute an 'extraordinary' circumstance justifying performance of an environmental assessment."[159]

Of course, NEPA does not impose substantive requirements to act in any particular way once an adverse impact has been identified, and it is hard to imagine that FDA would decline to approve a drug based on such impacts so long as the benefits of the drug outweigh the potential for adverse impacts later in the drug's life cycle. The main issue is that FDA is in a position of determining how much environmental harm and human health risk pharmaceutical companies (and to a lesser extent individual drug consumers) are allowed to externalize onto the environment, public, and future. These tradeoffs have economic, environmental, and moral implications. Requiring environmental impact statements to be prepared in accompaniment of new drug

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157 40 C.F.R. § 1508.27(a), (b)(4)–(5).

158 Obtaining an extraordinary circumstances exception from the U.S. FDA requires the filing of a citizen petition to the Commissioner of Food and Drugs within the Division of Dockets Management. *See* 21 C.F.R. §§ 10.20, 10.30.

159 Bligh, *supra* note 143, at 56, 57.

applications may have the effect of increasing the cost of drugs or delaying new drugs from reaching the market. The moral implication of such a requirement is that the health of potentially exposed persons is prioritized over the health of persons deprived of or delayed access to these drugs. It is FDA's responsibility to strike these balances, but that process should be explicit and supported by a thorough informational basis.

B. *Safe Drinking Water Act*

At first blush, the Safe Drinking Water Act (SDWA)[160] appears apt for the problems posed by PPCPs in public drinking water supplies. The purpose of SDWA is to identify, monitor, and control drinking water contaminants in surface water and groundwater, and, *inter alia*, to enforce standards, collect and disseminate water-related information, and fund water supply system upgrades.[161] It would appear that these broad purposes could be applied to PPCPs in surface water and groundwater ultimately supplied to the public, but SDWA does not fit neatly with the problem. The limits of SDWA in addressing the PPCP problem can be categorized as informational shortcomings, challenges to regulating PPCPs under the statutory mechanisms available, and institutional constraints like lack of initiative. There are organizational limitations to EPA's implementation of unregulated contaminant monitoring responsibilities, such as lack of transparency and consistency in reaching its determinations to monitor new contaminants. Maximum contaminant levels under SDWA cannot even be set until further risk assessment is conducted determining the level at which PPCPs pose a public health risk. Lastly, imposing new standards on public water supplies under SDWA will pose political and financial challenges that administrators will be loath to take on. These shortcomings will be addressed in turn.

1. *EPA Has Four Distinct Sources of Authority under SDWA to Research the Environmental Impacts of PPCPs on Water Supplies, Which It Does Not Fully Exercise*

Four distinct provisions of SDWA provide EPA with

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160 *See* 42 U.S.C. §§ 300f to 300j-26 (2006).

161 *See* Daniel J. Kucera, *Safe Drinking Water Act*, *in* ENVIRONMENTAL LAW HANDBOOK 437, 439–440 (Thomas F.P. Sullivan ed., 19th ed. 2007).

authority for research into PPCPs in water supplies,[162] of which little has been made. First, the Candidate Contaminant List (CCL) process from § 1412(b)(1)(B)(i) requires EPA to publish every five years a list of currently unregulated contaminants that should be considered for potential regulation because they are known to occur in public water systems. As of June 2012, the list included "chemicals used in commerce, pesticides, biological toxins, disinfection byproducts, and waterborne pathogens."[163] Despite fitting this description, only a few PPCPs have been included on the CCL, and none of these has been subsequently selected for regulation.[164] Sensing an inappropriate lack of urgency over PPCPs on the part of EPA, in 2009 the Science Advisory Board Drinking Water Committee for the EPA Office of Ground Water and Drinking Water advised "consideration of emerging issues and on-going research when selecting chemicals" for the CCL, including "special attention" to PPCPs "using data obtained in specialized wastewater effluent monitoring programs."[165] The U.S. Government Accountability Office reviewed the selection process again in 2011, finding that EPA's selection process under SDWA apparently still needs considerable revision,[166] without

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[162] For a discussion of the four major provisions of SDWA, see generally ECKSTEIN & SHERK, *supra* note 11, at 20–24, 44–46.

[163] *Basic Information on CCL and Regulatory Determinations*, EPA, http://water.epa.gov/scitech/drinkingwater/dws/ccl/basicinformation.cfm (last visited Mar. 11, 2014).

[164] *See* TOXSERVICES LLC, APPROACHES TO SCREENING FOR RISK FROM PHARMACEUTICALS IN DRINKING WATER AND PRIORITIZATION FOR FURTHER EVALUATION 12 (2008).

[165] EPA SCI. ADVISORY BD. DRINKING WATER COMM., SAB ADVISORY ON EPA'S DRAFT THIRD DRINKING WATER CONTAMINATION CANDIDATE LIST (CCL 3) 7, 14 (2009).

[166] *Preface of* U.S. GOV'T ACCOUNTABILITY OFFICE, SAFE DRINKING WATER ACT: EPA SHOULD IMPROVE IMPLEMENTATION OF REQUIREMENTS ON WHETHER TO REGULATE ADDITIONAL CONTAMINANTS (2011) ("Systemic limitations in EPA's implementation of requirements for determining whether additional drinking water contaminants warrant regulation have impeded the agency's progress in assuring the public of safe drinking water. EPA's selection of contaminants for regulatory determination in 2003 and 2008 was driven by data availability—not consideration of public health concern. EPA does not have criteria for identifying contaminants of greatest public health concern . . . . Moreover, EPA's testing program for unregulated contaminants—which can provide key data to inform regulatory determinations—has fallen short in both the number of contaminants tested and the utility of the data provided because of management decisions and program delays. . . . [T]he credibility of some of EPA's regulatory determinations is limited by a lack of transparency, clarity, and consistency of key documents.").

which it is unlikely that emerging contaminants like PPCPs will make it on the list.[167]

Second, § 408(p)(1) of the 1996 Food Quality Protection Act and § 300j-17 of the 1996 Amendments to SDWA authorize EPA to "[d]evelop a screening program, using appropriate validated test systems and other scientifically relevant information, to determine whether certain substances may have an effect in humans that is similar to an effect produced by a naturally occurring estrogen, or other such endocrine effect as the Administrator may designate." No individual PPCPs have been included in the Endocrine Disruptor Screening Program (EDSP), which focuses primarily on chemicals used in pesticides.[168] Even if multiple such chemicals were added to the EDSP, this substance-specific screening mission misses the PPCP problem of low-level, chronic, cumulative exposure to a wide range of bioactive chemicals.

Third, § 1445(a)(2) of SDWA requires EPA to develop an unregulated contaminant monitoring rule (UCMR) that would impose monitoring requirements on community water systems for a list of unregulated contaminants.[169] Despite this requirement, very few pharmaceuticals or personal care product chemicals have been identified as unregulated contaminants subject to monitoring. Public water works otherwise have no federal duty and generally no incentive to monitor PPCPs. Monitoring under this program is anonymous and voluntary. In a recent study by the USGS and EPA,[170] one-third of the sampled treated wastewater from

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[167] The updated CCL3 includes a few PPCPs, including but not limited to: 1,4-Dioxane, a solvent used in cosmetics and shampoos; 17alpha-estradiol, an estrogen hormone used in pharmaceuticals; 2-Methoxyethanol, used in consumer products such as fragrance and lotions; Butylated hydroxyanisole, an antioxidant food additive; equilenin, an estrogenic hormone used in pharmaceuticals; and Erythromycin, an antibiotic pharmaceutical. *See Candidate List 3 – CCL*, EPA, *available at* http://water.epa.gov/scitech/drinkingwater/dws/ccl/ccl3.cfm (last visited Apr. 21, 2014).

[168] *See Overview of the April 2009 Final List of Chemicals for Initial Tier 1 Screening*, EPA, http://www.epa.gov/endo/pubs/prioritysetting/final_list facts.htm (last visited Apr. 21, 2014) (suggesting that the only chemicals included in EDSP activities are pesticides, even though the scope of the program would include anything that affects the hormonal systems).

[169] 42 U.S.C. § 300f(15) (2006).

[170] Susan T. Glassmeyer et al., *What's in Your Water? Chemical and Microbial Contaminants of Emerging Concern in Source Water and Treated Drinking Water of the US*, *in* SOCIETY OF ENVIRONMENTAL TOXICOLOGY OF NORTH AMERICA 34TH ANNUAL MEETING, ABSTRACT BOOK 41 (2013), *available at* http://www.environmentalhealthnews.org/ehs/news/2013/pdf-links/SETAC-

municipal wastewater treatment works contained eighteen unregulated chemicals, including PPCPs in the form of the antibacterial compound triclosan and an antidepressant.[171]

Fourth, § 1414(c)(4) of SDWA requires community water systems to generate annual consumer confidence reports (CCRs) and provide them to their customers, indicating levels of unregulated contaminants. Because until recently PPCPs have not been included in the UCMR, no community water supplies were required by federal law (state laws may differ) to provide information about PPCPs to their customers. The UCMR finally did receive a relevant update (UCMR 3) on April 16, 2012,[172] when EDCs of concern here (namely, hormones) were added as List 2 Contaminants.[173] UCMR 3's List 2 Contaminants shall be monitored by virtue of what EPA calls a "screening survey," which requires the use of "specialized analytical method technologies not as commonly used by drinking water laboratories" over a twelve-month period sometime between 2013 and 2015.[174] Aside from a handful of hormones, no other PPCPs have been added to the UCMR 3.[175] Governors of seven or more states can petition EPA to add an unregulated contaminant to the monitoring rule under SDWA.[176]

Nashville-abstract-book-1.pdf.

171 Brian Bienkowski, *New Report: Unregulated Contaminants Common in Drinking Water*, ENVTL. HEALTH NEWS (Dec. 5, 2013), http://www.environmentalhealthnews.org/ehs/news/2013/unregulated-water-contaminants.

172 *See Unregulated Contaminant Monitoring Rule 3 (UCMR 3)*, EPA, http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/index.cfm (last visited Mar. 11, 2014).

173 *See Basic Information About the Unregulated Contaminant Monitoring Rule 3 (UCMR 3)*, EPA, http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/basicinformation.cfm (last visited June 21, 2012) (outlining List 2 contaminants as 17-β-estradiol, 17-α-ethynylestradiol, 16-α-hydroxyestradiol, equilin, estrone, testosterone, and 4-androstene-3,17-dione).

174 *See* EPA, *supra* note 168 ("All PWSs [Public Water Supplies] serving more than 100,000 people, 320 representative PWSs serving 10,001 to 100,000 people, and 480 representative PWSs serving 10,000 or fewer people are required to monitor for seven List 2 contaminants during a 12-month period from January 2013 through December 2015.").

175 *See* Bienkowski, *supra* note 171 ("The EPA plans to make decisions regarding at least five of the contaminants on its list next year. 'We're hoping through this work the EPA will do a much more intensive contaminant candidate list and develop new methods and requirements for drinking water plants,' said Edward Furlong, a scientist with the USGS who participated in the study.").

176 40 C.F.R. § 141.40(b)(1) (2011).

2. *Neither SDWA's Technology-Based and Cost-Benefit Analysis Risk Management Frameworks, nor Its Regulatory Mechanisms, Fit the PPCP Problem*

The National Primary Drinking Water Regulations for community water supplies are the main legal hook for SDWA. National Primary Drinking Water Standards are health-based, without exception, and include eighty-five standards divided into six categories of application: disinfectants, disinfection byproducts, inorganic and organic contaminants, microbiological contaminants, and radionuclides.[177] These standards, expressed as Maximum Contaminant Levels (MCLs), apply to contaminants that may pose public health risks *in isolation*, given the absence of statutory language about cumulative exposure and the statute's use of "contaminant" in the singular.[178] This statutory restraint possibly knocks out the PPCP problem of low-level, chronic, cumulative exposure from regulation under SDWA because—as a result of research limitations—the individual contaminants have not, at current observable levels, been determined to pose such a risk on an individualized basis.

However, PPCPs may be addressable under SDWA despite this uncertainty. If it is impossible to establish an MCL because of contamination measurement difficulties, or if there exists uncertainty about dosage-response exposure limits, MCLs can be expressed in terms of treatment techniques.[179] Treatment technique standards require adoption of the best available technology given cost considerations.[180] In addition to technology-based standards, MCL standards also require a form of cost-benefit analysis to determine whether the benefits of the technology standard justify its costs.[181] Given the state of technology at the moment, "best" fails to provide sufficient guidance in this context. The best technology does not exist because no technology exists that could feasibly be installed in wastewater treatment infrastructure throughout the country to address PPCPs. Active drug compounds are not adequately broken down by existing

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177 40 C.F.R. § 141.60–.66. Of these, standards for disinfectants, disinfectant byproducts, and organic chemicals standards could apply to PPCPs.

178 *See* 42 U.S.C. § 300g-1(b)(1).

179 *See id.* § 300g-1(b)(7).

180 *See id.* § 300g-1(b)(4).

181 *See* BEARDEN ET AL., *supra* note 116.

treatment processes, such that as much as ninety-three percent of these compounds leave as effluent from treatment plants just as active as when they entered.[182] Further, without a thoroughgoing assessment of downstream risks, cost-benefit analysis would fail to appreciate avoided environmental contamination as a benefit, thereby skewing the results against proposed technology standards.

Discharge into public drinking water systems ought to be as close as possible to attaining the Maximum Contaminant Level Goal (MCLG), a health-based standard that does not take cost into account.[183] Human health effects under SDWA are established by risk assessment.[184] "No Observed Transcriptional Effect Level" ("the dose of chemical which results in no significant changes to gene expression"[185]), a standard developed in the context of cancer research,[186] is the recommended threshold for regulations pursuant to SDWA. This standard may not be appropriate here because the concerns posed by PPCPs are also interference with hormones, metabolism, and reproduction, not just genetic mutation leading to cancer.[187] This safety standard evinces a bias toward cancer prevention rather than other health problems of significant public concern in their own right. At any rate, the problem of setting safety standards on a chemical-specific basis poses a significant problem for regulatory efforts under SDWA, because the unknown health impacts that drive the concern for regulating PPCPs stem from chronic, low-level, cumulative exposure. Potential harms to human health, and therefore threats to the public welfare, cannot be determined by assessing the toxicity or dosage-response of a contaminant in isolation since it would occur in the environment in combination with other contaminants, at low levels, and over long periods of time.

The MCLGs for non-carcinogenic substances are developed by performing a computation over several dosage and impact

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182 *See* Bligh, *supra* note 143, at 56.

183 *See* 42 U.S.C. §§ 300g-1(b)(4)(A)–(B).

184 *Id.* § 300g-1(b)(3)(A)(i).

185 Helen C. Poynton & Chris D. Vulpe, *Ecotoxicogenomics: Emerging Technologies for Emerging Contaminants*, 45 J. AM. WATER RES. ASS'N 83, 91 (2009).

186 *See id.* (describing how researchers working on an "estrogen responsive cancer cell line" developed the concept of NOTEL because "[a]ny significant cellular perturbation [such as cancer-related changes] should cause some change in gene expression").

187 *See* Diamanti-Kandarakis et al., *supra* note 96.

variables.[188] MCLGs are based on substance-specific Reference Doses.[189] As a result, SDWA currently makes it impossible for EPA to set a MCLG based on cumulative exposure to multiple contaminants.

3. *SDWA's Application to PPCPs Is Constrained by Financial and Political Limitations*

Pursuing PPCPs under SDWA would require EPA to develop new medical knowledge about cumulative exposure effects. However, this knowledge would be costly: regulatory thresholds would have to be set under SDWA regardless of the cost of technology needed to attain MCLGs. It would make no sense politically, economically, or technologically to mandate "best" technology in such a situation. There is no MCLG and no Best Available Technology (BAT) for PPCPs as a class of contaminants, and it is unlikely they would be developed for any individual PPCP contaminant.

New avenues under SDWA that would avoid the imposition of costs on public water supply systems include amending the Wellhead Protection Program and the Underground Injection Control Program.[190] The 1986 SDWA Amendments included the Wellhead Protection Program to protect underground drinking water sources from contaminants with adverse human health effects.[191] Wellhead protection areas are "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield."[192] This program could be amended to require states to develop programs that "preclude the discharge of wastes containing PPCPs in wellhead protection areas," such as prohibiting septic tanks and land application of biosolids.[193] Such prohibitions would address

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[188] *See Regulating Public Water Systems and Contaminants Under the Safe Drinking Water Act*, EPA, http://water.epa.gov/lawsregs/rulesregs/regulating contaminants/basicinformation.cfm (last visited Mar. 11, 2014); *see also* ECKSTEIN & SHERK, *supra* note 11, at 21 and accompanying text.

[189] *See Regulating Public Water Systems and Contaminants Under the Safe Drinking Water Act*, EPA, http://water.epa.gov/lawsregs/rulesregs/ regulatingcontaminants/basicinformation.cfm (last visited Apr. 21, 2014).

[190] *See* ECKSTEIN & SHERK , *supra* note 11, at 46.

[191] *See* 42 U.S.C. § 300h-7 (2006).

[192] *Id.* § 300h-7(e).

[193] ECKSTEIN & SHERK, *supra* note 11, at 46.

PPCP leachate from septic systems and address PPCPs in wastewater treatment residual sludge. A second way to mitigate the migration of PPCPs into groundwater supplies would be to amend the Underground Injection Control Program (UICP),[194] which would insulate groundwater from leachate and other contaminates. The UICP could be amended to restrict injection of wastes containing PPCPs to Class I wells beneath the lowermost underground source of drinking water[195] to prevent migration into drinking water supplies. Both of these initiatives would require EPA to impose new operational requirements on state and local water suppliers and environmental agencies, which is easier said than done.

C. *Clean Water Act*

The purpose of the Clean Water Act (CWA)[196] is to "restore and maintain the chemical, physical and biological integrity" of the nation's surface water resources.[197] Of particular relevance for this Article, CWA specifically protects the aquatic organisms of surface water ecosystems from pollutants that disrupt their procreation.[198] Based on that provision alone, even without further evidence of human health impacts from PPCPs, CWA would seem to readily apply to the PPCP problem because of the disruptive character of PPCPs on the sexual development of aquatic organisms. Nonetheless, the purpose of CWA would be stymied if EPA were to pursue PPCPs under its operational requirements. The main hurdles to addressing the PPCP problem with CWA are limited statutory enforcement mechanisms. CWA applies pretreatment standards to point sources of effluent emissions, yet the point sources of PPCP pollution are not apt for pretreatment and the majority of PPCP pollution comes from nonpoint sources.[199] Further, no water quality standards have been developed for PPCPs, and it is not clear whether they should be developed on an individual basis (which would be administratively

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194 For current UICP requirements, see 42 U.S.C. § 300h.

195 *See* 40 C.F.R § 146.5 (2012).

196 *See* Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251–1387 (2006).

197 *Id.* § 1251(a).

198 *See id.* § 1251(a)(2).

199 *See id.* (defining "nonpoint source" against the statutory definition of "point source").

onerous) or as a class of contaminants (which would depend upon risk assessment that is yet to occur). Despite the applicability of CWA to surface water contamination, the nefarious PPCP problem defies regulation under its procedures. It is not clear if unique control technologies have to be developed for each PPCP, or if, more generally, "the development and use of new wastewater treatment technology should be a condition precedent to the issuance of National Pollution Discharge Elimination System (NPDES) permits."[200] Even assuming technological availability for adequate water treatment, it would not be financially feasible to remove *all* EDCs.[201] Lastly, most CWA requirements apply to point sources, while pharmaceutical contamination of surface water comes significantly from nonpoint sources,[202] which is a problem for CWA with respect to nutrients and pesticides as well. Chemicals from personal care products pose water quality concerns in the aggregate, but, like pharmaceuticals, there is no feasibly targetable point source of personal care product contamination.

1. *CWA's Technology-Based Risk Management Framework Applies to Point Sources, but PPCP Pollution Largely Comes From Nonpoint Sources, and Pretreatment of Point Source PPCP Pollution Is Infeasible*

To achieve the law's goal of eliminating all discharges of pollutants into navigable waters of the United States,[203] CWA established the NPDES[204] such that all point source pollution discharges are prohibited unless in compliance with a permit issued under NPDES.[205] NPDES permits strike a federalism balance with two distinct pollution thresholds that dischargers may not pass: technology-based federal effluent limitations and water

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200 ECKSTEIN & SHERK, *supra* note 11, at 44.

201 Keith J. Jones, *Endocrine Disruptors and Risk Assessment: Potential for a Big Mistake*, 17 VILL. ENVTL. L.J. 357, 386 (2006) (arguing that a ban on EDCs might be more feasible than requiring treatment technology); Alana Van der Mude, *Endocrine-Disrupting Chemicals: Testing to Protect Future Generations*, 38 B.C. ENVTL. AFF. L. REV. 509 (2011).

202 Teirney Christenson, Comment, *Fish on Morphine: Protecting Wisconsin's Natural Resources Through a Comprehensive Plan for Proper Disposal of Pharmaceuticals*, 2008 WIS. L. REV. 141, 148 (2008).

203 *See* 33 U.S.C. § 1251(a)(1) (2006).

204 *See id.* § 1342.

205 *Id.* § 1311(a).

quality standards set by the states. These will be discussed in turn.

NPDES permits and effluent limitations would be relevant here, especially for Publicly Owned Treatment Works (POTWs), hospitals, and drug companies. Effluent limitations apply to point sources, exemplified by a pipe dumping waste from a factory into a stream, and defined as a "confined, discernible and discrete conveyance."[206] Effluent pollution from point sources other than POTWs requires the application of the best practicable control technology; if any point source discharges into a POTW, that source must satisfy the applicable pretreatment requirement.[207] Pretreatment is "the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW."[208] Pretreatment for PPCPs from point sources would appear practically (not just legally) necessary given the limitations on POTW treatment methods for PPCPs discussed above.[209] Indeed, the EPA Administrator must promulgate pretreatment standards for the introduction of pollutants into POTWs for those pollutants not susceptible to treatment by the POTWs.[210]

The three point sources of PPCPs (effluent from domestic sewage treatment plants, untreated sewage overflow, and hospital wastes released into domestic sewage systems)[211] probably could not feasibly be subject to pretreatment standards. These point sources are not amenable to pretreatment because (in respective order) (1) they have already undergone treatment that was apparently not effective, (2) effluent emissions from these sources are inadvertent and unpredictable, and (3) treatment standards would be financially onerous and time-consuming to an institution not readily competent in waste treatment.

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206 *Id.* § 1362(14) ("The term 'point source' means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.").

207 *See id.* § 1311(b)(1)(A).

208 40 C.F.R. § 403.3(s) (2011).

209 As much as 93 percent of active drug compounds pass through treatment facilities. *See* Bligh, *supra* note 143, at 56.

210 *See* 33 U.S.C. § 1317(b)(1).

211 Daughton, *supra* note 13.

2. *CWA Has Limited Statutory Enforcement Mechanisms for Nonpoint Sources, Which Comprise the Majority of PPCP Pollution*

With respect to the remaining *nonpoint* PPCP sources, it is not clear how the apparently mandatory pretreatment standards from 33 U.S.C. § 1317(b) could in practice apply to nonpoint or indirect discharges. This is a problem because the vast majority of PPCP chemicals do not enter the water supply through industrial point sources, but rather through myriad nonpoint sources, or commercial facilities for which no pretreatment standards currently exist.[212] PPCPs released into the environment through one of these various pathways can pollute drinking water supplies as nonpoint source pollution, which "is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters."[213] The leading cause of water quality problems today stems from nonpoint sources, with harmful effects on drinking water supplies, recreation, fisheries, and wildlife.[214] Clearly, the PPCP problem cannot be mitigated through point source reductions alone, yet it is difficult to imagine a scenario where pretreatment standards would feasibly apply to a nonpoint source of PPCP contamination such as toilet disposal of unused drugs because of the intrusiveness of such regulations and the difficulty of monitoring or enforcing such standards.

Since effluent and pretreatment standards are hopeless with respect to mitigating nonpoint and indirect discharges of PPCPs, we look to other provisions of CWA for guidance. In order to address nonpoint sources, CWA provides for area-wide waste treatment plans that address municipal and industrial waste treatment needs of a region[215] and state management programs that require implementation of best management practices.[216] Indeed, area-wide and regional waste treatment plans, in tandem with take-back initiatives by local healthcare-related facilities, may

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212 *See supra* Part I.A.

213 *What Is Nonpoint Source Pollution?*, EPA, http://water.epa.gov/polwaste/nps/whatis.cfm (last visited Mar. 11, 2014).

214 *See id*.

215 *See* 33 U.S.C. § 1288 (2006).

216 *See id.* § 1329(b).

better address PPCP contamination than federal programs under CWA. The states must prepare reports identifying waters that cannot reasonably be expected to comply with applicable water quality standards without additional control of nonpoint sources of pollution, and categories of nonpoint sources that significantly contribute to pollution in those waters.[217] Until water quality standards are developed for PPCPs, there is no reason for a state to prepare such a report, so states are currently not accountable for monitoring levels or sources of nonpoint PPCP discharges under CWA.

3. *Cumulative and Synergistic PPCP Impacts on Water Quality Frustrate Pollutant-specific Statutory Mechanisms under CWA*

An alternative means of controlling water pollution under CWA is obtained by the designation of uses for water bodies (at minimum, the "fishable, swimmable" standard)[218] and then by setting water quality criteria to protect those uses.[219] CWA creates a presumption in favor of the fishable/swimmable standard,[220] which is derived from the statutory language: "provides for the protection and propagation of fish . . . and recreation in and on the water."[221] CWA instructs each state to adopt water quality standards for all waters within its territory.[222] CWA requires water quality criteria to be expressed in scientifically defensible numeric terms[223] unless this is impracticable, in which case criteria should be expressed in narrative terms.[224] Because of the scientific uncertainty regarding the dosage-response curve for each PPCP chemical, a generic numeric water quality criterion applicable to all PPCPs would be inappropriate. Because of the wide range of PPCPs in surface waters, individualized numeric criteria for each

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217 *See id.* § 1329(a)(1).

218 *See id.* § 1251(a)(2).

219 *See NRDC v. EPA*, 16 F.3d 1395, 1400 (4th Cir. 1993) (utilizing this approach to setting water quality standards).

220 *See* 40 C.F.C. § 131.10(g) (2011) (requiring states wishing to deviate from the fishable/swimmable standard to demonstrate that the standard is unattainable or that implementing the needed pollution controls would cause substantial and widespread economic hardship).

221 33 U.S.C. § 1251(a)(2).

222 *See id.* § 1313(a).

223 *See* 40 C.F.R. § 131.11(b)(1).

224 *See id.* § 1311(b).

PPCP would be administratively impracticable. For these reasons, narrative criteria, such as a virtual prohibition of pharmaceutical contamination, would be legally justified. Whether they would be politically or economically justified is another matter. The key here is that because of the complex nature of the PPCP problem, the regulator would be backed into a position of establishing a narrative water quality criterion ("No PPCPs in the water") because a numeric criterion is by definition scientifically indefensible. It is hard to imagine any regulator taking this position on PPCPs in the absence of a salient catastrophe that would justify precautionary measures in the eyes of a public more concerned with the cost of water than the technicalities of toxicology. This is exactly what most states did for more conventional toxics ("no toxic[] [pollutants] in toxic amounts") for decades until EPA started forcing them to change over to numeric standards.[225] However, PPCPs have so far received a different response at the state and federal levels relative to conventional toxics.

Standards and designated uses under the state water quality programs are subject to EPA approval[226] and are often based on National Recommended Water Quality Criteria.[227] If EPA were to revise the National Recommended Water Quality Criteria to establish limitations for PPCPs (as some have argued they are under a mandatory duty to do),[228] emitting PPCPs without a NPDES permit would be prohibited.[229] If a water body is not meeting the applicable water quality standard, the state must develop a strategy to bring that water body into compliance, usually through development of total maximum daily loads (TMDLs) that identify the acceptable amounts of pollutant entering the water as well as through allocation of acceptable

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225 *Water Quality Standards History*, EPA, http://water.epa.gov/scitech/swguidance/standards/history.cfm (last visited Sept. 16, 2014).

226 *See* 33 U.S.C. § 1313(c).

227 *National Recommended Water Quality Criteria*, EPA, http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm (last visited Jan. 8, 2013).

228 *See* Jacki Lopez, *Endocrine-Disrupting Chemical Pollution: Why the EPA Should Regulate These Chemicals Under the Clean Water Act*, 10:3 SUSTAINABLE DEV. L. & POL'Y 19, 22 (2010), *available at* http://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1045&context=sdlp.

229 *See* 33 U.S.C. § 1311(a).

pollutant loads among various sources.[230] TMDLs are usually necessary because pollution control technologies applicable to point sources alone are insufficient to meet water quality standards; instead, nonpoint sources like agricultural runoff contribute to a water body's nonattainment. TMDLs are developed on a pollutant-by-pollutant basis.[231] Like SDWA, CWA's application of standards on a pollutant-specific basis could allow the cumulative, synergistic adverse health effects of PPCPs to dodge its regulatory scope.

New York State's Department of Environmental Conservation (NYS DEC) has adopted water quality standards for most of the state's surface waters[232] that meet or exceed the fishable/swimmable standard.[233] Pursuant to CWA, NYS DEC could issue water quality criteria that limit levels of PPCP contamination requisite to protect fish populations from developmental and breeding disruptions.[234] Given the documented impact of PPCPs on aquatic biota, attainment of this standard would be jeopardized by the presence of PPCPs. However, CWA suffers from several shortcomings with respect to PPCPs. The technology requirements under the NPDES program would be futile given the lack of economically feasible technology to treat PPCPs. Further, these standards apply only to point sources, and PPCPs enter the environment through multiple nonpoint sources (hence the importance of total maximum daily load requirements). If water quality standards were developed for PPCPs and water bodies were found in non-attainment, the heavy lifting of pollution control would have to come from TMDLs applicable to nonpoint sources. The problem then would be the proliferation of TMDLs, because one would have to be developed for each pollutant. In general, CWA would require treatment technologies that water

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230 *See* 40 C.F.R. § 130.4 (2011).

231 *See* 33 U.S.C. § 1313(d)(1)(C); *What is a TMDL?*, EPA, http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/overviewoftmdl.cfm (last visited Sept. 16, 2014).

232 *See* N.Y. COMP. CODES R. & REGS. tit. 6, §§ 700–706 (2011).

233 *See id.* §§ 701.2–701.7 (2011) [hereinafter N.Y. ENVTL. CONSERV. LAW].

234 *See* N.Y. ENVTL. CONSERV. LAW § 17-0301(4) (McKinney 2013) ("The department . . . shall adopt and assign standards of quality and purity . . . . Such standards shall prescribe what qualities and properties of water shall indicate a polluted condition of the waters of the state which is actually or potentially deleterious, harmful, detrimental or injurious to the public health, safety or welfare, to terrestrial or aquatic life or the growth and propagation thereof.").

suppliers would not be capable of implementing or, on the other hand, TMDLs that do not address the synergistic, cumulative effects of PPCPs on aquatic biota and human health. Despite CWA's apparent fit with the PPCP problem, the statute's technical requirements render its provisions largely infeasible to administer in the PPCP context.

D. *Resource Conservation and Recovery Act*

One purpose of the Resource Conservation and Recovery Act (RCRA)[235] is to protect environmental integrity and human health from hazards posed by industrial and commercial waste disposal practices.[236] Solid waste is defined as any "discarded material" that is not domestic sewage, or already regulated point source industrial discharges subject to CWA permitting.[237] Thus, PPCP-contaminated sludge left over from POTW treatment would constitute solid waste within the meaning of RCRA because it is not domestic sewage (although it was originally, it is arguably no longer "domestic" once it has been subject to municipal treatment) and it is not subject to CWA's biosolids rule.[238] However, only solid waste that is potentially dangerous to human health or the environment is classified as hazardous.[239] Because PPCP chemicals can be endocrine disruptors that are dangerous to human health and the environment, biosolids containing PPCPs could constitute hazardous solid waste under RCRA if the PPCPs therein meet EPA's regulatory definitions of a hazardous waste.[240]

A flexible approach under RCRA that had been proposed by EPA—the Universal Waste Rule—has been jettisoned, according to reviewers of this article, because of adverse comments received by EPA during the notice and comment period. Even though RCRA is generally not applicable to water quality issues, RCRA does apply to land-application of hazardous waste found in

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235 *See* Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901–6992k (2006).

236 *See id.* § 6902(a).

237 *See id.* § 6903(27); ENVTL. LAW INST., ENVIRONMENTAL STATUTES OUTLINE 15 (Michael O'Grady ed., 4th ed. 2007).

238 *See supra* Part III.D.2.

239 *See* Resource Conservation and Recovery Act, 42 U.S.C. § 6903(5); ENVIRONMENTAL LAW INSTITUTE, *supra* note 237, at 15.

240 *See* 40 C.F.R. §§ 261.20–.35 (2011) (presenting characteristics and lists of hazardous wastes).

biosolids, thereby also applying to PPCPs found in solid waste. However, the statutory definition of "hazardous" is broader than the regulatory definition of "hazardous,"[241] so substances like PPCPs in water that pose a hazard to human health only when they bioaccumulate may not be subject to regulation unless they are intrinsically hazardous. Additionally, many of the sources of PPCP contamination are exempt from RCRA because of EPA's narrow interpretation of "hazardous."[242]

1. *The Universal Waste Rule Would Help Reduce PPCP Pollution but Has Been Jettisoned*

EPA proposed a Universal Waste Rule for hazardous pharmaceuticals in 2008.[243] While this rule would not apply to personal care products, it was a promising start to addressing pharmaceutical contamination source reduction. The hazardous waste provisions of RCRA (discussed below) do not yet apply to the lion's share of PPCPs, which is where the Universal Waste Rule would come in to capture pharmaceutical waste streams from healthcare facilities.[244] The Universal Waste Rule appears to be an efficient, affordable, and relatively less onerous means of reducing pharmaceutical contamination because it would ease existing regulatory burdens and facilitate proper pharmaceutical disposal. The rule would apply to "pharmacies, hospitals, physicians' offices, dentists' offices . . . outpatient care centers, ambulatory health care services, residential care centers, veterinary clinics," and other facilities that generate hazardous pharmaceutical waste.[245] This rule would capture a significant volume of pharmaceutical waste without imposing the potentially onerous requirements of RCRA Subtitle C (discussed below), and without interfering with CWA regulation of pharmaceutical manufacturing or production facilities. The purpose of pursuing pharmaceutical waste through the Universal Waste Rule rather than through Subtitle C is to "mak[e] it easier for universal waste handlers to

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241 N.Y. COMP. CODES R. & REGS., *supra* note 231; N.Y. ENVTL. CONSERV. LAW, *supra* note, 232.

242 *See infra* Part III.D.3.

243 *See* Amendment to the Universal Waste Rule: Addition of Pharmaceuticals, 73 Fed. Reg. Vol. 73,520 (proposed Dec. 2, 2008, never finalized).

244 *See id.*

245 *Id.*

collect these items and send them for proper disposal . . . [which] may lead to better management of these wastes by providing a more streamlined, and effective waste management system."[246]

Some PPCPs become harmful after biodegradation and synergism with other chemicals in the environment, not because they possess intrinsically hazardous characteristics. The environmental and human health benefits of a Universal Waste Rule for pharmaceuticals would flow from the removal of the increment of unregulated pharmaceutical waste from wastewater treatment plants and municipal solid waste landfills by allowing the public to dispose of personal medications at specified collection facilities. The Universal Waste Rule would "modif[y] requirements for storage, labeling and marking, shipment offsite, employee training, responses to releases, and notification" in order to authorize such disposal.[247] This would reduce disposal costs of regulated entities between $33.9 million and $35.2 million per year.[248] Another benefit of this tactic is that facilities can opt into the Universal Waste Rule as a "handler" of universal waste in order to receive and consolidate waste from generators.[249] This distinction makes a difference. The handler of pharmaceutical universal waste (relative to a hazardous waste generator) gets "1) an increased accumulation threshold; 2) an increased on-site accumulation limit; 3) an increased storage time limit; 4) no manifest requirement; and 5) [reduced] basic training requirements."[250] One limitation to this approach is that, because the Universal Waste Rule would be less stringent than RCRA Subtitle C (discussed below), modification of waste disposal programs is not required, so the regulated community would not have this option unless their state adopted the Universal Waste Rule.[251] The Universal Waste Rule shows some promise in addressing the pharmaceutical side of the PPCP problem, but its effectiveness is contingent on states taking a proactive step to address the issue and adopt the rule. Even if all the states were to

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246 *Id*. at 73,522.
247 *Id*. at 73,528.
248 *Id*. at 73,539.
249 *Id*. at 73,533.
250 *Proposed Universal Waste Rule for Pharmaceuticals*, EPA, http://web.archive.org/web/20120617153348/http://www.epa.gov/wastes/hazard/wastetypes/universal/pharm-rule.htm (last visited Sept. 16, 2014).
251 *See* 73 Fed. Reg. Vol. 73,520, 73,538–39.

take this step to address pharmaceutical waste, a significant portion of PPCP waste would continue to enter the environment from other consumer products.[252]

EPA has neither implemented the Universal Waste Rule nor dealt with PPCPs that are not intrinsically hazardous. The public comments on adding hazardous pharmaceutical waste to the Universal Waste Rule reflected "numerous concerns over the lack of notification requirements for those facilities that generate, handle or transport 'universal waste' pharmaceuticals as well as for the lack of tracking requirements for the shipment of these wastes."[253] Ironically, the Universal Waste Rule was designed to be a flexible alternative to RCRA Subtitle C, and yet the gravamen of the public comments was that the proposed rule was not as stringent as RCRA Subtitle C's cradle-to-grave requirements. EPA went back to the drawing board to develop a new proposal for "healthcare facility-specific management standards for hazardous waste pharmaceuticals" that pertains only to those pharmaceutical wastes that "meet the current definition of a RCRA hazardous waste."[254] The vast majority of pharmaceuticals do not meet this regulatory definition of "hazardous waste," so the scope of this rule—if it comes to pass—will be extremely narrow. This is an example of the perfect being the enemy of the good: the Universal Waste Rule could have been a significant improvement in management of general pharmaceutical waste from healthcare facilities, but it has been scrapped in favor of a much more narrow rule.

2. *RCRA's Technology-Based Risk Management Framework Could, but Currently Does Not, Apply to Land Application of Biosolid Waste that Includes PPCP Pollution*

RCRA and CWA have the effect of dividing pollution between land and water, respectively: RCRA applies almost exclusively to disposal of wastes on land, not water pollution per se. Nonetheless, RCRA is relevant to the water pollution problem identified in this Article because land application of wastes that

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[252] *See supra* Part I.A (describing the various sources of PPCP contamination).

[253] *Management of Hazardous Waste Pharmaceuticals*, EPA, http://www.epa.gov/waste/hazard/generation/pharmaceuticals.htm (last visited Dec. 9, 2013).

[254] *Id*.

contain PPCPs, such as sludge left over from POTW wastewater treatment processes, can become an indirect or nonpoint source of water contamination.

Biosolids are the nutrient-rich organic materials resulting from the treatment of sewage sludge (the name for the solid, semisolid or liquid untreated residue generated during the treatment of domestic sewage in a treatment facility).[255] When treated and processed, sewage sludge becomes biosolids, which can be safely recycled and applied as fertilizer to sustainably improve and maintain productive soils and stimulate plant growth.[256]

This appraisal of the recycling potential of biosolids does not take into account that sludge from POTWs can be contaminated with residual PPCP chemicals that were not broken down in the treatment process. Of course, "[o]nly biosolids that meet the most stringent standards spelled out in federal and state rules can be approved for use as a fertilizer";[257] yet this is of little comfort with no extant regulations applicable to PPCPs. And even when biosolids are not recycled as fertilizer, they are either incinerated or buried in landfills.[258] Obviously, these disposal options create environmental costs of their own: incineration creates air pollution concerns, and landfilling PPCP-laden biosolids will result in leachate from the leachate collection systems to be sent off to POTWs for treatment (where the PPCP residue passes through, virtually unfiltered).[259]

RCRA prohibits disposal of uncontained liquid hazardous waste in landfills,[260] and bans land disposal of certain hazardous wastes unless it can be demonstrated that there will be no migration of hazardous constituents.[261] If some PPCPs were listed as hazardous, or determined hazardous based on their

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255 *See Water: Sewage Sludge (Biosolids)*, EPA, http://water.epa.gov/polwaste/wastewater/treatment/biosolids/genqa.cfm (last visited Apr. 21, 2014).

256 *Biosolids Compliance Monitoring*, EPA, http://www.epa.gov/oecaerth/monitoring/programs/cwa/biosolids.html (last visited June 17, 2013).

257 *See* EPA, *supra* note 255.

258 *See id.* ("Local governments make the decision whether to recycle the biosolids as a fertilizer, incinerate it or bury it in a landfill.").

259 *See* Bligh, *supra* note 143, at 56 ("[T]reatment processes do not completely eliminate active drug residue. In fact, the efficiency of wastewater treatment processes to eliminate active drug compounds is as low as 7 percent.").

260 *See* 42 U.S.C. § 6924(c) (2006).

261 *See id.* § 6924(d)–(e).

characteristics, these provisions would apply to keep POTW sludge from coming into contact with agricultural land and out of landfills. RCRA imposes minimum treatment standards for hazardous waste before it can be land disposed through setting numeric limits or through specifying treatment technologies such as combustion or stabilization.[262] Further, EPA developed minimum technology standards for disposal sites, including new landfills and surface impoundments, which could help limit the migration of PPCPs into drinking water supplies.[263] Unfortunately, without characterizing individual PPCP products as hazardous (to be discussed next), the manifesting and disposal requirements of RCRA would not apply to waste streams laden with PPCPs.

Even if these requirements were technically feasible, subjecting generators and treatment, storage, and disposal facilities (TSDFs) of PPCP waste to RCRA regulation could create perverse incentives for increased drug flushing and illegal dumping of hazardous wastes as the waste generators and waste management entities try to avoid costly and burdensome requirements.[264] The Universal Waste Rule, discussed above, is a way to apply RCRA without leading to this result.

3. *Despite Potential Hazards, PPCP Pollution Is Not "Hazardous" Waste under EPA's Narrow Regulatory Definition, thereby Exempting Sources of PPCP Contamination*

RCRA established a "cradle to grave" program to regulate the management of hazardous waste,[265] while leaving non-hazardous solid waste primarily subject to state regulation.[266] The primary legal hook of RCRA is Subtitle C, which imposes strict controls on the management of "hazardous"[267] "solid waste."[268] These

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262 40 C.F.R. Part 268 requires waste handlers to treat hazardous waste or meet specified levels for hazardous constituents before disposing of the waste on the land. Treatment standards are found in Subpart D.

263 40 C.F.R § 264.301 (2011).

264 *See* George J. Mannina, Jr., *Medicines and the Environment: Legal and Regulatory Storms Ahead?*, LEGAL BACKGROUNDER, Mar. 24, 2006, at 4, *available at* http://www.wlf.org/upload/032406LBmannina.pdf (noting that provisions in RCRA and Drug Enforcement Administration regulations may encourage the flushing of pharmaceuticals).

265 *See* 42 U.S.C. §§ 6901–6992k.

266 *See id.*

267 A waste is "hazardous" if it is:

statutory definitions would seem to apply to PPCPs in waste (solid, liquid, or sludge) generated by water supply treatment plants, waste treatment plants, agricultural waste, PPCP manufacturing, and healthcare facilities. The statutory definition of "hazardous" would apply to PPCPs with endocrine-disrupting potential under the statutory health-related provision,[269] or pharmaceuticals that exhibit hazardous characteristics of ignitability (if they contain more than 24 percent alcohol), corrosivity (strong acids or strong bases), reactivity (like nitroglycerine), or toxicity (if they use heavy metals).[270] Of course, not all PPCPs with endocrine-disrupting potential are hazardous wastes. The statutory definition is broader than the regulations, leaving many PPCP chemicals unregulated.

RCRA provides EPA broad authority to develop regulations for hazardous waste. Some pharmaceuticals are listed on the "P" list (chemicals considered acutely hazardous regardless of concentration) or the "U" list (chemicals considered hazardous at higher concentrations).[271] Commercial chemical product (CCP) ingredients used in pharmaceuticals may be regulated under RCRA if they "are disposed of unused and are explicitly designated as acutely hazardous (P-listed) or toxic (U-listed) by the RCRA

> a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Id. § 6903(5).

[268] A waste is "solid waste" if it is:

> any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under [the Clean Water Act or certain materials covered under the Atomic Energy Act].

Id. § 6903(27).

[269] *Id.* § 6903(5).

[270] *See* Amendment to the Universal Waste Rule: Addition of Pharmaceuticals, 73 Fed. Reg. 73,520, 73,523 (proposed Dec. 2, 2008, never finalized).

[271] *See* 40 C.F.R. § 261.33 (2012).

regulations"; these listed chemicals "are considered hazardous materials and must be disposed of accordingly."[272] A drug is considered a P- or U-listed hazardous waste if its sole active pharmaceutical ingredient is listed.[273] Those substances that are listed as hazardous or that exhibit a hazardous waste characteristic, if generated in large enough quantities,[274] are subject to RCRA regulation if disposed of by non-household facilities like a hospital or other medical facility.[275] Further, RCRA empowers EPA to enact regulations "to assure that substances identified or listed [as hazardous] which pass through a sewer system to a publicly owned treatment works are adequately controlled to protect human health and the environment."[276] In theory, there are limits on what can go down the drain—no ignitable hazardous waste, for example—though enforcement levels are questionable. Regulations require notification to the local POTW, the state environmental regulatory agency, and the regional EPA waste management division director if any amount of P-listed waste is sewered and if fifteen kilograms or more of a U-listed or characteristic hazardous waste is sewered in a calendar month.[277]

Environmental advocacy groups could petition EPA to add additional PPCPs to the P or U lists based on their hazardous characteristics. The listing of hazardous drugs "has not been substantially updated since the rules went into effect in 1976."[278] There are currently thirty-one chemical products on the P and U lists with pharmaceutical uses, but this number does not completely represent the total number of brand name pharmaceuticals that may actually be listed as hazardous wastes.[279] Additionally, RCRA could help provide information

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[272] *See* MAE WU ET AL., *supra* note 148, at 13.

[273] *See* Lisa Lauer, *RCRA and Pharmaceutical Waste Management: A Brief Federal Overview*, OFFICE OF RES. CONSERVATION AND RECOVERY 16–21, http://www.deq.state.ok.us/lpdnew/HW/PharmaceuticalWaste/RCRAAndPharmaceuticalWasteMan.pdf (last visited Mar. 11, 2014).

[274] *See* 40 C.F.R. Part 260. Different regulations apply based on monthly volume of waste generated.

[275] *See id.* § 262.20.

[276] 42 U.S.C. § 6939(b) (2006).

[277] *See* 40 CFR § 403.12(p). These provisions are under CWA, rather than RCRA, regulations.

[278] Christenson, *supra* note 202, at 150.

[279] Amendment to the Universal Waste Rule: Addition of Pharmaceuticals, 73 Fed. Reg. 73,520, 73,522, 73,526 n.26 (proposed Dec. 2, 2008, never finalized).

about the scope of PPCPs and their ultimate fate in the environment through the Uniform Hazardous Waste Manifest System, applicable to hazardous waste generators and operators of TSDFs, which tracks hazardous waste from "cradle to grave."[280] EPA has not exercised its full authority under RCRA, and does not regulate all hazardous materials under this law—"a number of pharmaceuticals have developed since RCRA was enacted, including perhaps one hundred chemotherapy drugs that should be but are not regulated as hazardous."[281]

Although all RCRA requirements for hazardous waste generation, storage, and treatment apply prior to drain disposal, there are built-in limits to the scope of Subtitle C's application to the domestic context where individual users flush their drugs. Because RCRA exempts residential or household users from its regulations, PPCPs are not regulated by EPA if they are disposed by an individual household.[282] That said, where not preempted, states may develop regulations that are more stringent than federal rules. Because of the Domestic Sewage Exclusion and the potential overlap with CWA wastewater standards, respectively, RCRA does not apply to *domestic* waste (passing from sewage system to POTW), or to *industrial* wastewater discharges already subject to CWA point source standards. It would appear these exclusions apply even if those wastes would otherwise be regulated based on their hazardous characteristics. The Domestic Sewage Exclusion stipulates that hazardous waste discharged to POTWs via a general use sewer system is not a "solid" waste within the meaning of RCRA (which regulates *solid* waste),[283] and therefore by definition domestic sewage is not a "hazardous waste" subject to RCRA. For domestic sewage (including, for our purposes, PPCPs dumped down the drain by individual drug users) to be subject to RCRA, there would have to be a sewage line leakage where hazardous waste reached the environment (a potential basis for an imminent and substantial endangerment lawsuit).[284] The Domestic

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280 *See* 40 C.F.R. § 262.20.

281 MAE WU ET AL., *supra* note 148, at 13.

282 *See* 40 C.F.R. § 261.4(b)(1).

283 *See* 40 C.F.R. § 261.4(a)(1)(ii).

284 RCRA allows any person to file suit in federal court against any person, "who has contributed or is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment."

Sewage Exclusion's purpose was to prevent dual regulation, since it applies where RCRA stops and CWA begins. CWA regulations do not allow the discharge of a chemical that causes interference or pass-through problems with the receiving POTW, unless the discharger has an affirmative defense, such as a POTW Pretreatment Program.[285] However, in this case, there are not any applicable federal CWA pre-treatment standards for PPCPs. Hence, a regulatory gap between RCRA and CWA exists with respect to PPCPs introduced into the environment by domestic drain disposal.

Although the so-called "mixture rule" would subject to RCRA regulation a mixture of a listed hazardous waste with a solid waste[286] (to prevent attempts at dilution from escaping the ambit of the law), this rule may not apply to domestic drain disposal. For the mixture rule to apply, the *mixture* must exhibit the hazardous characteristics of the hazardous waste product, and must contain more than *de minimis* amounts of hazardous constituents.[287] If the listed hazardous waste were listed solely for a hazardous waste characteristic and the resulting mixture no longer exhibited that characteristic, then the mixture would not be "hazardous waste."

Another limitation to the applicability of RCRA's hazardous waste provisions stems from the nature of PPCP contamination. Individual PPCP substances may not be intrinsically hazardous according to the statutory definition, but may become so as a result of intermixing with other PPCPs and breaking down in the environment. As long as characterization analysis and listing is done on a substance-specific basis, the hazards of cumulative exposure may escape RCRA's application. The ideal application of RCRA here is to keep hazardous waste from entering the environment in the first place, so that the cumulative or synergistic potential of PPCP contaminants never manifests. In order for RCRA to address PPCPs, the trigger for subjecting a chemical to cradle-to-grave hazardous waste regulation should be based on what hazardous potential exists in cumulative, synergistic, chronic, and low-dose exposure once released into the environment, rather than substance-specific risk assessment.

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42 U.S.C. § 6972(a)(1)(B) (2006).

285 *See* Prohibited Discharge Standards, 40 C.F.R. § 403.5.

286 *See* 40 C.F.R. § 261.3(a)(2).

287 *See id.*

E. *Toxic Substances Control Act*

The Toxic Substances Control Act[288] (TSCA) was enacted to identify and control potentially dangerous chemical supply chains that had not adequately been addressed by existing environmental laws.[289] Given the imperfect fit, or rather inapplicability, of the other environmental statutes discussed in this Article, TSCA would seem to function as a catchall for substances like PPCPs. Importantly, this law would seem to apply to the chemicals used in pharmaceuticals as well as personal care products; however, it does not apply to drugs, cosmetics, or devices themselves because of the overlapping authority of FDA under the FDCA.[290] TSCA regulates chemical products themselves rather than the disposal of wastes containing those products. The limits of TSCA's applicability to the PPCP problem stem from statutory constraints on EPA's authority.

1. *TSCA Empowers EPA to Regulate PPCPs Only in Theory*

TSCA would seem to accomplish for PPCPs what FDA complying with NEPA would accomplish: forcing PPCP producers to provide information about the adverse environmental consequences of a chemical before it is introduced into the market. Title I of TSCA puts the burden of testing for risk on the manufacturers and processers of chemicals if: (1) any aspect of the production and supply chain of the chemical "may present an unreasonable risk of injury to health or the environment;" (2) production of the chemical occurs "in substantial quantities," and the risk for release into the environment or human exposure "is substantial or significant"; and (3) "existing data are inadequate to predict" the adverse effects of environmental contamination and

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288 *See* Toxic Substance Control Act, 15 U.S.C. §§ 2601–2692 (2006).

289 *See* COUNCIL ON ENVTL. QUALITY, TOXIC SUBSTANCES v–vi (1971); *see also* Linda Schierow, *Toxic Substances Control Act*, *in* CONG. RESEARCH SERV., ENVIRONMENTAL LAWS: SUMMARIES OF ENVIRONMENTAL LAWS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY 87, 88 (2010).

290 *See* 15 U.S.C. § 2602(2)(A) (defining "chemical substance" as "any organic or inorganic substance of a particular molecular identity"); *id.* § 2602(2)(B)(vi) (exempting from the definition of "chemical substance" "any food, food additive, drug, cosmetic, or device (as such terms are defined in section 201 of the Federal Food, Drug, and Cosmetic Act [21 U.S.C. 321]) when manufactured, processed, or distributed in commerce for use as a food, food additive, drug, cosmetic, or device").

human exposure."[291]

This appears to be a perfect fit for PPCPs in the nation's drinking water supplies: PPCPs may present an unreasonable risk of injury, are produced in substantial quantity, and have a clear potential for release and exposure (because "actual" entails "potential"), and one of the most certain things about PPCPs is the limitation of data about their adverse impacts. The testing requirements can include risk-based toxicity tests and exposure-based tests for long-term, low-level, cumulative exposure.[292] Chemicals leading to genetic changes or birth defects, such as known carcinogens, mutagens, or teratogens, receive higher testing priority.[293] TSCA could be used to provide additional information about environmental and human health impacts of chronic, low-level exposure to PPCPs.

At least as the law is written, the burden of producing this information would lie on upstream actors who manufacture, process, distribute, use, and dispose of PPCPs. This burden is supported by dicta in the so-called "Benzene Case" (discussed below).

2. *TSCA Would Require More Mature Risk Assessment for PPCPs than Is Currently Available*

In *Industrial Union Department, AFL-CIO v. American Petroleum Institute*, 448 U.S. 607 (1980) (the "Benzene Case"), a plurality of the Supreme Court decided the legality of a standard for benzene (a carcinogen) exposure set by the Occupational Safety and Health Administration "that places the most stringent limitation on exposure to benzene that is technologically and economically possible."[294] Although the Benzene case arose under the administration of a different statute and concerned a different agency, it remains relevant for EPA's risk management decisions under TSCA, particularly in the PPCP context, since the same substantive standard (significant risk of human harm) applies,[295]

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[291] *Id.* § 2603(a), (b)(3)(a).

[292] *See* Stanley W. Landfair, *Toxic Substances Control Act*, *in* ENVIRONMENTAL LAW HANDBOOK 607, 644 (2007).

[293] *See id.* at 643.

[294] Indus. Union Dep't, AFL-CIO v. Am. Petroleum Inst., 448 U.S. 607, 611 (1980) (plurality opinion).

[295] *See* 15 U.S.C. § 2603(f) (2011) ("Upon the receipt of [data] . . . which indicates to the Administrator that there may be a reasonable basis to conclude

and risk management decisions must be made in a state of relative scientific uncertainty. The main issue in applying this standard for purposes of agency oversight is "how to define and allocate the burden of proving the significance of the risk in a case such as this, where scientific knowledge is imperfect and the precise quantification of risks is therefore impossible."[296] Typically, the burden of proof is on the agency promoting a new rule, but sometimes, in the case of regulatory proceedings for toxic substances, "Congress has shifted the burden of providing that a particular substance is safe onto the party opposing the proposed rule."[297]

Despite this apparent burden shifting, TSCA is considered one of the least effective federal regulatory statutes ever, with many calls for its reform,[298] because the threshold for regulation is exceptionally high.[299] EPA has not regulated many chemicals under TSCA. A major limitation to the applicability of TSCA's regulatory requirements on EPA is that they are triggered only if a chemical *will* present an unreasonable risk of injury to health or the environment.[300] Thus, EPA is required to protect against risks from manufacturing, processing, distribution, use, and disposal of a chemical only if this demonstration has been made. Once this high threshold for harm has been demonstrated, however, the EPA's authority is broad: the unreasonably risky chemical can be prohibited from use, limited in amounts of production or distribution, limited by concentration, accompanied by warning labels, subject to record-keeping and disposal requirements, and so on.[301] These extensive grants of authority under TSCA—specifically, the power to prohibit production—appear to exceed the EPA's authority over hazardous waste under RCRA Subtitle C.

Notwithstanding this sweeping authorization to regulate

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that a chemical substance or mixture presents or will present a *significant risk* of serious or widespread harm to human beings from cancer, gene mutations, or birth defects, the Administrator shall . . . initiate appropriate action . . . .") (emphasis added).

296 *Id.* at 653.

297 *Id*.

298 *See* R.A. Denison, *Ten Essential Elements in TSCA Reform*, 39 ENVTL. L. REP. 10,020, 10,021 (2009) ("As recognition of . . . problems [with TSCA] has increased, calls for reforming TSCA have become more urgent.").

299 *Id*. at 1.

300 *See* 15 U.S.C. § 2605(a).

301 *See id*.

chemicals throughout the national market, TSCA limits EPA's authority so severely that there is little room to maneuver. EPA is enjoined to use only the "least burdensome" regulatory choices under TSCA, even when dealing with chemicals that pose an unreasonable risk.[302]

Of all the laws surveyed, TSCA would appear (to those unfamiliar with its lackluster history) to be the most promising for the PPCP problem, with the fewest inherent limitations. However, as is the case with the other laws surveyed, TSCA applies on a chemical-specific basis, rather than to PPCPs as a class. It is not clear that a potential disposal problem associated with a chemical would justify EPA's decision under TSCA to prevent that product from reaching the market. Lastly, given that EPA has done so little under TSCA, it is unlikely that this law would be the statute of choice if and when the agency decides to affirmatively regulate the chemicals used in PPCPs.

F. *Pollution Prevention Act*

According to the 1990 Congress, industry had not been taking advantage of significant opportunities for source reduction and prevention of pollution despite the availability of "cost-effective changes in production, operation, and raw materials use."[303] This was owing in part to the fact that "existing regulations, and the industrial resources they require for compliance, focus upon treatment and disposal, rather than source reduction" of pollutants and "do not emphasize multi-media management of pollution."[304] Congress responded to the historical lack of attention given to source reduction strategies with a precatory call for risk management based on a policy of prevention, noting that "[s]ource reduction is fundamentally different and more desirable than waste management and pollution control."[305] This law is based on the cost-effectiveness risk management framework, which aims to accomplish a general objective at the lowest cost given a fixed budget.[306] However, the non-binding nature of the Pollution Prevention Act (PPA) means any attempt to apply its policies to

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302 *Id.*

303 42 U.S.C. § 13101(a)(2) (2006).

304 *Id.* at § 13101(a)(3).

305 *Id.* § 13101(a)(4).

306 *See* LAVE, *supra* note 58, at 19 (discussing how cost-effectiveness refers to "accomplishing some general objective at lowest cost").

the PPCP problem without a specific mandate from Congress would require voluntary action on the part of EPA.

1. *PPA's Policy of Source Reduction Is not Mandatory*

The principles of pollution prevention are stated as if they were a mantra in the declaration of policy of the 1990 Pollution Prevention Act: in general, pollution should be "prevented or reduced at the source whenever feasible."[307] Principles of pollution prevention follow a common-sense approach to risk management that attempts to eliminate adverse impacts at their source when feasible. The main limitation to the Pollution Prevention Act in addressing PPCPs is the fact that the law has "no teeth"—it is discretionary, not mandatory.

2. *PPA Provides Limited Authority to Address Environmental Attributes of PPCP Products*

"Source reduction," the primary policy objective under PPA for EPA, means any practice that reduces the amount of pollution entering any waste stream prior to disposal, thereby reducing the hazard to public health and the environment associated with the release of that pollution.[308] According to PPA, source reduction includes: "equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control."[309]

Based on this excerpt from the definition, it could be argued that PPA empowers EPA to encourage product redesign that does not lead to the endocrine-disrupting drinking water contamination problems that stem from currently approved PPCPs. This broad definition of "source reduction" would seem to allow EPA intervention into industrial processes, product design, sourcing decisions, and inventory management. However, the next

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307 42 U.S.C. § 13101(b) ("[P]ollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.").

308 42 U.S.C. § 13102(5)(A)(i)–(ii).

309 *Id.* § 13102(5)(A).

provision in the same definition makes clear that "'source reduction' does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a hazardous substance, pollutant, or contaminant through a process or activity which itself is not integral to and necessary for the production of a product or the providing of a service."[310] In other words, PPA authorizes EPA to accomplish pollution source reduction, even through the use of product redesign, but EPA cannot require a product designer to perform anything new that is just for safety's sake. The proposals for alternative product designs that lead to reduced PPCP chemical pollution would have to be executed through a process or activity already integral to and necessary for that product's production. If such designs were developed, they could be recommended and prioritized over the approval of an alternative new drug that contains bioactive or persistent chemicals. However, these suggestions for consumer product safety would come not from FDA but from EPA.

CONCLUSION

There is only so much that EPA and FDA can do with respect to addressing the PPCP problem. Agencies cannot feasibly regulate all PPCPs at once, and significant barriers remain in risk assessment before administrators can reasonably prioritize certain PPCPs over others, or choose certain remediation or mitigation methods over others.

A. *Political Constraints to Addressing PPCP Pollution*

There are several pathways between the manufacture of PPCP chemicals and water supplies. To enact regulations to cover each pathway would require distinct political battles with different groups of stakeholders. The obvious targets for this campaign would be the parties responsible for the discharge of PPCPs in the water supplies. The problem with this criterion is there are too many dischargers. Everyone that uses hand lotion, farmers who use steroids for their livestock, and retirement homes disposing of unused pills contribute to the problem. Another approach is to lobby to regulate the behavior of pharmaceutical companies responsible for the manufacture of these drugs. The success of

310 *Id.* § 13102(5)(B).

various alternatives to regulation suggested by Eckstein and Sherk—drug design, delivery, marketing, dispensing, disposal, recycling, and drug alternatives[311]—all depend upon behavioral change on the part of the pharmaceutical industry.

B. *Opportunities for Interagency Collaboration*

There are options available for interagency collaboration with respect to the PPCP problem. EPA, FDA, USGS, and other government agencies that possess an interest in contaminant loads in public water supplies could utilize the information generated in environmental reviews of PPCPs for research purposes and to make more informed decisions regarding cumulative exposure. Information sharing and collaboration on PPCPs could be accomplished by convening an interagency task force comprised of representatives of the relevant "protecting" agencies. A nationwide regulatory solution to the PPCP problem will require a concerted, holistic, collaborative approach between multiple professions—prescribing doctors, medical insurers, environmental scientists, and lawmakers—as well as collaboration between the various federal protective agencies.[312]

As a precedent for interagency collaboration between EPA and FDA in the context of chemical regulation, consider pesticides. Although EPA regulates pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA),[313] FDA oversees contaminants in food. This provides an obvious opportunity for interagency collaboration on food additive and pesticide issues. Although the model for interagency collaboration exists in the context of food contaminants, there is no such linkage on the issue of pharmaceuticals or personal care products as environmental contaminants. Despite informal collaboration between EPA and USGS, PPCPs are not going to be regulated under SDWA until challenges are overcome in capturing occurrence and health effects data, which would require a long-term, formal collaborative agreement between these two agencies.[314]

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311 ECKSTEIN & SHERK, *supra* note 11 at 48–51.

312 Daughton & Ruhoy, *supra* note 58 at 226.

313 *See* Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. §§ 136–136y (2006).

314 U.S. GOV'T ACCOUNTABILITY OFFICE, ENVIRONMENTAL HEALTH: ACTION NEEDED TO SUSTAIN AGENCIES' COLLABORATION ON PHARMACEUTICALS IN

There is precedent for collaboration to remedy gaps in information and regulation. Consider the example of triclosan, "an antimicrobial active ingredient contained in a variety of products where it acts to slow or stop the growth of bacteria, fungi, and mildew."[315] EPA first registered triclosan as a pesticide under FIFRA in 1969,[316] and it is currently also regulated by FDA under FDCA for consumer uses.[317] EPA regulates triclosan under FIFRA when it is used in crop applications by the agriculture industry,[318] and FDA regulates triclosan when manufacturers use it in antimicrobial hand soap. This regulatory division of labor would be appropriate for PPCPs. Currently, FDA has regulatory authority over PPCPs in consumer products. Regulatory initiative taken by EPA would address PPCPs in the broader environment. Whether this shared authority over PPCPs is desirable depends in part on which risk management technique is most effective—source reduction (accomplished by potential restrictions on the use of these substances by FDA) or environmental remediation (accomplished through regulation by EPA). Even if PPCPs were not meant for shared regulatory authority, information sharing would be a salutary step forward.

C. *Risk Management Policy*

A dominant theme in the scholarly debate over risk regulation is the tension between cost-benefit analysis and the precautionary principle. This Article takes the position that the precautionary principle helps resolve the threshold decision of whether to take any action at all; cost-benefit analysis helps discriminate between available regulatory policy instruments and to choose the most efficient measures; and sustainability provides the perspective to guide decision-making in a way that accords appropriate consideration to long-term, intergenerational, and holistic factors. These principles fit the nature of the problem, which is widespread, uncertain, potentially costly, and intergenerational in consequence.

In practice, the precautionary principle would justify taking

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DRINKING WATER 2 (2011).

315 *Triclosan Facts*, EPA, http://www.epa.gov/oppsrrd1/REDs/factsheets/triclosan_fs.htm (last visited Sept. 16, 2014).

316 *Id.*

317 *Id.*

318 *Id.*

some affirmative action to reduce contamination and exposure even before a direct human health impact is verified. We should address the PPCP problem at least in part because of justifiable concerns over environmental and human health impacts. There will be distinct costs and barriers to feasibility for any method of mitigation ultimately chosen. Cost-benefit analysis would assess these various risk mitigation techniques and sanction those measures that would create benefits that justify attendant compliance costs. Perhaps more than one measure would survive cost-benefit scrutiny; perhaps none would. In addition to keeping already-purchased drugs out of the water, principles of sustainability applied to the prescription stage of medical treatment would limit whether and how much of a drug is suggested for consumption in the first place.

Not all risks are avoidable. The pollutants that we can measure are not always the ones we should be most concerned about from a health perspective. The risk-mitigation actions that are needed are not always affordable. The problem of PPCPs in drinking water supplies appears to be an intractable problem as long as disposal practices remain unchanged, filtration technology remains ineffective, and the pharmaceutical manufacturer-physician-patient dynamic remains pro-prescription. The PPCP problem may not have an extant "environmental law" solution. Non-legal changes, such as consumer action, may prove more effective than applying traditional environmental laws. Changes in the drug approval process or in the distribution of pharmaceutical drugs would be heavily resisted by one of the most effective lobbying organizations in the nation's capital.

While we do not have complete information about the adverse human health impacts of PPCP contamination, we know that male fish living in watersheds of metropolitan areas have been found with eggs growing in their testicles because of PPCP exposure. The proverbial canaries in the coal mine have started dying. If nothing else, the PPCP problem should serve as a paradigmatic case study of risk, uncertainty, and precaution, and the complex balance between public health, environmental protection, and market dynamics. The PPCP problem is not going away and promises only to get worse as the nation's consumption of pharmaceuticals and personal care products shows no sign of abatement.

Like the operational requirements of potentially applicable

regulatory frameworks, the appropriate framework for managing risks associated with PPCPs must fit the problem. Hence, it will accommodate the complexity of synergistic accumulations of contaminants, the myriad pathways of discharge, and the epidemiological limitations to attributing any particular health impact to long-term, low-dose exposure. Different risk management frameworks may apply to different aspects of the PPCP problem. This Article finds the precautionary principle, sustainability, and cost-benefit analysis to be the most applicable to the unique nature of the emerging organic wastewater contaminant problem troubling U.S. water supplies.

As water supplies dwindle and urban locations turn to recycling grey and brown water, PPCP contamination may increase in concentration and, presumably, drinking water supplies will become increasingly loaded with PPCPs. LEED certification and sustainability initiatives will increase the trend toward wastewater recycling, which is generally positive for the environment, but without addressing PPCP levels, this trend suggests an increasing problem with human PPCP exposure. On the other hand, society's conception of what constitutes water safe to drink evolves over time,[319] and perhaps PPCPs in our water supplies is something with which the public is willing to live.

D. *Legal Applications*

Do old laws apply to the new risks posed by PPCPs? The answer is: not very well. Where some laws limit the authority of EPA and FDA to address the PPCP problem because of the inherent constraints on statutory authority (NEPA and PPA do not impose mandatory substantive requirements on agencies), others are limited because of the nature of PPCPs (CWA, SDWA, and RCRA would not reach benign effluents that only become hazardous when they bioaccumulate), or because the operational requirements are not triggered until science on the issue matures (where the law requires demonstrated harm, such as TSCA), and still others would fail even in the absence of the foregoing because of a lack of regulatory initiative. Of all PPCPs, just a handful of hormones have been added to the Unregulated Contaminant Monitoring Rule under the SDWA. The majority of PPCP

[319] *See generally* James Salzman, *Is It Safe to Drink the Water?*, 19 DUKE ENVTL. L & POL'Y F. 1 (2008) (exploring the nature of this evolution).

contamination comes from nonpoint sources, while the main features of the CWA apply to point sources. RCRA will not address pharmaceuticals that meet the definition of hazardous waste with a program to regulate their disposal by healthcare-related facilities until a rule, scheduled to be released March 2014, is finalized.[320] TSCA and PPA are impotent because they set prohibitively high standards for regulatory action and fail to provide substantive regulatory authority, respectively.

NEPA, the only statute discussed here that should apply with no problem to PPCPs, does not induce compliance from FDA. Compliance with NEPA would not require FDA to take any particular substantive action in the face of environmental impacts identified in the environmental assessment for new drugs. FDA should, but does not, comply with NEPA's environmental impact review process when approving new substances. Because of the nature of PPCP pollution, FDA should, but does not, analyze cumulative impacts when preparing environmental impact statements. Extraordinary circumstances could, but currently do not, override FDA's basis for the categorical exclusion to environmental review for PPCPs.

Can we teach old laws a new risk? With creativity and regulatory initiative, the answer is yes. Should we regulate PPCPs under federal environmental law? This Article suggests a tentative yes. Regulatory initiatives should be prioritized according to the following factors:[321]

- Drugs and chemicals that provide marginal benefits and which are known or suspected EDCs or EDC precursors should be prioritized for regulation over drugs and chemicals that have significant benefits and unknown adverse environmental effects.
- After known or suspected EDCs, all existing bioactive pharmaceutical and chemical ingredients should be prioritized

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[320] *See Management of Hazardous Waste Pharmaceuticals*, EPA, http://www.epa.gov/waste/hazard/generation/pharmaceuticals.htm (last visited Sept. 16, 2014).

[321] Alternatively, researchers have "developed a comprehensive ranking system for prioritizing PPCPs and EDCs in stream water/source water and finished drinking water . . . using four criteria: (1) occurrence, (2) treatment, (3) ecological effects, and (4) human health effects." Arun Kumar & Irene Xagoraraki, *Pharmaceuticals, Personal Care Products and Endocrine-Disrupting Chemicals in U.S. Surface and Finished Drinking Waters: A Proposed Ranking System*, 408 SCI. TOTAL ENV'T 5972, 5987 (2010).

for regulation as a function of their potency and volume in the environment.

- Existing PPCPs should be prioritized over new drug and chemical ingredients because they exist in the environment and in the market at much greater volumes. This way, risk management procedures apply to the existing source of harm while keeping interference with the introduction of potentially helpful products to the market at a minimum.

At this point in the state of the art of filtration and remediation technology, the regulatory response should focus on source reduction. Like many environmental problems, PPCP contamination of drinking water supplies is a growing concern for which there is no silver bullet. Source reduction, an obvious way to remedy any environmental contaminant, will require behavioral changes on the part of the medical community, patient-consumers, and the pharmaceutical industry, which will be hard to come by and which do not sound in environmental law per se.

Hopefully, this Article provides clarity regarding the complex suite of potentially applicable federal laws, and may help guide government officials, industry, and public interest advocates as they grasp the nettle and address this issue.

NEITHER MAGIC BULLET NOR LOST CAUSE: LAND TITLING AND THE WEALTH OF NATIONS

SCOTT J. SHACKELFORD*

This Article offers a critique of land titling movements that advocate the uniform formalization of property rights. Formalizing property rights is a popular idea in academic circles. This Article seeks to determine whether such widespread praise is justified based on an analysis of the available empirical literature on the subject. It argues that instead of property rights formalization being a panacea for alleviating poverty in the developing world, rights formalization is but one part of a more holistic process of legal reform that is required before economic development might be catalyzed and property rights defined in culturally relative terms. Not only does this research provide new insights from development economics and the rule of law in an attempt to find a scholarly consensus on the critical question of formalizing property rights, but it also engages first principles as emerging and developed markets wrestle with the lessons from the Great Recession. It makes an original contribution by applying new conceptual frameworks to the field including polycentric governance, as well as using case studies from Indonesia, South Africa, and the United States. Ultimately, this Article analyzes the "meta-question" of whether we should indeed place "law alongside economics as foundational for studying the wealth of nations."[1]

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[1] O. Lee Reed, *What Is "Property"?*, 41 AM. BUS. L.J. 459, 501 (2004).

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INTRODUCTION

On January 22, 2012, some two thousand Brazilian police raided an illegal settlement comprised of landless workers situated in the outskirts of São Paulo to restore the property to its private owners.[2] Sixteen people were arrested as they tried to defend their

[2] *Brazil Police Storm Landless Settlement Near Sao Paulo*, BBC NEWS (Jan.

homes, and more than six thousand others were evicted following a legal dispute over their rights to the land that the workers "had developed into a settled neighbourhood" boasting shops and churches since 2002.[3] This episode in Brazil is being repeated around the world as urban populations explode.[4]

The year 2008 witnessed a milestone in the way people live: "for the first time in human history," more people live in cities than in rural areas.[5] But this "triumph of the urban" is not without its costs.[6] Approximately nine hundred million people currently live in slums throughout the developing world, a figure that is expected to grow to more than 1.7 billion by 2030.[7] Life in these slums can be unbearable.[8] The Mathare slum in Nairobi, Kenya, for example, extends some seven miles and is home to more than five hundred thousand people, who are among the poorest people in sub-Saharan Africa.[9] But where many people see poverty without hope, others see a persistent drive to climb the economic ladder.[10]

Proponents often laud free trade, free markets, and international investment as the path to prosperity, but despite widespread adoption of these "staples of the Washington Consensus," more than 1.2 billion people still live on less than $1

22, 2012, 5:57 PM), http://www.bbc.co.uk/news/world-latin-america-16675027.

[3] *Id*.

[4] *See, e.g.*, Mark R. Montgomery, *The Urban Transformation of the Developing World*, 319 SCI. 761, 761 (2008).

[5] *Id.*; United Nations Expert Group Meeting on Population Distribution, Urbanization, Internal Migration and Development, Jan. 21–23, 2008, iii, U.N. Doc. ESA/P/WP.206 (Mar. 2008), *available at* https://www.un.org/esa/population/meetings/EGM_PopDist/EGM_PopDist_Report.pdf.

[6] Jim Hansen, *Living in an Urban Slum: The Places We Live*, KENYA IN 2011 (Apr. 30, 2011, 1:17 PM), http://kenyain2011.blogspot.com/2011/04/living-in-urban-slum-places-we- live.html.

[7] *See* U.N. HUMAN SETTLEMENTS PROGRAMME, THE CHALLENGE OF SLUMS 12 (2003), *available at* http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=1156.

[8] *See* KATHARINE BOO, BEHIND THE BEAUTIFUL FOREVERS: LIFE, DEATH, AND HOPE IN A MUMBAI UNDERCITY 5–7 (2012) (describing life in a Mumbai slum).

[9] *See* Jim Hansen, *The Children of Mathare Slum*, KENYA IN 2011 (Apr. 30, 2011, 12:41 PM), http://kenyain2011.blogspot.com/2011/04/children-of-mathare-slum.html.

[10] *See, e.g.*, HERNANDO DE SOTO, THE MYSTERY OF CAPITAL: WHY CAPITALISM TRIUMPHS IN THE WEST AND FAILS EVERYWHERE ELSE 4 (2000).

per day.[11] Since World War II, developed nations have spent a staggering amount on targeted foreign aid for poverty alleviation, such as for improving infrastructure and enhancing the prospect of long-term economic growth.[12] But macroeconomic evidence does not support the notion that this aid is catalyzing significant economic growth in many of the world's poorest places.[13] The search for alternatives beyond these orthodox remedies for relieving poverty has led some, such as Professor Mancur Olson, to conclude that it is not a lack of resources that is to blame for lagging development; rather, it is the weakness of institutions that are otherwise poised to take advantage of these resources.[14] In particular, Professor Olson singles out the need for multilevel institutions to impartially enforce contracts and secure property rights.[15] Other institutional economists, such as Hernando de Soto (who has done much to popularize the field), have built upon Professor Olson's work by arguing that the key to economic development is the growth of local capital markets built on robust,

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[11] Robert J. Samuelson, *The Spirit of Capitalism*, FOREIGN AFFAIRS (Jan. 2001) (reviewing HERNANDO DE SOTO, THE MYSTERY OF CAPITAL: WHY CAPITALISM TRIUMPHS IN THE WEST AND FAILS EVERYWHERE ELSE (2000)) (noting that "[f]rom 1987 to 1998, the share of sub-Saharan Africa's population living on less than $1 per day remained constant at approximately 46 percent"; Latin America and Caribbean poverty rates were maintained at roughly 16 percent; while South Asia's poverty rates fell from 45 percent to 40 percent. One of the main success stories has been East Asia, where the average poverty rate has dropped from 27 percent to 15 percent. As a result of these failures, countries from Venezuela to Russia have become more skeptical about the benefits of classic free market economics); *see also Poverty Overview*, WORLD BANK, http://www.worldbank.org/en/topic/poverty/overview (last visited Feb. 18, 2014) ("[I]f the current rate of progress is to be maintained, some 1 billion people will still live in extreme poverty in 2015.").

[12] *See* Channing Arndi, *Technical Cooperation*, *in* FOREIGN AID AND DEVELOPMENT: LESSONS LEARNT AND DIRECTIONS FOR THE FUTURE 154, 163 (Finn Tarp & Peter Hjertholm eds., 2000).

[13] *See* William Easterly, *Can Foreign Aid Buy Growth?*, 17 J. ECON. PERSPECTIVES 23, 40 (2003) ("The goal [of foreign aid] is simply to benefit some poor people some of the time.").

[14] *See* Mancur Olson Jr., *Big Bills Left on the Sidewalk: Why Some Nations are Rich, and Others Poor*, 10J. ECON. PERSPECTIVES 3, 7 (1996) ("[V]ariations in institutions and policies are surely the main determinants of international differences in per capita incomes.").

[15] *Id.* at 6 ("The structure of incentives depends not only on what economic policies are chosen in each period, but also on the long run or institutional arrangements: on the legal systems that enforce contracts and property rights and on political structures, constitutional provisions, and the extent of special-interest lobbies and cartels.").

formalized property rights regimes.[16] Their central thesis is that formalized, state-sanctioned property rights generate capital and promote economic development, as seen in the relative success of developed legal systems that have formalized hitherto informal economies.[17] The argument, in simplistic terms, is that if it worked for the West, it will work for the rest.[18] This Article offers a critique of the hypothesis that formalized private property rights are uniformly a key determinant of the wealth of nations.

Formalizing property rights is a popular idea. Endorsements range widely. Former President Bill Clinton, for example, publicly declared that Hernando de Soto was "probably the world's most important living economist" for his work on property rights formalization.[19] Even the World Bank has supported the formalization thesis, stating, "Land is a key asset for the rural and urban poor."[20] But, to be successful, formalized property rights regimes must be culturally relative, recognizing the rich array of local traditions and legal systems replete around the world.

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[16] *See generally* DE SOTO, *supra* note 10. This Article uses the terms "formalization" and "land titling" interchangeably, as is customary in the literature. *See, e.g.*, Quy-Toan Do & Lakshmi Iyer, *Land Titling and Rural Transition in Vietnam*, 56 ECON. DEV. & CULTURAL CHANGE 531, 531 (2008).

[17] *See* Jim Thomas, Book Review, 34 J. LATIN AM. STUDIES 189, 189–91 (2002) (reviewing HERNANDO DE SOTO, THE MYSTERY OF CAPITAL: WHY CAPITALISM TRIUMPHS IN THE WEST AND FAILS EVERYWHERE ELSE (2000)).

[18] *See* Kevin E. Davis, *The Rules of Capitalism*, 22 THIRD WORLD Q. 675, 675–77 (2001) (reviewing HERNANDO DE SOTO, THE MYSTERY OF CAPITAL: WHY CAPITALISM TRIUMPHS IN THE WEST AND FAILS EVERYWHERE ELSE (2000) (noting that both de Soto's books, *The Other Path* and *The Mystery of Capital*, outline the virtues of laws that facilitate asset transfers. Building off the traditional theories regarding the importance of property rights, de Soto argues that people who hold formally recognized rights are more accountable than those who do not, since they have a formal, vested stake that may be taken away in the event of a default); HERNANDO DE SOTO, THE OTHER PATH: THE INVISIBLE REVOLUTION IN THE THIRD WORLD (1989) (arguing that the reason that informal economies existed was the large degree of bureaucracy in developing countries that forced small businesses to stay unregistered, and caused land to go untitled).

[19] *This Land Is Your Land*, WORLD POL'Y INST., http://www.worldpolicy.org/journal/summer2011/this-land-is-your-land (last visited Feb. 18, 2014); John Gravois, *The De Soto Delusion*, SLATE (Jan. 29, 2005, 12:33 AM), http://www.slate.com/articles/news_and_politics/hey_wait_a_minute/2005/01/the_de_soto_delusion.html.

[20] *Land Policies for Growth and Property Reduction*, WORLD BANK POL'Y RES. REPORT xvii (2008), *available at* http://documents.worldbank.org/curated/en/2003/06/2457830/land-policies-growth-poverty-reduction [hereinafter WORLD BANK POLICY RESEARCH REPORT].

This fact may be illustrated by considering the experience of Native American communities.[21] The U.S. Congress began privatizing commonly held Native American land in 1887, a process known as "allotment" that would eventually cost Native Americans two-thirds of their property and devastate tribal communities.[22] According to Professor Kenneth Bobroff, "[a]llotment failed . . . because it attempted to impose private property on the indigenous peoples who had no conception of the private ownership of land."[23] But contrary to the conventional wisdom of the time, Native Americans possessed a complex system of fluid tribal property rights systems prior to the Congressionally mandated, static system of allotments.[24] Thus, the disastrous consequences to the welfare of Native Americans was not caused by instituting a property rights system, but rather by imposing a rigid system that failed to account for traditional Native American property rights regimes that were based on cultural norms reflective of the common social good. Evidence from the Oregon Trail also exemplifies how culturally determined and deeply ingrained property rights can be to a community even absent a means to enforce them.[25] Despite life-threatening travails, emigrants respected a complex system of ownership on the trail from Ohio to California, sometimes under horrific conditions.[26]

The goal of this Article is to determine whether the

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[21] *See* Kenneth H. Bobroff, *Retelling Allotment: Indian Property Rights and the Myth of Common Ownership*, 54 VAND. L. REV. 1559, 1559–61, 1621 (2001).

[22] *Id*. at 1560–61. This Article uses terms like "Indian" and "Native American" interchangeably in reference to indigenous peoples of the Americas, as is consistent with the accounts of scholars and activists. *Id.* at 1560 n.2 (citing STEPHEN CORNELL, THE RETURN OF THE NATIVE: AMERICAN INDIAN POLITICAL RESURGENCE vi (1988)).

[23] *Id*. at 1561 (citing Babbitt v. Youpee, 519 U.S. 234, 238 (1997)).

[24] *Id*. at 1562–63. Subsequent to the enactment of the 1887 Dawes Act, though, an act of Congress was required to amend Native American property law. *See id*. at 1563 (citing General Allotment Act, ch. 119, 24 Stat. 388 (1887)).

[25] *See* John Phillip Reid*, Paying for the Elephant: Property Rights and Civil Order on the Overland Trail*, 41 HUNTINGTON LIBRARY Q. 37, 56–58 (1977); *see also* AMELIA CLEWLEY FORD, COLONIAL PRECEDENTS OF OUR NATIONAL LAND SYSTEM 432, 462 (1908) (noting that "squatting" was "one of the oldest traditions in the colonies" and detailing how widespread it was throughout colonial America through the nineteenth century, as well as illustrating why property rights laws in emerging nations must conform to local cultural traditions or risk obsolescence and why people living in poverty take what they need to survive in spite of formal property institutions).

[26] *See* Reid, *supra* note 25, at 58.

widespread praise for property rights formalization is justified based on an analysis of the available literature on the subject. Particular attention is paid to the importance of considering the various derivations of property rights in culturally relative terms. In essence, the Article argues that, because of the difficulty of setting up adequate legal systems that are sensitive to cultural norms and the common good, land titling in the form of a single, externally-imposed and static system of private property rights should not be viewed as a one-size-fits-all solution to catalyzing capital and building wealth. That is not to say that formalizing private property rights is always a failing proposition—far from it. The incentives created by private property rights are, assuming perfect enforcement, critical to enticing individuals to maximize the benefit of their land without worrying about free riders.[27]

While many cultures practice some form of private property in the context of exclusive right to an object,[28] the difference lies in the fact that "private property" does not always mean exclusive private right to a set of tangible or intangible resources as it does in many Western systems.[29] But the boundaries for exclusive use must be set according to commonly accepted norms if they are to be self-sustaining and successful with minimal disruption to local communities with differing legal traditions. This emphasis on local governance to sustainably manage resources evokes Nobel Laureate Elinor Ostrom and her colleagues' framework of polycentric governance, which in part has shown through numerous field studies that top-down planning by national officials is oftentimes unnecessary to build efficient regimes.[30] Rather, by recognizing and reinforcing local rules, if done correctly by incentivizing systems where "large, medium, and small governmental and nongovernmental enterprises engage in diverse cooperative as well as competitive relationships," such a bottom-up approach can lower transaction costs, leaving people better

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[27] *See* Elinor Ostrom, *A General Framework for Analyzing Sustainability of Social-Ecological Systems*, 325 SCI. 419, 419 (2009).

[28] *See* HERITAGE FOUND., 2014 INDEX OF ECONOMIC FREEDOM: EXPLORE THE DATA, http://www.heritage.org/index/explore (last visited Apr. 18, 2014).

[29] *See generally* Elinor Ostrom & Charlotte Hess, *Private and Common Property Rights* (Ind. Univ. Workshop in Political Theory and Policy Analysis, Working Paper No. W07-25, 2007).

[30] *See* Elinor Ostrom, *Polycentric Systems as One Approach for Solving Collective-Action Problems* 2 (Ind. Univ. Workshop in Political Theory and Policy Analysis, Working Paper No. 08-6, 2008).

off.[31] This framework will be applied to titling efforts, particularly in determining how titling can reinforce rather than replace organic regimes. There is also a cognitive component of the exclusive right to property to consider, insofar as a lack of understanding about how to behave in foreign private property systems can strain local communities.[32] Other literature has noted the need for titling programs to avoid the marginalization of women or the poor, but ignores larger questions of what form property rights should take.[33] This Article thus makes an original contribution by critiquing the formalization thesis and, for the first time that I could locate, applying principles of polycentric governance to argue for localized, culturally-relative titling efforts to help safeguard human rights and build the wealth of nations.[34]

The Article is structured as follows. Part I offers a general introduction to the land titling literature focusing on the work of leading institutional economists. Part II assesses the results of empirical studies measuring the efficacy of property rights

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[31] *Id*. at 3–4 (discussing the distinction between polycentric systems and a "monocentric hierarchy") (citing Bruno S. Frey & Reiner Eichenberger, *FOCJ: Competitive Governments for Europe*, 16 INT'L REV. L. ECON. 315, 315 (1996)); *see also* Daniel H. Cole, *From Global to Polycentric Climate Governance*, 2 CLIMATE L. 395, 405 (2011) ("Instead of a 'monocentric hierarchy,' where governmental units at higher levels make all the decisions, and units at lower levels simply follow commands from above, a truly polycentric system is one in which governmental units both compete and cooperate, interact and learn from one another, and responsibilities at different governmental levels are tailored to match the scale of the public services they provide."); Elinor Ostrom, *Polycentric Systems for Coping with Collective Action and Global Environmental Change*, 20 GLOBAL ENVT'L CHANGE 550, 552 (2010) ("Polycentric systems are characterized by multiple governing authorities at differing scales rather than a monocentric unit.").

[32] *See* Jude Wallace, *Making Land Markets Work for All*, INT'L FED. SURVEYORS 2 (May 2009), http://www.fig.net/pub/monthly_articles/may_2009/may_2009_wallace.html. I am indebted to Professor O. Lee Reed for his comments and insights that led to the significant revision of this section, as well as for his encouragement to consider a wide sampling of institutional economists, and for his argumentation regarding the formalization hypothesis.

[33] *See, e.g.*, Brett J. Miller, *Living Outside the Law: How the Informal Economy Frustrates Enforcement of the Human Rights Regime for Billions of the World's Most Marginalized Citizens*, 5 NW. U. J. INT'L HUM. RTS. 127, 127–29 (2007).

[34] *But see* Scott Burris, Michael Kempa & Clifford Shearing, *Changes in Governance: A Cross-Disciplinary Review of Current Scholarship*, 41 AKRON L. REV. 1 (2008); William Boyd, *Climate Change, Fragmentation, and the Challenges of Global Environmental Law: Elements of a Post-Copenhagen Assemblage*, 32 U. PA. J. INT'L L. 457 (2010); Cole, *supra* note 31, at 405.

formalization. Part III focuses on how lessons have been applied using examples from the United States, Indonesia, and South Africa. Finally, Part IV summarizes the promise and perils of property rights formalization and the applicability of polycentric governance in land titling efforts to help unlock the wealth of nations. In conclusion, the Article argues that property rights formalization does hold the promise of unlocking capital and growing the wealth of nations, but notes that legal reform must be both comprehensive and culturally relative, taking special note of the unique sociopolitical heritages of the societies in question. This is consistent with both the literature on polycentric theory and the corpus of human rights law, and recognizes the extent to which property informality is problematic for both economic and social development.

I. THE PROMISE OF PROPERTY RIGHTS FORMALIZATION

Market-based capitalism has led to rapid industrialization and widespread prosperity in the developed world, but capitalism has not been as universally embraced in the developing world, in some cases breeding discontent and insecurity, as well as contributing to an explosion of unplanned urban sprawl.[35] As of 2007, more than half of the "urban population in Africa and more than 40 percent in Asia live[d] under informal tenure," i.e., living on land to which one does not have any formal title.[36] This unregistered sprawl is a central conundrum with which institutional economists, such as de Soto, grapple. But de Soto is only the most prominent of the institutional economists, having been called "the global guru of neo-liberal populism."[37]

Proponents of the land titling movement frame the issue by asking what role legal institutions play in development. This is not a new question. More than forty years ago, according to Professor Kevin Davis, "the first law and development movement disintegrated as its leading figures loudly renounced their prior conviction that legal institutions alone were crucial determinants of

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[35] *See, e.g.*, Diego Sánchez Anochea, *The Models of Capitalism Approach and Development: An Application to Small Countries in Latin America*, LATIN AM. STUDIES ASSOC. at 2 (Mar. 15–18, 2006); DAVID CLARK, URBAN WORLD/GLOBAL CITY 70 (2003).

[36] WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxv.

[37] MIKE DAVIS, PLANET OF THE SLUMS 79 (2006).

a society's prospects for development."[38] But more recently, partly inspired by the work of Douglass North, among others, there has been a resurgent belief that rule of law institutions do matter.[39] Following the work of the French historian Fernand Braudel, this school of institutional economics came to this conclusion by arguing that the main reason that the developing world has been held back economically is a lack of domestic capital that has inhibited the growth of robust capital markets, which in turn holds back entrepreneurs.[40] Professor North and others within this school would likely not go so far as to argue that the mere titling of land is sufficient in and of itself to grow national wealth absent broader reforms.[41] But certain adherents such as de Soto have placed the formalization thesis at the center of their efforts, arguing that appropriate public information about ownership should be made available and that legal institutions are critical to economic development because they promote the growth of capital markets. It is worth analyzing this argument in some detail given its centrality to the land-titling thesis.

A. *The Central Role of Capital to the Formalization Thesis*

Today, three main questions are typically addressed in discussing the role of property rights in development, namely: (1) "what role do legal institutions play in development?"; (2) "[w]hy have some countries failed to develop" necessary institutions?; and (3) what steps may be taken "to foster the development of" such institutions?[42] Two primary camps have attempted to answer these questions. The first is made up of institutional economists such as de Soto and his followers, who are collectively referred to here as

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[38] DAVIS, *supra* note 18, at 675.

[39] *See* William M. Dugger, *Douglas C. North's New Institutionalism*, 29 J. ECON. ISSUES 453, 453 (1995).

[40] *See* Jim Webb, *Braudel's Civilizational Economics*, 27 COMP. CIVILIZATIONS REV. 143, 144 (1992) (reviewing FERNAND BRAUDEL, THE PERSPECTIVE OF THE WORLD VOL. III (1986)).

[41] *See, e.g.*, Douglas C. North, *Institutions*, 5 J. ECON. PERSP. 97, 98 (1991) ("The central issue of economic history and of economic development is to account for the evolution of political and economic institutions that create an economic environment that induces increasing productivity.").

[42] DAVIS, *supra* note 18, at 675–76; Kevin Davis & Michael J. Trebilcock, *What Role Do Legal Institutions Play in Development?*, IMF, at 10 (1999), *available at* https://www.imf.org/external/pubs/ft/seminar/1999/reforms/trebil.pdf.

"formalizers." On the other side of the debate are those who argue that formalization has proven to be too socially and institutionally complex, costly, and time consuming to effectively advance large-scale poverty alleviation.[43] The case for formalization is laid out below and critiqued in Part II. Part III then uses case studies to examine on-the-ground realities, and Part IV analyzes areas for compromise between these competing camps. First, though, core principles of capital and property rights must be introduced to provide a framework for discussion.

According to de Soto, "[c]apital is the force that raises the productivity of labor and creates the wealth of nations."[44] It is the starting point of credit history, of the creation of securities that are then sold on secondary markets.[45] Capital, in other words, is essential for the creation of markets that create positive externalities. As such, it is central to economic development and poverty alleviation. But what exactly is "capital," and how do property rights lead to its promotion?

Capital is commonly confused with money, but money is simply a facilitator, making transactions easier.[46] In contrast, capital is an asset that is fixed and realized in a particular subject, and is "the most tangible and detectable of assets."[47] Yet it is not the subject itself, such as a house, which is the key to capital, but rather the potential of that subject to create additional capital.[48] Capital, then, is not the building, but rather an economic concept

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[43] *See, e.g.*, Edward Robbins, *Formalisation of Land and Housing Tenure to Empower the Poor: Simple Nostrum or Complex Challenge*?, *in* RIGHTS AND LEGAL EMPOWERMENT IN ERADICATING POVERTY 175, 175 (Dan Banik ed., 2008).

[44] DE SOTO, *supra* note 10, at 5.

[45] *Id.* at 6–7.

[46] *See id*. at 11–12.

[47] *Id.* at 30, 40–42 (noting that the roots of the critical theoretical basis of capital's importance lie in the work of Adam Smith and Karl Marx. For Smith, the "division of labor and the subsequent exchange of specialized products" was the source of increased productivity. "The more capital was accumulated, the more specialization became possible, and the higher society's productivity."). For a discussion of how informality impacts the division of labor, see Avner Grief, *Cultural Beliefs and the Organization of Society: Historical and Theoretical Reflection on Collectivist and Individualist Societies*, 102 J. POL. ECON. 912 (1994); Simon Johnson et al., *Entrepreneurs and the Ordering of Institutional Reform: Poland, Slovakia, Romania, Russia and Ukraine Compared*, 8 ECON. OF TRANSITION 1, 1–3 (2000) (discussing similar limitations when trading is confined to closed circles.).

[48] DE SOTO, *supra* note 10, at 49.

about the building embodied in a consensual legal representation.[49] In this manner, capital is the potential that an accumulated stock of assets has to deploy new production.[50] In essence then, proponents such as de Soto claim that property rights are a prerequisite of capital—to put it simply, "you need a property right before you can make money."[51] Critically, formalizers then go on to argue that informal property rights do not unlock the capital held in property such as small businesses, street vendors, and urban marketplaces.[52] To accomplish that feat, they argue, formalized, state-sanctioned property rights are required. But what specifically do "property" and "property rights" mean? Different interpretations abound, leading to the first primary critique of the formalization thesis.

B. *Defining "Property" in the Context of Formalization*

Theorists from Cicero to John Locke have failed to reach a common definition of "property,"[53] and, according to Professor O. Lee Reed, "to some scholars it is merely considered 'a contested concept and one that evolves historically.'"[54] The dictionary "defines property as a thing or collection of things that one owns," or as "a bundle of 'sticklike rights.'"[55] The positive rights making up this bundle include the rights to possess, to use, to consume, or to alienate property.[56] Interpretations of property can bring to the

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[49] *Id*. at 50.

[50] Davis, *supra* note 18. As an analogy for the dual nature of capital, consider livestock. It is possible to obtain milk, food, hides, and even fuel from animals. It is also possible to breed them. This illustration of capital demonstrates both "the physical dimension of assets . . . as well as its capacity to generate surplus value." DE SOTO, *supra* note 10, at 40–41.

[51] DE SOTO, *supra* note 10, at 64; *see also* James C. W. Ahiakpor, *Mystifying the Concept of Capital: Hernando de Soto's Misdiagnosis of the Hindrance to Economic Development in the Third World*, 13 INDEP..REV. 57, 67–69 (2008) (critiquing de Soto's work in this area).

[52] *See, e.g.*, Samuelson, *supra* note 11.

[53] O. Lee Reed, *What Is "Property"?*, 41 AM. BUS. L.J. 459, 470 n.34 (2004) (citing PETER STEIN & JOHN SHAND, LEGAL VALUES IN WESTERN SOCIETY 207 (1974)).

[54] *Id.* at 470 n.34 (citing MARGARET JANE RADIN, REINTERPRETING PROPERTY 245 n.45 (1993)).

[55] *Id.* at 459; *see also* WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1818 (Philip Babcock Gove ed., 1986) (defining property pertinently as "something that is or may be owned or possessed").

[56] *See* A.M. Honore, *Ownership, in* OXFORD ESSAYS IN JURISPRUDENCE 107, 113–20 (A. G. Guest ed., 1st ser., 1961).

fore nearly the full range of human experience, from murder to liberty.[57] Some contend that property rights exploit the poor,[58] while others, such as the formalizers,[59] believe that formalized property rights are the salvation of the poor.[60] Commentators do not even agree whether property is a natural right[61] or an artificial creation of the state,[62] or whether property rights lead to environmental degradation[63] or are a primary way to stave off collective harm.[64] The amorphous definitions of property, from "that which is owned," which the U.S. Supreme Court has referred to as property "in its vulgar . . . sense,"[65] to ownership over resources,[66] complicate the arguments for and against formalizing property rights that will be discussed in Parts II-IV.[67]

What is clear from this enormous array of contradictory claims is that property is an important concept, one to which

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[57] *See* Reed, *supra* note 53, at 459–60 (citing KENNETH PATCHEN, THE JOURNAL OF ALBION MOONLIGHT 25 (1941); JOHN PHILLIP REID, CONSTITUTIONAL HISTORY OF THE AMERICAN REVOLUTION: THE AUTHORITY OF RIGHTS 31–32 (1986)).

[58] *Id*. at 459–60 n.9.

[59] *See* Gravois, *supra* note 19; WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xvii.

[60] *E.g.*, TOM BETHELL, THE NOBLEST TRIUMPH: PROPERTY AND PROSPERITY THROUGH THE AGES 202 (1998); CASS R. SUNSTEIN, FREE MARKETS AND SOCIAL JUSTICE 210 (1997); *cf.* LAWRENCE LESSIG, CODE AND OTHER LAWS OF CYBERSPACE 131 (1999) (discussing the legal concept of private property in the cyber law context, and arguing that the State's interests in property can trump individual rights).

[61] *See* JOHN LOCKE, SECOND TREATISE OF GOVERNMENT 18–30 (C. B. Macpherson ed., 1980) (1690).

[62] *See* Reed, *supra* note 53, at n.75 (citing M. COOLEY, THE GENERAL PRINCIPLES OF CONSTITUTIONAL LAW IN THE UNITED STATES OF AMERICA 327 (Alexis C. Angell ed., 2d ed. 1998) (1891)).

[63] *Cf.* AL GORE, EARTH IN THE BALANCE 287 (1992) (stating that large Brazilian landowners have pursued "short-term profits" at the expense of "long-term ecological tragedy"). *See* Reid, *supra* note 25, at n.13.

[64] Reed, *supra* note 53, at 461–62.

[65] *Id.* at 468 (quoting United States v. Gen. Motors Corp., 323 U.S. 373, 377 (1945)).

[66] *See* LAWRENCE C. BECKER, PROPERTY RIGHTS: PHILOSOPHIC FOUNDATIONS 18 (1977).

[67] *See* R. H. TAWNEY, THE ACQUISITIVE SOCIETY 54 (1920) ("[Property rights] may be conditional like the grant of patent rights, or absolute like the ownership of ground rents, terminable like copyright, or permanent like a freehold, as comprehensive as sovereignty or as restricted as an easement, as intimate and personal as the ownership of clothes and books, or as remote and intangible as shares in a gold-mine or rubber plantation.").

increasing attention is being paid in development circles now that there is a growing consensus "that the material rise of the West during the last" three centuries is at least in part attributable to legal institutions formalizing property rights.[68] If this is indeed correct, then property rights, particularly those that advance a right of exclusion, may place "law alongside economics as foundational for studying the wealth of nations."[69] For this reason, clarifying and advancing property regimes are critical subjects for development economists and rule of law practitioners alike. What is needed, then, is a critical analysis of the extent to which formalized property rights do in fact promote economic development and what, if any, sociopolitical pitfalls exist in formalizing hitherto informal economies, as is alluded to by the literature on polycentric governance discussed below.

C. *Raising Dead Capital: Why Formalized Property Rights Are Part of the Answer*

One school of thought among scholars maintains that coupling an efficient contract law system with private property rights provides a solid foundation for successful market economies.[70] In some ways, this tradition dates back to William Blackstone, who argued that enforcing property rights through contracts incentivizes individuals "to make socially desirable investments in improving assets."[71] The work of modern formalizers builds off of this foundation. Professors John Turner and Hans Harms helped begin the line of modern work in the 1960s and 1970s, arguing for the importance of formalizing property rights, which they termed "land regularisation."[72] They,

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[68] Reed, *supra* note 53, at 463 n.18 (noting that the relatively robust property systems of the Western nations: "(1) provide maximum incentive for new resource development because they allow private persons to keep the increase from their efforts; (2) allow landholders to work outside their homes by protecting land and housing from seizure by others; (3) facilitate the generation of development capital from land and other resources by enabling these resources to be put up to secure loans; (4) make resources easily divisible so that those who value them most highly can transfer them by contract.").

[69] *Id*. at 501.

[70] *See, e.g.*, Andrzej Rapaczynski, *The Roles of State and the Market in Establishing Property Rights*, 10 J. ECON. PERSPECTIVES 87, 87 (1996); Davis, *supra* note 18, at 676.

[71] Davis, *supra* note 18, at 676; WILLIAM BLACKSTONE COMMENTARIES ON THE LAWS OF ENGLAND, VOL. 2 OF THE RIGHTS OF THINGS 979 (1766).

[72] Robbins, *supra* note 43, at 176 n.3.

and modern formalizers generally, succinctly argue that "titling," i.e. formalization, "improves land market efficiencies," reduces uncertainty, and provides incentives to develop property, thus catalyzing capital markets.[73] The developed world got rich, then, formalizers assert, because of advanced property systems that allowed entrepreneurs to realize the full potential of their fixed assets, and in turn led to the development of banking and capital markets.[74] In other words, property makes people accountable and assets fungible,[75] thus providing all the mechanisms required for financial systems to function.[76]

As an example of the important role that formalized property rights play in promoting economic development, consider mortgages. Mortgages are the single most vital source of capital to start small businesses in the United States.[77] Without property rights, innovative businessmen and businesswomen would be unable to leverage their home equity to take out loans and turn their ideas into reality, curtailing growth. Beyond funding new enterprises, half of the credit in the U.S. is tied to some form of real or personal property.[78] Indeed, up to half of the wealth of the developed world is held in some form of real estate,[79] although these figures changed to an extent beginning in 2008 as a result of the global financial crisis with lingering effects on small business

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[73] *Id*. at 176; *see* Karol C. Boudreaux, *The Legal Empowerment of the Poor: Titling and Poverty Alleviation in Post-Apartheid South Africa*, 5 HASTINGS RACE & POVERTY L.J. 309, 314 (2008).

[74] *See* Christopher Clague et al., *Contract-Intensive Money: Contract Enforcement, Property Rights, and Economic Performance*, 4 J. ECON. GROWTH 185, 185–86 (1999) (analyzing the importance of secure property rights to economic growth and investment).

[75] WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxi (arguing that widespread land ownership strengthens democratic accountability).

[76] DE SOTO, *supra* note 10, at 63; Davis, *supra* note 18, at 677; John McMillan & Christopher Woodruff, *Interfirm Relationships and Informal Credit in Vietnam*, 114 Q. J. ECON. 1285, 1286 (1999).

[77] *See, e.g.*, Christian E. Weller & Amanda Logan, *Wall Street Leads to Your Street*, CTR. FOR AM. PROGRESS (Oct. 1, 2008), http://www.americanprogress.org/issues/2008/10/wall_street_leads.html; DE SOTO, *supra* note 10, at 7.

[78] Heywood Fleisig, *Secured Transactions: The Power of Collateral*, 33 FINANCE & DEV. 44, 44 (1996). However, a question arises about how far to expand the definition of property; for example, it is an open question as to whether intellectual property should be considered property for purposes of collateral. *See* Davis, *supra* note 18, at 679.

[79] DE SOTO, *supra* note 10, at 86.

loans.[80] Property, then, is a crucial driver of capital creation in developed economies.[81] As de Soto argues:

> [T]he substantial increase of capital in the West over the past two centuries is the consequence of gradually improving property systems, which allowed economic agents to discover and realize the potential in their assets, and thus to be in a position to produce the non-inflationary money with which to finance and generate additional production.[82]

Institutional economists such as de Soto assert that this vast source of capital stemming from formalized property is not available in developing countries due to high rates of informality.[83] Indeed, it has been estimated that as much as 90 percent of the population in some developing nations now operates outside the formal economy.[84] Beyond facing a number of threats to their wellbeing, people operating outside the formal economy have limited opportunities to leverage their assets. Tax revenues are also lost, or so the argument goes, and capital growth is curbed.[85] "Without legal ownership of the homes they inhabit or the businesses they operate, the poor" in developing countries

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[80] *See, e.g.*, Josh Bivens, Andrew Fieldhouse & Heidi Shierholz, *From Free-Fall to Stagnation,* ECON. POL'Y INST. (Feb. 14, 2013), http://www.epi.org/publication/bp355-five-years-after-start-of-great-recession/; Felix Salmon, *The Wealth Effects of House Price Declines*, UPSTART BUS. J. (Nov. 9, 2008), http://upstart.bizjournals.com/views/blogs/market-movers/2008/11/09/the-wealth-effects-of-house-price-declines.html; Scott Shane, *The Great Recession's Effect on Small Loans to Business*, SMALL BUS. TRENDS (Apr. 23, 2012), http://smallbiztrends.com/2012/04/the-great-recessions-effect-on-small-loans-to-business.html.

[81] *See* Fleisig, *supra* note 78, at 44–46.

[82] DE SOTO, *supra* note 10, at 65.

[83] *See, e.g.*, Hernando de Soto, *Egypt's Economic Apartheid*, WALL ST. J. (Feb. 3, 2011), http://online.wsj.com/article/SB10001424052748704358704576118683913032882.html.

[84] *Id*. (referencing Egypt); *A Man and a Morass: Briefing Nigeria's Prospects*, ECONOMIST, May 2011, at 26–28.

[85] *See* Kerry A. Dolan, *A New Kind of Entitlement*, FORBES (Dec. 23, 2002), http://www.forbes.com/forbes/2002/1223/321.html. Land formalization increases tax revenues, and potentially strengthens local political accountability, though the World Bank does not spell out how these outcomes may be attained. *See* WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxi. *But see* Manya M. Mooya, *Property Rights, Real Estate Markets and Poverty Alleviation in Namibia's Urban Low Income Settlements*, 34 HABITAT INT'L 436, 436 (2010) (finding in the Namibian context that there was limited potential to derive benefits from real estate markets in aid of capital accumulation absent interventions made to bring about increased trading activity).

operate in "a shadow economy subject to expropriation" as well as "bureaucratic arbitrariness[] and political corruption."[86] As a result, entrepreneurs in developing nations cannot use their property as collateral to start new businesses or take out mortgages to improve their land, limiting economic growth.[87] Accordingly, formalizers argue that the savings of the developing world is wasted since it is held in an inefficient form for capital creation—instead of registered homes and businesses, it is invested in unrecorded property and unincorporated firms.[88]

A system is needed to translate the invisible savings of the developing world into capital, making illegality the exception rather than the norm.[89] To accomplish this feat, formalizers argue that formal property institutions are required to expand opportunities to generate capital.[90] A 2002 World Bank Development Report states that such an effective property law system would lower transaction costs across the developing world.[91] Currently, high transaction costs in property markets can make it more difficult to provide credit, constrain the private sector, and decrease overall development rates.[92] In fact, a 2008 World Bank study found that, in India, such distortions reduce annual GDP growth by as much as 1.3 percent.[93] Property formalization could lower transaction costs, creating savings that would then be passed on to property holders who then possess more capital to make improvements and establish credit.[94] The

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[86] Gary D. Libecap, Book Review, 61 J. ECON. HIST. 1166, 1166 (2001) (reviewing HERNANDO DE SOTO, THE MYSTERY OF CAPITAL: WHY CAPITALISM TRIUMPHS IN THE WEST AND FAILS EVERYWHERE ELSE (2000)).

[87] *But see* Klaus Deininger & Gershon Feder, *Land Registration, Governance and Development: Evidence and Implications for Policy*, 24 WORLD BANK RES. OBSERVER 233, 246 (Aug. 2009) (arguing that when property cannot be used as collateral, access to credit for low-income individuals may be limited).

[88] DE SOTO, *supra* note 10, at 6–7.

[89] *Id.* at 30.

[90] Libecap, *supra* note 86, at 1166–67.

[91] *See* BUILDING INSTITUTIONS FOR MARKETS, WORLD BANK DEV. REPORT 8 (2002), *available at* http://www.worldbank.org/wdr/2001/fulltext/fulltext2002.htm.

[92] WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xix.

[93] *Id.*

[94] *See* Matthew Rosenberg, Book Review, 78 INT'L AFF. 174, 174 (2002) (reviewing HERNANDO DE SOTO, THE MYSTERY OF CAPITAL: WHY CAPITALISM TRIUMPHS IN THE WEST AND FAILS EVERYWHERE ELSE (2000)) (noting that most

question becomes: how might such property reforms commence, and what forms should they take?

Property rights based on exclusion already exist in many developing nations, even in informal urban areas such as in the outskirts of São Paulo.[95] In particular, communal property rights systems reminiscent of Native American regimes remain prevalent around the world.[96] Myriad examples are explored below, and include housing developments with communal property on the grounds, and even corporations, since the relationship between stockholder and the firm is far from individual ownership.[97] The question then becomes whether imposing a private property regime on top of preexisting communal relationships will function the way formalizers intend, especially given that common property has been found in some contexts to enjoy better outcomes than private property systems.[98] A powerful example is the Maasai pastoralists of Kenya, as explored by Professor Ostrom and Esther Mwangi.[99] Originally, Maasai pastoralists maintained "seasonal herd movements between dry and wet season pastures within and outside Maasai territory."[100] During the colonial period, the British

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of the developing world does not enjoy collateralized mortgages, instead relying on extra-legal means to manage property). De Soto illustrates the power of formalization by referring to a story from the U.S. Civil War. He relates "the story of an Indian merchant who had been promised by a prophet that he would be rich beyond his wildest dreams." DE SOTO, *supra* note 10, at 37. Motivated, the merchant traveled the world in search of his fortune. *Id.* Finding nothing, he returned home dejected, but when digging a new well on his property struck the Golconda load, the world's greatest diamond mine. *Id.* The analogy is clear—formalizers believe that everything that people in the developing world need to increase capital and end poverty is right under their noses, so to speak: "[E]ven those who live under the most grossly unequal regimes possess far more than anybody has ever understood." *Id.* at 16.

[95] *See Brazil Police Storm Landless Settlement, supra* note 1.

[96] *See* Elinor Ostrom & Charlotte Hess, *Private and Common Property Rights*, *in* ENCYCLOPEDIA OF LAW & ECONOMICS 53, 54 (Boudewijn Bouckaert & Gerrit De Geest eds., 2010).

[97] *Id.* at 72 ("Since the income that will be shared among stockholders, management, and employees is itself a common pool to be shared, all of the incentives leading to free riding (shirking) and overuse (padding the budget) are found within the structure of a modern corporation.").

[98] *Id.* at 54.

[99] *See* Esther Mwangi & Elinor Ostrom, *Top-Down Solutions: Looking Up from East Africa's Rangelands*, ENV'T MAG., Jan.–Feb. 2009, at 34, *available at* http://www.environmentmagazine.org/Archives/Back%20Issues/January-February%202009/MwangiOstrom-abstract.html.

[100] *Id*. at 36.

replaced the Maasai's communal system with "individual ownership of specific parcels of land."[101] This legacy of privatization continued even after independence through the 1980s and is thought to have led to changing land use patterns and escalating conflicts over scarce resources.[102] Ostrom and Mwangi observe that such consequences are not limited to Kenya: "When institutions are not well-matched to the ecological and social conditions on the ground, tragic overuse is likely to result."[103]

This argument explicitly evokes Garrett Hardin's classic tragedy of the commons model, predicting the eventual overexploitation and degradation of open access, common pool resources.[104] This model has become part of the conventional wisdom in diverse fields ranging from economics and ecology to political science and law.[105] Hardin called for either nationalization or privatization to avoid this tragedy.[106] But since its introduction more than forty years ago, the theory has been critiqued and modified, notably by Professor Ostrom, which is part of the reason for her shared 2009 Nobel Prize in Economics.[107] Rather than seeing all common pool resources as being open access, existing in an anarchic state of overexploitation, Ostrom posits that "resources are embedded in complex, social-ecological systems" operating on multiple levels.[108] Her and others' work has identified numerous examples of such polycentric systems in which local communities have successfully managed community resources for the common good without the necessity of state intervention,[109] underscoring the need for culturally relative,

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101 *Id*.

102 *Id*.

103 *Id*.

104 *See* Garett Hardin, *The Tragedy of the Commons*, 162 SCI. 1244, 1244–45 (1968).

105 *See e.g.,* ARTHUR F. MCEVOY, THE FISHERMAN'S PROBLEM: ECOLOGY AND LAW IN THE CALIFORNIA FISHERIES, 1850–1980 214 (1986).

106 Hardin, *supra* note 104, at 1248.

107 *See, e.g.*, ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 1–3 (1990); Jay Walljasper, *Ostrom's Nobel Prize a Milestone for the Commons Movement*, COMMONS MAG. (Dec. 16, 2013), http://onthecommons.org/magazine/ostrom%E2%80%99s-nobel-prize-milestone-commons-movement.

108 *See* Ostrom, *supra* note 27, at 419.

109 *See, e.g.*, Elinor Ostrom, *A Polycentric Approach for Coping with Climate Change* 40 (World Bank Policy Research, Working Paper No. 5095, 2009). Polycentrism has arisen across an array of disciplines, from law to urban studies,

community-driven property rights regimes applicable to critiquing the formalization thesis.

In an ideal scenario, freeing "dead capital"[110] in the developing world would begin a second industrial revolution and help narrow the large disparities in wealth and income between the developed and developing nations.[111] Without reform, the "legal apartheid" in which 80 percent of property is held informally could continue[112]—by 2015, one-half to one-third of the total output from the developing world may be "extralegal," according to de Soto.[113] If formalization may help end these disparities and catalyze economic development, it should be encouraged. But before formalization is accepted as the path to promote equitable, sustainable growth around the world, the data and methodology upon which the formalizers base their claims must be analyzed, as must the extent to which such goals mesh with polycentric principles.

II. DOES THE MYSTERY OF CAPITAL REMAIN A MYSTERY? CRITIQUES OF THE TITLING MOVEMENT

If property titling is a path to the legal and economic empowerment of the poor, then results from titling programs should provide supporting evidence.[114] After all, developing countries have been experimenting with titling programs for decades, oftentimes with mixed results.[115] Some proponents, such as de Soto, dismiss unsuccessful efforts, noting: "An extraordinary number of them had been prematurely aborted because of poor results . . . and with the exception of some rural Thai property certification programs, none of these efforts succeeded in turning

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and involves the study of multiple power centers in a given environment. *See, e.g.*, SURYA PRAKASH SINHA, LEGAL POLYCENTRICITY AND INTERNATIONAL LAW 1 (1996); Robert C. Kloosterman & Sako Musterd, *The Polycentric Urban Region: Towards a Research Agenda*, 38 URBAN STUD. 623, 623 (2001).

110 Davis, *supra* note 18 (noting that de Soto defines "dead capital" as the building on publicly owned land, land zoned for exclusively industrial or commercial use, or the illegal subdivision of true ownership among unregistered individuals).

111 Libecap, *supra* note 86, at 1167.

112 DE SOTO, *supra* note 10, at 83.

113 *Id.* at 84.

114 Boudreaux, *supra* note 73, at 312.

115 Christopher Woodruff, *Review of de Soto's* The Mystery of Capital, 39 J. ECON. LITERATURE 1215, 1216, 1220 (2001) (book review).

extralegal assets into legal ones."[116] Although early abandonment was not the problem that prevented the full unlocking of capital in Peru after formalization in the early 1990s, that program has also had mixed results.[117] This fact calls into question several aspects of the formalization hypothesis that are expanded on below, including whether formalization automatically leads to increased collateral and access to credit.

Critics of titling movements argue that land tenure has proven to be too "complex, [controversial,] costly, and time consuming to" promote large-scale poverty alleviation.[118] Emblematic of this camp is Anna Kajumulo Tibaijuka, who states, "The global experience of land titling is that it is too slow, expensive and cumbersome to meet the needs of the poor, posing a serious equity and governance issue."[119] Formalization critics note that there is only weak evidence that titling benefits property security, and little support for the proposition that titling leads to expanded access to credit, or better jobs and more labor time away from home, as discussed below. Nor is there a proven increase in transaction certainty, the ability to transfer property, or less displacement of the poor.[120] In fact, certain studies in South Africa found that land

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116 DE SOTO, *supra* note 10, at 169.

117 *See* Woodruff, *supra* note 115, at 1215. No comprehensive data has been published on how successful the Peruvian titling program has been since it was enacted. This is surprising given that in 1990 President Fujimori appointed de Soto to begin registering informal land claims of Peruvians with an aim to making them available to generate collateral for gaining credit. *See* EDESIO FERNANDES AND ANN VARLEY, ILLEGAL CITIES: LAW AND URBAN CHANGE IN DEVELOPING COUNTRIES 25 (1998). One of the few estimates of the program's success states that 300,000 titles were registered, and the value of that land doubled in six years. Dolan, *supra* note 86 (arguing that titling meant that Peru's poor could deal with just one agency to obtain title, rather than up to fourteen, thus "lowering the cost of registering a business to $174"). But of the more than 200,000 Lima households that were awarded property titles between 1998 and 1999, only 24 percent obtained any financing by 2002, and this financing was from the state, not banks. Gravois, *supra* note 19. For the sake of comparison, in El Salvador, one million properties have been titled under a titling scheme similar to Peru's, reportedly leading to $800 million in new mortgages annually. Dolan, *supra* note 85.

118 Robbins, *supra* note 43, at 176.

119 Anna Kajumulo Tibaijuka, *UN-Habitat's Contribution to Security of Tenure*, *in* LEGAL EMPOWERMENT: A WAY OUT OF POVERTY 28 (M.E. Brother & J.A. Solberg eds., 2006).

120 Robbins, *supra* note 43, at 177; A. Durand-Lasserve & H. Selod, *The Formalization of Urban Land Tenure in Developing Countries,* WORLD BANK URBAN RES. SYMPOSIUM 118–120 (May 14, 2007).

titling actually created more homelessness and disempowered more people than was the case before the program commenced.[121] Critics also argue that informal markets and forms of land tenure are "more contextual, more efficient, and more flexible than the formal."[122] Regardless of formal titling, informal economies in urban land economies are important and will likely continue to exist.[123] Both the formalizers and their critics at times occupy extreme positions, according to Professor Edward Robbins: "For the supporters of titling, the informal is chaotic while for its opponents the formal is overly constricting and inappropriate."[124] In order to critique both camps, and potentially find common ground, this Part analyzes the efficacy of land titling based on the available empirical data beginning with a discussion of de Soto's thesis given that his work is credited with jumpstarting popular attention in the field.

A. *Analyzing the Efficacy of Titling Efforts*

Arguably the most well-known account of the land-titling thesis is propounded by de Soto in *The Mystery of Capital*. But the work is not without its methodological problems. It was meant for a popular audience, and so is long on examples and metaphors and short on empirical studies and citations.[125] Still, the examples de Soto evokes are powerful. Consider his finding that obtaining a formal property title in the Philippines takes 168 steps through fifty-three public agencies, and may take on average anywhere between thirteen and twenty-five years.[126] Or the fact that it is allegedly so expensive to register a business in Mexico that there are approximately 2.65 million unregistered microbusinesses in Mexico City alone.[127] If the 1.5 million informal food stands were

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[121] Robbins, *supra* note 43, at 177; Ben Cousins et al., *Will Formalizing Property Rights Reduce Poverty in South Africa's "Second Economy?" Questioning the Mythologies of Hernando de Soto*, POL'Y BRIEF No. 18, PROGRAMME FOR LAND AND AGRARIAN STUDIES 27 (2005).

[122] Robbins, *supra* note 43, at 177.

[123] *See* T. ANAYAMBA, 'DIVERSE INFORMALITIES' SPATIAL TRANSFORMATIONS IN NAIROBI (2006).

[124] Robbins, *supra* note 43, at 177.

[125] *See id.* at 176–78; Renzo G. Rossini & J.J. Thomas, *The Size of the Informal Sector in Peru: A Critical Comment on Hernando de Soto's El Otro Sendero*, 18 WORLD DEV. 125, 125 (Jan. 1990).

[126] DE SOTO, *supra* note 10, at 20.

[127] *Id.* at 28.

put together, they would stretch over one hundred miles.[128] Together, these examples illustrate "a culture of illegality, corruption, and excessive risk-taking" that develops in nations with large informal economies in which homes are insecure, and property is illiquid.[129] The resulting inability to convert homes into equity, he argues, is "the major stumbling block that keeps the rest of the world from benefiting from capitalism."[130] What is the value of all this unregistered residential and commercial property? De Soto and his team offer a figure of $9.3 trillion in untapped capital in the developing world.[131] That figure is roughly "40 times all of the foreign aid sent to developing countries since 1945."[132]

It is unclear how de Soto and his team arrived at their estimate of dead capital. Their methodology is opaque. Using surveys from just five cities—Cairo, Lima, Manila, Mexico City, and Port-au-Prince[133]—they extrapolated to the rest of the developing world, estimating that 85 percent of urban land, and 53 percent of rural land, is held either informally or illegally.[134] It is by multiplying these extralegal holdings by their fair market value that de Soto arrives at $9.3 trillion.[135] The problems with this methodology are apparent and have been well documented.[136] These problems include not taking into account the location of properties, and abstracting out results from a small, unrepresentative sample.[137]

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128 *Id.* at 29.

129 Libecap, *supra* note 86, at 1167. The main problem surrounding property rights is not security of ownership. In fact the reverse may be the case—ownership is too secure. Land must be subject to seizure for it to be used as collateral by banks, which has happened a great deal in the United States since 2008. *See Sales of New Homes Fell 2.1 Percent in May*, NPR, June 23, 2011, *available at* http://www.npr.org/blogs/thetwo-way/2011/06/23/137366337/sales-of-new-homes-fell-2-1-percent-in-may. This is far more difficult in an informal system of land ownership. Woodruff, *supra* note 115, at 1215–16.

130 DE SOTO, *supra* note 10, at 5.

131 *Id.* at 35.

132 *Id.* at 33.

133 *Id.* at 24, 31.

134 *See* Woodruff, *supra* note 115, at 1220 (noting that the figure of 85 percent is "much higher than three of the four countries for which de Soto provides detail—Peru (53 percent), the Philippines (57 percent), and Haiti (68 percent)").

135 DE SOTO, *supra* note 10, at 29.

136 *See, e.g.*, Thomas, *supra* note 17, at 189–91.

137 *See generally* FRIEDRICH SCHNEIDER & DOMINIK H. ENSTE, THE SHADOW ECONOMY: AN INTERNATIONAL SURVEY (2002).

Given these shortcomings, several authors have attempted to gauge a more accurate figure for the value of informal property in the developing world. Professor Christopher Woodruff, for example, estimates a total a figure of $3.6 trillion.[138] The salient point, though, is that even an estimate of $3 trillion is still approximately $5,000 per developing country household based on purchasing power parity, which is enough to make a significant difference in people's lives. Matthew Rosenberg agrees, arguing that even if de Soto's numbers are not accurate, they still point to the majority of the property in the developing world being held informally; and this land is worth a significant amount of money that could be used to help jumpstart developing economies.[139] To demonstrate how this may be done, de Soto evokes the example of the American West, but the relevance of this case study raises a host of additional concerns that are addressed in Part III regarding how to put the formalization theory into practice.[140]

None of this is meant to detract from the importance of this work, nor to ignore de Soto's other ongoing projects through the Institute for Liberty and Democracy, which is active in more than twenty nations.[141] In some ways, that is the downside of "pop academics," whose scholarly work can be oversimplified to a thesis that that the author would likely not support. It is likely untrue, for example, that de Soto or many other institutional economists believe that land titling alone is sufficient to jumpstart poverty alleviation in the developing world. De Soto makes clear in *The Mystery of Capital* that broader legal reforms are critical to property reform.[142]

Yes, there are significant problems with de Soto's data and methodology in *The Mystery of Capital*, but the formalizers are correct that informal economies will only increase without property rights reform, potentially leading to higher rates of bribery and corruption.[143] In Peru, for example, one study determined that bribes alone already "raise the cost of running a

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138 Woodruff, *supra* note 115, at 1221.

139 Rosenberg, *supra* note 94, at 174.

140 *See infra* Part III.

141 *See* INST. FOR LIBERTY AND DEMOCRACY, OUR WORK, http://www.ild.org.pe/index.php/en/map (last visited Jan. 14, 2014).

142 *See* DE SOTO, *supra* note 10, at 189, 198.

143 *Id.* at 195; *A Man and a Morass, supra* note 84.

small business by 10 to 15 percent."[144] Thus, the formalization thesis does have some merit. However, as with the subsequent modifications of Hardin's classic tragedy of the commons,[145] the wider literature on formalizing property rights has modified the classic formalization thesis, but not completely disavowed it outright. Five primary critiques are relevant, including: (1) the absence of cultural considerations in the formalization hypothesis; (2) the need to develop grassroots political coalitions to bring comprehensive property reform; (3) the social cost and environmental degradation of titling; (4) the efficacy of previous titling efforts, challenging the central claim of formalizers that land titling leads to capital growth; and (5) the necessity of considering the benefits and drawbacks of property formalization, such as gains from trade and entrepreneurship, from a more inclusive perspective. Each of these critiques is addressed in turn within the framework of polycentric management in order to ascertain how the formalization thesis should be modified in light of recent empirical findings.

B. *Cultural Considerations in Land Titling Design*

The World Bank has noted the importance of cultural context in structuring effective property formalization programs, stating "[p]olicy advice that is oblivious of either the complexity of . . . [cultural] issues or the historical and political repercussions of policy interventions in this area can lead to unintended negative consequences."[146] But the trap that many institutional economists (including, at times, de Soto) seem to fall into is that they dismiss the notion that the developing world has not developed economically due to cultural considerations as untrue and inhumane,[147] arguing instead that human nature with regard to property is uniform and that everyone will seek to maximize profits and respond identically to identical assumptions.[148] But

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144 Samuelson, *supra* note 11.

145 *Compare* Hardin, *supra* note 104, at 1244–45, *with* ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 3, 6–8 (1990) (summarizing and critiquing the tragedy of the commons and discussing the role played by local communities in sustainably managing common pool resources).

146 WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xvii.

147 *See* DE SOTO, *supra* note 10, at 4.

148 *See* LAWRENCE E. HARRISON & SAMUEL P. HUNTINGTON, CULTURE

human nature might not be so uniform. Different values, beliefs, and customs are replete around the world.[149] Leading scholars such as Professor Robert Samuelson have recognized this fact, arguing against a "single bullet" approach to land titling and for a degree of cultural relativism.[150] Similarly, Professor John Phillip Reid has made the case that the specific legal boundaries of property rights must come from cultural norms in order to enjoy the force necessary for wealth creation.[151] Cultural considerations thus may well modify the overall formalization hypothesis. Property has different meanings and degrees of importance in different parts of the world. Even within countries, diverse regions and groups can have dissimilar experiences.[152] Property then may be "best understood as the distribution of social entitlements that vary in form and substance" in and among states and cultures.[153] This complexity should be taken into account when constructing titling programs, but often is not.

Many institutional economists seem to agree with de Soto that "[i]nternational law treats the property rights of individuals as

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MATTERS: HOW VALUES SHAPE HUMAN PROGRESS 60–61 (2000).

[149] *See id.* at 21–27. Samuelson, *supra* note 11, at 209. Some argue that different cultures accept capitalism's principles, and put them into practice, more readily than do others. For example, Mariano Grondona argues that prolonged economic development may only occur in a society in which twenty traits are present, including competition, innovation, hard work, and trust in the individual. Samuelson, *supra* note 11, at 209. Carlos Montaner maintains that in large parts of Latin America people "nurture . . . relationships in which personal loyalty is rewarded and merit is substantially ignored." He goes on to note that the Catholic clergy undermine the psychology of success through intoning against the profit motive. HARRISON & HUNTINGTON, *supra* note 148, at xxv, 59, 62.

[150] *See* Samuelson, *supra* note 11.

[151] *See* JOHN PHILLIP REID, LAW FOR THE ELEPHANT: PROPERTY AND SOCIAL BEHAVIOR ON THE OVERLAND TRAIL *passim* (1997).

[152] Samuelson, *supra* note 11. As an example, consider a letter from a U.S. nurse and Peace Corps volunteer in Malawi, with the following passage:

> Malawians are a lovely people who value social relationships above all else. My job was to teach Western-style management skills to the nursing and administrative staff [of a local hospital.] As part of a management skills training course, I instituted the disciplinary process that was on the books but used since the British left in 1964. After a week, the supervisors returned and flatly refused to try and better supervise their employees using a disciplinary process. Why? The employees had put a curse on them, and they were afraid.

Samuelson, *supra* note 11.

[153] Robbins, *supra* note 43, at 179; *see* C.M. HANN, PROPERTY RELATIONS: RENEWING THE ANTHROPOLOGICAL TRADITION 10–12 (1998).

more sacred than the sovereignty of states,"[154] in that a Western, market-based view of property rights is favored in many international instruments.[155] But on-the-ground realities differ. Thus, while it may well be true that "[p]rivate property is arguably the single most important institution of social and political integration,"[156] de Soto, and at times other formalizers, are apt to generalize the universality of their claims and oversimplify the barriers standing in the way of reaching desired outcomes.[157] As an example of the various types of property rights that should be considered in the formalization analysis, consider the prevalence of leasing relationships.

An increasingly common facet of life in developing and developed nations alike is the rise of rental markets. For example, according to the World Bank, more than 70 percent of land in some developed nations is rented or leased.[158] Yet leasing relationships are commonly ignored in titling schemes that expound the virtues of individual, private property rights over local cultural considerations.[159] Titling may have dire effects on these leasing relationships. How would sub-leasers in Copenhagen, or a family of renters on government land in Nairobi, react to a sudden change in property rights allocations? Evidence from South Africa suggests that property formalization may actually raise rental prices and inhibit the development of low-cost rental markets, be they formal or informal.[160] Consequently, there is a need to create security of tenure in leasing arrangements without a reallocation of property rights; this is a question that has not been adequately considered in the formalization literature to date.

Other policies besides titling may benefit leasers. In particular, the free, uninhibited operation of rental markets has been shown to lead to more secure property rights.[161] The World

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154 DE SOTO, *supra* note 10, at 166.

155 The formalization literature, and de Soto in particular, similarly criticize developing countries for providing too much protection to land owners: "the law and official agencies are trapped by early colonial and Roman law, which tilt toward protecting ownership." *Id.* at 62.

156 *Id.* at 195.

157 *See* Thomas, *supra* note 17, at 189–91.

158 WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxxii.

159 *Id.* at xliii.

160 Cousins, *supra* note 121, at 28.

161 *See* WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxxvii.

Bank, for example, advocates for the removal of bureaucratic barriers inhibiting the growth of rental markets, such as increasing the duration of tenancy and eliminating rent ceilings.[162] Studies focusing on Ethiopia indicate that barriers to the efficient operation of rental markets undermine the growth of non-farm enterprises.[163] Eliminating these restrictions on rental land could promote accelerated development of the rural economy, and be less economically or politically costly than a classic titling scheme. Many South Asian countries also have regulation "restricting land rentals to avoid exploitation of tenants by landlords."[164] The case for the gradual abolition of such restrictions is bolstered by evidence from Southeast Asian countries that illustrates how quickly "active markets in use rights can develop" in the absence of burdensome restrictions.[165] Similar arguments apply to Latin America, which also has a history of weak land rental markets with many restrictions that lead to high transaction costs.[166] There are rich layers of entities, from individuals, to groups, to governments that claim property,[167] but many people in the developing world may be helped not through formalizing property rights, but, at least in the interim, through the less burdensome route of leasing reform.[168]

Beyond leasing, other examples of common property systems are replete around the world from South Africa to Indonesia and closer to home as is explored in Part III.[169] Common property comes in many forms, but often involves "group control over a resource" leading "to the balancing of benefits and costs."[170] A common property system may be defined as a form of resource ownership in which the resource and user group are well defined,

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162 *Id*.

163 *Id.* at xxxiv.

164 *Id*.

165 *Id.*

166 *See id*. at xxxv.

167 Robbins, *supra* note 43, at 187.

168 *See* Reed, *supra* note 53, at 485 ("Property establishes and preserves social order and encourages resource development by protecting private resources acquired without coercion, theft, or deception from the predations of others in the general community.").

169 *See infra* Part III.

170 GLENN G. STEVENSON, COMMON PROPERTY ECONOMICS: A GENERAL THEORY AND LAND USE APPLICATIONS 3 (1991) (distinguishing between open access resources and common property).

and rules exist regarding joint use.[171] Unlike open access areas lacking property rights,[172] common property involves ex ante rights and duties for non-property holders.[173] Common property is thus like private property in that "the resource has a definable set of users who may be declared its owners, outsiders are excluded from use, and the users control resource extraction to increase the . . . net product in order to benefit themselves."[174] But it is unlike private property because of the prevalence of collective ownership.[175]

Figure 1: Types of Property Institutions[176]

	Private Property	**Common Property**	**Open Access – Limited User**	**Open Access – Unlimited User**
Group Limitation	One Person	Members Only	Members Only	Open to Anyone
Extraction Limitation	Extraction Limited by Decision	Extraction Limited by Rules	Extraction Unlimited	Extraction Unlimited

Self-governing communities may use common property rights, according to Professor Ostrom, "in making and adapting rules within collective choice arenas regarding the inclusion or exclusion of participants, appropriation strategies, obligations of participants, monitoring and sanctioning, and conflict resolution."[177] Some remote areas, such as Swiss alpine meadows, have been so managed for centuries.[178] This stands in contrast to the externally imposed and inflexible property regime from the Dawes Act set up to govern Native Americans' land transactions,

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171 *Id.* at 40 (listing seven characteristics of common property systems).

172 *Id.* at 49.

173 *Id*. at 43, 49; WIETZE LISE, AN ECONOMETRIC AND GAME THEORETIC MODEL OF COMMON POOL RESOURCE MANAGEMENT 22 (2007).

174 STEVENSON, *supra* note 170, at 57.

175 *See id*. at 69.

176 Figure redrawn from *id.* at 58.

177 Ostrom, *Polycentric Systems*, *supra* note 30, at 8.

178 *See id*. *See generally* ROBERT NETTING, BALANCING ON AN ALP: CHANGE AND CONTINUITY IN A SWISS MOUNTAIN COMMUNITY (1981).

noted in the introduction.[179] Effective communal property management is the stuff of grassroots public participation. Polycentric theorists, including Professor Ostrom, have extolled the benefits of small, self-organized communities in the context of managing common resources.[180] Professor Ostrom in particular states that social groups are often able to design, utilize, and adapt ingenious mechanisms in long-surviving resource systems to allocate use rights among themselves.[181] Even the medieval English commons from Hardin's paper was subject to regulation, such as stinting to prevent overgrazing, which was a layer of detail lost in his original analysis.[182] The same holds true now with meadow commons in Japan,[183] and even for online communities.[184] Professor Ostrom postulates that polycentrism featuring bottom-up governance and common property, depending on the culture at issue, can help capitalize on local knowledge and is a viable alternative to outright privatization or nationalization in some circumstances.[185]

Land titling in the form of privatizing land that was once managed collectively eschews polycentric notions of the benefits of common property systems and self-governance. The theory underlying such privatization is at its root about the incentive structure of private property rights, which give the owner a pecuniary interest in refraining from destructive practices and that in turn may be used to catalyze the creation of capital markets. Privatization requires the divvying up of land into distinct parcels and assigning individual rights to hold, use, and transfer those parcels as desired, subject to pertinent legal restrictions.[186]

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[179] *See supra* text accompanying note 24.

[180] *See, e.g.*, Elinor Ostrom et al., *Revisiting the Commons: Local Lessons, Global Challenges*, 284 SCI. 278, 278 (1999) (questioning policymakers' use of Garrett Hardin's tragedy of the commons in light of the empirical data showing self-organizing groups can effectively manage common-pool resources).

[181] *See* Ostrom, *Polycentric Systems*, *supra* note 30, at 8.

[182] *See* Susan J. Buck Cox, *No Tragedy on the Commons*, 7 EVNTL. ETHICS 49, 49–51 (1985).

[183] *See* David Feeny et al., *The Tragedy of the Commons*: *Twenty-Two Years Later*, 18 HUMAN ECOLOGY 1, 10 (1990).

[184] *See* Joseph S. Nye, Jr., *Cyber Power*, HARV. KENNEDY SCH. 15 (May 2010).

[185] *See* Ostrom, *Polycentric Systems*, *supra* note 30, at 1.

[186] *See, e.g.,* PAUL B. TRAWICK, THE STRUGGLE FOR WATER IN PERU: COMEDY AND TRAGEDY IN THE ANDEAN COMMONS 304 (1991).

Economists argue that if private property rights are distributed to "users of common property. . . [then] incomes from labor and property will eventually exceed. . . income from labor alone," so long as private ownership is not concentrated into a monopoly.[187]

Property rights are sometimes applied in combinations that incorporate various overarching ideologies. For instance, many tribal cultures balance individual ownership with the norms of collective groups.[188] A contemporary example is China, where Deng Xiaoping's reforms have pushed China towards transforming property rights through the creation of special economic zones and leasing what had been communal land.[189] These reforms provide a vivid illustration of how fundamentally different types of property rights may coexist within a single society and contribute to its rapid economic development.[190]

Before turning to the political and environmental implications of codifying cultural relativism within land titling design, it is important to note the applicability of the "tragedy of the anticommons" to help explain the drawbacks of formalization. The tragedy of the anticommons situation is one "in which private ownership leads to underuse . . . that is detrimental to both individual owners and the public"—the opposite of the tragedy of the commons discussed above.[191] Under this conceptualization, "multiple owners each have a right to exclude others . . . and no one has an effective privilege of use" stifling innovation.[192] This

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[187] R. Peter Terrebonne, *Privatizing the Commons: The Distribution of Total Product*, 19 EASTERN ECON. J. 165, 165 (1993).

[188] *See, e.g.,* David E. Ault & Gilbert L. Rutman, *The Development of Individual Rights to Property in Tribal Africa*, 22 J.L. & ECON. 163, 163 (1979); Scott J. Shackelford, *The Tragedy of the Common Heritage of Mankind*, 28 STAN. ENVTL. L.J. 109, 153–54 (2009) (expanding on this treatment of comparative political ideologies and their conceptualization of property rights).

[189] *See* Louis Putterman, *The Role of Ownership and Property Rights in China's Economic Transition*, 144 CHINA Q. 1047, 1047 (1995); *Still Not to the Tiller*, ECONOMIST, Oct. 23, 2008, at 16, *available at* http://www.economist.com/node/12471124; Peter F.

[190] *See Promises, Promises: A "Breakthrough" in Land Reform? Or a Damp Squib?*, ECONOMIST, Oct 16, 2008, at 62, *available at* http://www.economist.com/world/asia/display story.cfm?story_id=12437707.

[191] Mark A. Rodwin, *Patient Data: Property, Privacy & the Public Interest*, 36 AM. J. L. & MED. 586, 603 (2010).

[192] *Id.* at 603–04 (quoting Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 624 (1998)); Michael A. Heller, *The Tragedy of the Anti-commons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 624

situation is rare because property owners can oftentimes buy one another out and develop the resource, but it can happen.[193] Land titling has been described as a type of anticommons, in that a multitude of owners means that no one person has a veto over management decisions, resulting in gridlock.[194] But D. Benjamin Barros has critiqued this application, since not all "owners" are equal and in fact overlapping authority leads to transaction costs and free riders, but not necessarily to the formation of an anticommons.[195] This interpretation evokes Professor Ostrom's work on polycentric governance, in particular the idea that overlapping authority and group control is not necessarily something to be feared, even if it may be foreign to Western notions of private property. The success of such forms of governance depends on building the political coalitions necessary to undertake culturally relative property reform efforts as part of broader rule of law and access to justice initiatives.

C. *Formalizing the "People's Law"*

Overcoming political opposition is central to formalizing the "people's law," and consequently reinforcing and legitimizing, rather than replacing, local property regimes. For example, in Nairobi, "it is not the lack of laws regarding land [that inhibits reform], it is about the unwillingness or lack of political will on the part of government in light of actions by powerful members of society to effectively enforce the law."[196] As with the "thin" reform of procedural rule of law, there are significant political interests who wish to maintain the status quo in the developing world, including politicians, large property owners, and their lawyers.[197] Indeed, much of the land now being adversely possessed by the poor is likely held by urban elites.[198] Giving the poor legal title to the land they occupy would effectively amount

(1998).

[193] *See* Richard A. Epstein & Bruce N. Kuhlik, *Is There a Biomedical Anticommons?*, REG., Summer 2004, at 54–56 (arguing against a biomedical anticommons, but noting that an anticommons scenario can arise such as in situations of sequential monopolists).

[194] *See* D. BENJAMIN BARROS, HERNANDO DE SOTO AND PROPERTY IN A MARKET ECONOMY 110 (2010).

[195] *Id*. at 111.

[196] Robbins, *supra* note 43, at 184.

[197] Samuelson, *supra* note 11.

[198] *See, e.g.*, *Brazil Police Storm Landless Settlement*, *supra* note 2.

to the uncompensated redistribution of a massive amount of wealth that will be fought by elites across the developing world.[199] But formalizers such as de Soto pay scant attention to how to build the political coalitions necessary to take on powerful vested interests, noting "[T]he poor must make their voices heard in the democratic process," but emphasizing a top-down approach starting with the Executive.[200] This conclusion runs contrary to the grassroots mobilization envisioned by Professor Ostrom, and stands in contrast to myriad field studies demonstrating the benefits of local self-organization relying on small groups rather than state-imposed reform.[201] And even if reform was successful, new property owners would have to continue mobilizing to protect against expropriation, which may be difficult since it is not clear how happy the poor would be to accept government recognition if it brought with it taxes and regulation.[202] As Professor Robbins states, "The offer of tenure with the costs and responsibilities it may entail is not an obvious economic good for those who straddle city and country."[203]

One of the growing risks of failing to politically mobilize is being unable to protect against mass expropriation (i.e., expropriating the property of an entire community). This practice is increasingly common given that, as has been shown, land values often increase after formal titling,[204] violating the fundamental right of exclusion that is the basis of property rights[205] as

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[199] *See* Deininger & Feder, *supra* note 87, at 238–39, 257 (arguing that marginal governance in developing nations often means that instituting more formalized land rights cements the dominance of the elite).

[200] DE SOTO, *supra* note 10, at 191. Other nations such as Argentina have had more success with instituting a top-down approach, but even there the political atmosphere has become increasingly polarized. *See, e.g.*, Roger F. Noriega & José R. Cárdenas, *Argentina's Race to the Bottom*, AM. ENTERPRISE INST. (Mar. 15, 2013), http://www.aei.org/outlook/foreign-and-defense-policy/regional/latin-america/argentinas-race-to-the-bottom/.

[201] *See, e.g.*, Clark C. Gibson, Elinor Ostrom & Margaret A. McKean, *Forests, People, and Governance: Some Initial Theoretical Lessons*, *in* PEOPLE AND FORESTS: COMMUNITIES, INSTITUTIONS, AND GOVERNANCE 227, 227–28 (Clark C. Gibson et al. eds., 2000).

[202] Robbins, *supra* note 43, at 192 (noting that many small businesses operate at a slim margin, and formalization may cut into that profit margin, indirectly impacting local support of property reform).

[203] *Id*. at 189.

[204] WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxvi.

[205] At the conceptual core of property lies what Blackstone termed in exaggeration the "total exclusion of the right of any other person in the

recognized by the U.S. Supreme Court.[206] One study estimated "that a formal title doubles the price of land in Brazil."[207] Another found "that land values are increased by a more modest" 4 percent in Ecuador.[208] Many estimates seem to fall within this range.[209] In Phnom Penh, Cambodia, for example, formal titles have increased the value of land by ten times the prior asking price.[210] In this case, the land was so valuable that the slums were cleared out, and the residents relocated—seemingly defeating one of the primary purposes of reform efforts by being too successful.[211] In other instances, such as in Manila, "squatters"[212] have sold their land to

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universe." Reed, *supra* note 53, at 487–88, 500 ("If having 'property' means anything, historically and legally, it is that the owner can exclude others from the resource owned and that others have a duty not to infringe this right."). According to Professor Reed's definition of exclusion, property has several characteristics, including: "(1) a constitutional right; (2) recognized and enforced by the laws of the state; (3) that excludes others from specifiable limited resources; (4) which are originally possessed or have been acquired without coercion, theft, or deception." *Id.* at 473.

[206] *Id.* at 488 n.86 (citing College Sav. Bank v. Fla. Prepaid Postsecondary Educ. Expense Bd., 527 U.S. 666, 673 (1999); *see also* Int'l News Serv. v. Associated Press, 248 U.S. 215, 246 (1918) (Holmes, J., concurring) ("Property depends upon exclusion by law from interference . . . ."); *cf.* Kaiser Aetna v. United States, 444 U.S. 164, 176 (1979) (referring to "one of the most essential sticks in the bundle of rights that are commonly characterized as property—the right to exclude others"); *Int'l News Serv.*, 248 U.S. at 250 (Brandeis, J., dissenting) ("An essential element of individual property is the legal right to exclude others from enjoying it.")).

[207] *See* Lee Alston, Gary Libecap & Robert Schneider, *The Determinants and Impact of Property Rights: Land Titles on the Brazilian Frontier*, 12 J. OF L., ECON. & ORG. 25, 25–26 (1996).

[208] *See* Jean O. Lanjouw & Philip I. Levy, *Untitled: A Study of Formal and Informal Property Rights in Urban Ecuador*, 112 ECON. J. 986, 986–87 (2002) ("[T]he value of property owned by a newly established household with no adult males can increase 46% with the acquisition of title.").

[209] *See, e.g.*, Emmanuel Jimenez, *Tenure Security and Urban Squatting*, 66 REV. ECON. & STAT. 556, 556–58 (1984) (finding an increase of 58 percent in the value of land after formal titling); Joseph Friedman, Emmanuel Jimenez & Stephen Mayo, *The Demand for Tenure Security in Developing Countries*, 29 J. DEV. ECON. 185, 185 (determining that formal titles increase the value of land in Manila by 25 percent).

[210] *See* Special Representative of the Secretary-General for Human Rights in Cambodia, *Land Concessions for Economic Purposes in Cambodia: A Human Rights Perspective*, Cambodia Office of the High Comm'r on Human Rights UN 22 (Nov. 2004), *available at* http://cambodia.ohchr.org/WebDOCs/DocReports/2-Thematic-Reports/Thematic_CMB14112004E.pdf.

[211] *See id.*

[212] "Squatters" is a common term in the formalization literature referring to impoverished citizens of the developing world who reside on property to which

middle-income residents who wait for the announcement of a titling program and then enjoy the leap in property values.[213] Thus, land titling may increase the risk that the politically powerful will take, or at least undercompensate, the poor for their land. Studies suggest that legal reform is only effective when the government can be held accountable, which is not necessarily true in all developing nations.[214]

There is also the difficult question to consider of whether a legal amnesty for those who have previously benefited from the invasion of another's land leads to a greater overall respect for property. Would such an action in fact create perverse incentives, i.e., the hope for future amnesty, thus increasing the motivation for property invasion and thereby sacrificing the integrity of nascent political coalitions?[215] In response, Geoffrey Payne, a British urban planning consultant, has recommended "temporarily insulating slums from" commercial land markets "by granting informal neighborhoods" land rights for a limited duration.[216] This interim period would allow land values to increase. Then, the neighborhood would receive a group land title, which then may be subdivided, avoiding future predatory practices,[217] and having the added benefit of maintaining local property allocations. It is important, though, to ultimately grant property rights over a long enough horizon such that investment incentives may "be defined in a way that makes them easy to observe, enforce, and exchange."[218]

Realizing the benefits from land registration seems to depend on the quality of governance and the nature of the intervention.[219] Cohesive political organization is essential to bring about lasting property reform enjoying majority support. Such organization should be catalyzed from the bottom up in keeping with

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they have no formal title. It is not meant here to be derogatory in any way.

213 Gravois, *supra* note 19.

214 *See* Deininger & Feder, *supra* note 87, at 257–58.

215 *Cf.* Mahmood Mamdani, *A Preliminary Critique of the Report of the Truth and Reconciliation Commission of South Africa (TRC)*, 32 Diacritics 33, 33–34 (2002) (discussing the role of amnesty in the South African TRC process).

216 Gravois, *supra* note 19.

217 *See* GEOFFREY PAYNE ET AL., SOCIAL AND ECONOMIC IMPACTS OF LAND TITLING PROGRAMMES IN URBAN AND PERI-URBAN AREAS: INTERNATIONAL EXPERIENCE AND CASE STUDIES OF SENEGAL AND SOUTH AFRICA 29 (2008), *available at* http://www.unrol.org/files/synthesis_report.pdf.

218 WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxii.

219 *See* Robbins, *supra* note 43, at 191.

polycentric governance to stand the best chance of enduring success,[220] while recognizing that there is still a coordinating role for governments, such as by reinforcing local cultural best practices, to avoid problems of gridlock as is discussed in Part IV.[221] Grassroots organizations and civil society generally should be encouraged if both governments and powerful local elites are to respect the various titles and claims held by people and groups and curtail mass expropriation.[222] Property titles are by themselves useless without a robust political culture and legal system to enforce them.[223]

Yet even if political coalitions are successful in formalizing the informal economy, is that necessarily the optimal outcome? The cost-effectiveness and long-term impacts of government intervention in property rights are not well known.[224] Moreover, formalizers can go too far in the other direction and spend so much effort on deciding how to formalize customary property relationships that they neglect to consider whether existing customary rules are, in fact, good rules. Some scholars, such as Professor Robert Cooter, have published studies suggesting that customary rules generated by closely-knit groups may be efficient when the law reflects those local social norms.[225] Yet others, such as Professor Michael Trebilcock, note that some customary law discounts the interests of outsiders, and particularly vulnerable minority groups, women,[226] indigenous peoples, and nomads.[227]

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220 *See* Ostrom, *supra* note 109, at 3–5.

221 *Cf.* Anne-Marie Slaughter, *Sovereignty and Power in a Networked World Order*, 40 STAN. J. INT'L L. 283, 283 (2004) (discussing network theory as applied to transnational regulatory networks and its progeny).

222 *See, e.g.*, Ostrom et al., *supra* note 180, at 282 (illustrating the benefits of local self-organization to manage common resources).

223 Robbins, *supra* note 43, at 189.

224 *See* Deininger & Feder, *supra* note 87, at 256.

225 *See* Robert Cooter, *The Rule of State Law and the Rule-of-Law State: Economic Analysis of the Legal Foundations of Development*, *in* ANNUAL WORLD BANK CONFERENCE ON DEVELOPMENT ECONOMICS 191, 191–92 (M. Bruno & B. Pleskovic eds., 1996) ("Alignment of state law with social norms enables citizens to economize on costly legal counsel by using morality as a guide to legality . . . . [Risky behavior can be] rational when state law reflects social norms. When this is the case most people perceive the law as just, and many people obey the law out of respect, thereby creating a rule-of-law state."); Robert Cooter, *Decentralized Law for a Complex Economy: The Structural Approach to Adjudicating the New Law Merchant*, 144 U. PENN. L. REV. 1643, 1643–44 (1996).

226 WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xx (finding

Examples from the U.S. experience include the mining associations in California, which excluded Mexican and Asian miners.[228] Without certain safeguards, formalizing these relationships could run the risk of codifying informal law lacking human rights protections. As an example of exclusion concerns that may arise, there are inheritance considerations. In many cultures, women and certain family members are not always eligible to inherit property.[229] Currently, these people have property rights as members of a group. But if property is privatized, these rights could disappear, potentially resulting in fewer, not greater, property rights protections for the overall population.[230] This further underscores the need for instilling localized, culturally relative formalization into titling efforts along with baseline human rights protections so as not to jeopardize at-risk populations.[231]

There is also the larger question to consider of how, in the words of Matthew Rosenberg, "informal property arrangements can" best "be incorporated into a formal body of" enforceable law.[232] What is the optimal mechanism, for example, for codifying the unwritten holdings of local, informal dispute resolution

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that control of land has been shown to be particularly imperative for women, whose asset ownership affects household spending, such as on girls' education).

[227] Michael Trebilcock, *Comment on Cooter The Rule of State Law and the Rule-of-Law State: Economic Analysis of the Legal Foundations of Development*, *in* ANNUAL WORLD BANK CONFERENCE ON DEVELOPMENT ECONOMICS 187–90 (Micheal Bruno & Boris Pleskovic, eds., 1996).

[228] DE SOTO, *supra* note 10, at 137–38, 145.

[229] *See, e.g.*, Elizabeth Cooper, *Women and Inheritance Sub-Saharan Africa: What Can Change?*, 30 DEV. POL'Y REV. 641, 641 (2012).

[230] Robbins, *supra* note 43, at 187.

[231] *See* Miller, *supra* note 33, at 133; Declaration on the Right to Development, G.A. Res. 41/128, art. 1, ¶¶ 1–2, U.N. Doc. A/RES/41/128 (Dec. 4, 1986), *available at* http://www.un.org/documents/ga/res/41/a41r128.htm. Other drawbacks of formalizing customary law include the fact that it may not keep pace with rapid environmental and technological changes, though it may stand a better chance than externally imposed one-sized-fits-all schemes such as the Dawes Act. *See* Eric A Posner, *Law, Economics and Inefficient Norms*, 144 U. PENN. L. REV. 1697, 97–98 (1996); Samuelson, *supra* note 11. Technology can also be a lifeline for squatter communities struggling with the travails in informality, as seen in the U.N. program to map slums using satellites in order to enhance legitimacy and enable the development of basic services. *See Kenya Slum Upgrading Project*, UN-Habitat http://www.unhabitat.org/content.asp?cid=668&catid=206&typeid=13 (last visited Mar. 24, 2014).

[232] Rosenberg, *supra* note 94.

bodies?[233] Formalizers such as de Soto argue that such a system could be organically generated, given that many local informal dispute resolution bodies use "quasi-legal" methods for resolving property disputes that share commonalities and could be codified.[234] Efficient conflict resolution is key if land formalization is to succeed, including "ensuring minimum standards for the rapid dispensation of justice, accountability, and transparency."[235] Professor Ostrom's work on polycentric governance similarly recognizes the critical importance of effective, low-cost dispute resolution.[236] The key for formalizers "is to show that informal property arrangements can" in fact be codified and enforced.[237] This would require "that the people have more direct political" and economic "control over their property" to the extent that their cultures allow.[238]

Codifying the people's law must also be done in an environmentally conscious manner since encouraging land claims can also hurt society by leading to environmental degradation. Motivated by potential gains, squatters with a high tolerance of risk will settle on and claim marginal land, such as land left vacant to prevent erosion, thus increasing social environmental costs.[239] However, there is a counterargument to this concern insofar as this initial "invasion" of property will not need to be repeated, since early landowners will leverage their property as capital to start businesses. Latecomers may then choose to devote their labor to

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[233] In answer to this issue, de Soto evokes another anecdote, describing passing a series of farms in rural Bali. Each property had a different dog that was defending it: "Those Indonesian dogs may have been ignorant of formal law, but they are positive about which assets their masters controlled." DE SOTO, *supra* note 10, at 162.

[234] Rosenberg, *supra* note 94.

[235] WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxi. *See* ANIL DIVAN, LEGAL AND JUDICIAL REFORM (2002) (discussing the need for legal reform in India); H.R. Bhardwaj, *Legal and Judicial Reforms in India*, Int'l Ctr. Alt. Dispute Resolution, *available at* http://www.icadr.org/articles/article_1.html (last visited Mar. 24, 2014) (investigating the use of informal Indian alternative dispute resolution systems termed 'Lok Adalats' (peoples' courts) to settle disputes and reduce judicial backlog).

[236] *See* Thomas Dietz, Elinor Ostrom & Paul Stern, *The Struggle to Govern the Commons*, 302 SCI. 1907, 1909, 1909 (2003).

[237] Rosenberg, *supra* note 94.

[238] *Id*.

[239] *See* Carol N. Rose, *Invasions, Innovation, Environment*, *in* HERNANDO DE SOTO AND PROPERTY IN A MARKET ECONOMY 21, 29 (D. Benjamin Barros ed., 2010).

the established economy rather than settling marginal land given higher possible rates of return. Again, insights from the field of polycentric governance provide evidence of local groups being able to sustainably manage their property.[240] Different cultures maintain varied perspectives and philosophies regarding environmental governance.[241] These various approaches can, in the best-case scenario, result in adaptive learning. In the worst case, they can spark enduring conflicts. Ensuring the sustainable use of resources while respecting local traditions requires infusing titling efforts with characteristics identified by advocates of polycentric governance, including the need for robust information sharing, effective conflict resolution, graduated sanctions, and adaptive frameworks that can flex with changing socioeconomic and environmental conditions as are discussed in Part IV.[242] Building such flexible titling efforts to formalize the people's law is no small feat. The picture is muddied still further when considering the empirical support for the links in the formalization chain, discussed next.

D. *Empirical Support for the Four Links in the Formalization Chain*

The primary assumptions underpinning the formalization hypothesis are that newly granted land titles may be used as collateral to generate loans to make improvements,[243] spur financial institutions, and increase growth rates.[244] It is uncontroversial that property is a key element for generating wealth, but significant questions arise from this basic premise. Would a market develop for property after titling? And does such a market exist in developing nations, albeit informally, already? Would the value be high enough to overcome transaction costs?[245] To parse these issues, studies demonstrate that four transfers must happen for formalization to function as advertised: (1) property

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240 *See* Ostrom, *supra* note 30, at 2.

241 *See* Dietz, Ostrom & Stern, *supra* note 236, at 1909.

242 *Id*.

243 Inequality can hamper growth because loans cannot be collateralized. *See e.g.* Philippe Aghion, Eve Caroli & Cecilia Garcia-Penalosa, *Inequality and Economic Growth: The Perspective of the New Growth Theories*, 37 J. ECON. LIT. 1615, 1615 (Dec. 1999).

244 Thomas, *supra* note 17, at 189–91.

245 *See* Thomas, *supra* note 17, at 189–91.

must be transformed into collateral; (2) collateral must be transformed into credit; (3) credit must be transformed into income; and (4) income must be transformed into capital markets.[246]

Empirical investigation yields mixed signals as to the actual occurrence and general robustness of these four transfers. First, in Peru it was shown that titling did not lead to an increase in available collateral of the kind that banks were likely to recognize.[247] However, studies from other nations, notably Thailand, have reached the opposite conclusion. Two studies in particular are illustrative. The first, by Professor Gershon Feder, examines the "effects of formal titles in four rural provinces in Thailand," finding that, regardless of the involvement of banks, "owners of untitled land are as likely to receive credit as farmers with titled land, even from banks."[248] For those Thai farmers "with untitled land, group lending" is substituted for collateral,[249] highlighting the more collective conception of property rights common in certain societies and providing further evidence against adopting a one-size-fits-all approach. But "the size of loans" that farmers with formalized property received from banks is over 50 percent larger.[250] The authors explain this result through the fact that "titled land can be used as collateral . . . having a formal title increases the value of land, and hence the value of the available collateral."[251] Indeed, due to imperfections in the credit markets, such as the inability of banks to foreclose on poor rural borrowers and the increased covariance of risk in farming communities due to the common risk factor of weather, large farm owners may be the only ones able to benefit from increased access to credit.[252]

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246 *See* Hans P. Binswanger & Klaus Deininger, *Explaining Agricultural and Agrarian Policies in Developing Countries,* 35 J. ECON. LIT. 1958, 1958–60 (1997); Timothy Besley, *Property Rights and Investment Incentives: Theory and Evidence from Ghana*, 103 J. POL. ECON. 903, 903–04 (1995).

247 *See* WORLD BANK POLICY RESEARCH REPORT*, supra* note 20, at xxvi.

248 Woodruff, *supra* note 115, at 1219; *see* Gershon Feder, *The Impact of Landownership Security: Theory and Evidence from Thailand*, 2 WORLD BANK ECON. REV. 187, 187 (1998); Gershon Feder, *Collateral Guaranties and Rural Credit in Developing Countries: Evidence from Asia*, 2 AGRICULTURAL ECON. 231, 231–32 (1988).

249 Woodruff, *supra* note 115, at 1219.

250 *Id*.

251 *Id*. at 1219 n.8.

252 *See* Deininger & Feder*, supra* note 87, at 246.

Second, the basic credit model maintains that formalized property rights increase a borrower's collateral value due to lower transaction costs, thereby increasing efficiency and, eventually, output. Some "evidence suggests that access to credit is increased" to an extent through formalized titling, assuming an efficient credit market and the absence of cost to property rights reform.[253] Yet other studies have found that titling does little to increase access to credit.[254] Some go so far as to conclude that in markets with low competition among lenders, it might not be optimal to have enforceable property rights, and that if property rights were formalized no efficiency gains would be realized.[255] Results from other regions of the world on the link between formal property rights and investment activity are similarly ambiguous. Researchers in Paraguay found that farmers with more than four hectares of land who have a formal title have good access to credit, but that having a formal title had no effect on farmers with less than two hectares of land.[256] Nevertheless, Timothy Besley determined that "farmers who have various transfer rights to their land in Ghana invest more in" improvements,[257] which can raise productivity.[258] Consequently, there is some support for the first two links in the formalization chain, but that evidence is far from definitive. Increased access to credit depends on the liquidity of the market and the existence of worthy investment projects; these conditions do not always play out in practice.[259]

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253 Woodruff, *supra* note 115, at 1219; *see* Tim Besley & Matreesh Ghatak, *The de Soto Effect* ii (STICERD Working Paper, London School of Economics & Political Science, Apr. 2009), http://eprints.lse.ac.uk/25429/1/de_soto_effect.pdf (finding that the positive impact of formalization varies "with the degree of market competition. Where competition is weak, it is possible that borrowers will be worse off when property rights improve.").

254 Woodruff, *supra* note 115, at 1219; *but see* WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxvi (noting that in Peru, property rights formalization has contributed to a 50 percent increase in the labor market).

255 *See* Besley & Ghatak, *supra* note 253, at ii (arguing that in inefficient systems, lenders would favor property rights reform, while poor borrowers would lobby against reform).

256 See M.R. Carter & P. Olinto, Getting Institutions Right for Whom: The Wealth-differentiated Impact of Property Rights Reform, XXI LASA Cong. (1998); Robert Ruben et al., Land Rights, Farmers' Investment, and Sustainable Land Use: Modeling Approaches and Empirical Evidence, in ECONOMIC POLICY AND SUSTAINABLE LAND USE 317, 326–27 (Nico Heerink et al. eds., 2001).

257 Woodruff, *supra* note 115, at 1219 n.7; Besley, *supra* note 246, at 903.

258 WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xix.

259 *See* Deininger & Feder, *supra* note 87, at 246, 256.

Where credit is given, some evidence for the third link, between credit and income, suggests that earnings are indeed increased by some 25 percent after formalization.[260] These findings show that if collateral could indeed "be translated into credit," it "would likely have a significant impact on earnings."[261] Once again, though, other studies have reached a contradictory conclusion, noting that "[t]here is . . . no evidence of either a credit effect or a measurable impact of titling on income or expenditure, consistent with the notion that, without complementary changes in banking and rules for land transactions, titling alone is unlikely to set off big changes in economic structure."[262]

In sum, there is relatively little data linking formalizing property titles to increased collateral, credit access, and thus poverty reduction.[263] Nor are there many studies demonstrating how widespread property ownership leads directly to advanced capital markets.[264] Further research is needed to delve more deeply into the links in the formalization chain, as well as the relationship between titling, trade, and entrepreneurship.

1. *Indirect Benefits of Formalization: Trade*

The connection between property and trade is in many ways stronger than its relationship to capital markets, and may be considered an additional if unintended component of the formalization chain. There is a strong empirical link between formalized property rights and trade promotion. As Professor Woodruff explains:

> I may not know you, but I can quickly confirm whether you own real estate, automobiles, or other assets. I can also learn whether you have pledged those assets in support of other transactions. And, within some limits, I can take those assets from you if you do not perform as promised in our relationship.[265]

Researchers investigated settlers on Brazil's Amazonian

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260 *See* Jonathan Morduch, *The Microfinance Promise*, 37 J. ECON. LIT. 1569, 1569–70 (1999).

261 Woodruff, *supra* note 115, at 1220.

262 Deininger & Feder, *supra* note 87, at 253.

263 *See* HARRISON & HUNTINGTON, *supra* note 148, at xxxiv.

264 Woodruff, *supra* note 115, at 1220 ("Capital markets function poorly in developing countries for reasons other than property title.").

265 *Id.* at 1217.

frontier to determine the veracity of this link between titling and trade, finding that "having title is perceived as an advantage by settlers, as it broadens the range of potential purchasers."[266] Other researchers surveyed titled and untitled landowners in Guayaquil, Ecuador, and "asked whether they would be able to contract with a stranger for the sale or rental of their property."[267] Those with formalized property claims were far "more likely to say they could do so."[268] Such an efficient titling system can also help prevent abuses of the rule of law.[269] Consequently, besides creating collateral and credit, property formalization may have other benefits, including trade promotion and entrepreneurship, but more empirical research is needed to confirm these links.

2. *Indirect Benefits of Formalization: Entrepreneurship*

Like trade, there is also empirical support for the proposition that titling incentivizes capital improvements to the home and incentivizes entrepreneurial activity. For example, one study found that in South Africa, title-holders invest in improving their homes more often than informal residents, which often raises property values.[270] Professor Robert Townsend similarly reported "data from separate surveys in rural Thailand, focusing on the formation of household enterprises," noting that households with "businesses are much more likely . . . to have titled land" and suggesting that titling "may encourage entrepreneurship."[271] Yet other work has found that banks are responsible for less than 10 percent of startup funding to entrepreneurs in developing economies, again demonstrating the reluctance of banks to use formalized titles as collateral.[272] One reason for this may be that collateral prices can

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266 Alston, Libecap & Schneider, *supra* note 207, at 29.

267 Woodruff, *supra* note 115, at 1217.

268 *Id.*; *see* Lanjouw & Levy, supra note 208, at 986, 1000–01.

269 *See* DE SOTO, *supra* note 10, at 198.

270 *See* Gina Shoeman, *Soweto Property Market Boom*, PROP. NEWS (Dec. 12, 2006), http://www.privateproperty.co.za/news/market-news/soweto-property-market-boom.htm?id=51; Erica Field & Maximo Torero, *Do Property Titles Increase Credit Access Among the Urban Poor? Evidence from a Nationwide Titling Program* (Mar. 2006) (unpublished manuscript), *available at* http://www.economics.harvard.edu/faculty/field/files/FieldTorerocs.pdf.

271 Woodruff, *supra* note 115, at 1219; ROBERT M. TOWNSEND, TOWNSEND THAI PROJECT HOUSEHOLD ANNUAL RESURVEY (2010), http://cier.uchicago.edu/data/annual-resurvey.shtml.

272 Woodruff, *supra* note 115, at 1219.

be very high, valued at many times the size of the principal loans in some countries.[273] "In Mexico, for example, banks require collateral averaging three times" the principal.[274] This is partly due to high foreclosure costs that may be reduced through a comprehensive property rights system.[275]

In summary, if there are not breaks in the formalization chain, then the literature demonstrates that there are at least stress points that require further empirical treatment. Though there is some support in Ghana, Paraguay, and Thailand that formal land titles increase access to formal credit and promote trade, other studies have found that urban squatters in Turkey, Mexico, South Africa, and Colombia enjoy little of the benefit of formalized property rights that formalizers suppose. For example, according to Professor Alan Gilbert, "[i]n Bogotá. . . property titles seem to have brought neither a healthy housing market nor a regular supply of formal credit."[276] Moreover, some banks increasingly "care more about stable employment than" land ownership in making loan decisions.[277] Thus, it is clear that there are other forces at work beyond simply the presence or absence of titling that explain the success or failure of these programs—capital markets and property rights regimes "function poorly in developing countries" for other reasons than property rights alone.[278] These include: foisting inflexible private property rights regimes on cultures unfamiliar with the concept; lack of grassroots political coalitions to promote culturally relative and holistic reform; and insufficient attention being paid to property relationships, such as leasing, that are common in the developing world.[279] Each of these factors must be addressed if property reform is to embrace polycentric principles and to become more lasting and culturally compassionate.

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273 *Id*.

274 *Id*. at 1219; Rafael La Porta, Florencio López-de-Silanes & Guillermo Zamarripa, *Related Lending*, 118 Q. J. ECON. 231, 231 (2003).

275 Woodruff, *supra* note 115, at 1220 ("The sort of broad-based, property registration system might help reduce foreclosure costs, but is not likely to be sufficient by itself.").

276 Gravois, *supra* note 19.

277 *Id.*

278 Woodruff, *supra* note 115, at 1220.

279 Libecap, *supra* note 86, at 1167–68.

E. *Summary: Why Formalization Is Not the Whole Answer*

This review of the empirical literature has demonstrated that the formalization theory is overly broad, trying to do too much with too little empirical support. What evidence exists demonstrates that at best the four links in the formalization chain are strained, and that cultural and political dimensions must be added to the classic formalization thesis for it to enjoy more universal resonance. At least, a distinction should be made between institutions that define property rights (including personal property) and those that regulate those who default on their obligations and may be deprived of their rights.[280] This clarification denotes the need for formalizers to consider studies from the field of polycentric governance to craft land titling programs that reinforce rather than replace local good governance while providing baseline human rights protections. But that is far easier said than done—it is so difficult that, in fact, there has arguably not yet been a single completely successful formalization program.[281] Land titling, then, is only part of the answer to solving urban poverty and galvanizing entrepreneurship.[282] This fact is made more evident below, by comparing the experiences of Indonesia and South Africa with the United States in order to exemplify the many nuances in property reform.

III. CASE STUDIES IN LAND TITLING: UNITED STATES, INDONESIA, AND SOUTH AFRICA

Applying the lessons from Part II to build successful property reform interventions requires analyzing case studies of land titling. Three in particular illustrate the divergent nature and types of titling systems, juxtaposing the property reform process in the United States that formalizers have pointed to as a successful model with contemporary reform efforts in Indonesia and South Africa. This Part begins by analyzing the relevance of the U.S. experience to titling efforts before investigating ongoing efforts at

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280 *See* Davis, *supra* note 18, at 189–90.

281 *See* WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xx (noting that land formalization programs impact "(a) households' ability to produce for their subsistence and to generate a marketable surplus; (b) their social and economic status and often their collective identity; (c) their incentive to invest and to use land in a sustainable manner; and (d) their ability to self-insure and/or to access financial markets.").

282 *Id.*

land titling further afield. Throughout, the importance of culturally relative and localized reform is emphasized, in keeping with polycentric principles.

A. *Property Rights in the American West and Developed World*

During the late nineteenth century, overlapping land claims were the norm in the American West, and squatting was common before adverse possession was an established legal doctrine,[283] just as is the case in many developing nations today. The United States overcame this state of affairs by codifying Locke's labor theory of value, according to de Soto.[284] The thinking goes that if a person makes improvements on their land, they should have the first chance at acquiring legal title to it. Formalizers including de Soto point to this "swift recognition of squatters' claims to land on the frontier" and the resulting drop in land prices as being ideal drivers for quick and efficient formalized property claims.[285] Although this principle does have some relevance to the situation of developing countries, significant differences abound. These include: the series of executive, legislative, and judicial efforts needed to form the modern U.S. property regime; the differences between rural and urban adverse possession; as well as the need for political organization on a massive scale to advocate for this long series of legislative changes.

The process of formalizing property rights in the West that culminated in the Homestead Act was far from straightforward. In fact, the process required action by the Supreme Court,[286] more than five hundred federal statutes, and thousands of state laws.[287] And despite all these efforts, it was largely retroactive—thirty-two

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283 Adverse possession occurs when a trespasser acquires ownership by occupying a parcel of land until the end of the statutorily set period of time runs out. *See, e.g.*, Matthew Baker, Thomas Miceli, C. F. Sirman,s & Geoffrey K. Turnbull, *Property Rights by Squatting: Land Ownership Risk and Adverse Possession Statutes*, 77 LAND ECON. 360, 360 (2001).

284 DE SOTO, *supra* note 10, at 17, 163. 172.

285 Libecap, *supra* note 86, at 1167.

286 The Supreme Court ruled against the rights of squatters in the 1823 case Green v. Biddle, 21 U.S. (8 Wheat.) 1 (1823). But in 1828, Congress determined that squatters performed a valuable public service by improving the land, and by 1856, twelve states had overturned this decision. DE SOTO, *supra* note 10, at 134. In 1878, the Supreme Court affirmed the practice of squatting on public and Western private lands in Jennison v. Kirk, 98 U.S. 453, 459 (1878).

287 DE SOTO, *supra* note 10, at 128.

million people and more than three hundred thousand farms were settled in the American West between 1785 and 1890, but only two million were settled legally under these progressive statutes.[288] The case study of the American West raises further doubt concerning the likelihood that the U.S. experience may be applied in the developing world. It is, after all, "hidden in thousands of pieces of legislation, statutes, regulations, court decisions, and institutions,"[289] which are exceedingly difficult to replicate in foreign contexts, much like the rationale behind newly independent nations choosing to institute civil rather than the more complex and abstract common law.[290] Similarly, property reform was often far from peaceful, being at times violent and tumultuous in the quest for balancing private claims with the common good.[291]

The long process of formalizing property rights was only relatively recently completed in parts of the developed world, demonstrating that any similar change in the diverse property regimes of developing nations would likely be a long campaign rather than a one-off political battle. For example, there were thirty-five mining guilds that handled property disputes between the prospectors in California through 1850, while the same process happened in claims associations in the Midwest until the twentieth century.[292] Germany completed its formalized property registration in 1896.[293] Japan only did so in 1958.[294] The battle between second-hand clothes dealers and peddlers in France lasted more than three hundred years and may have led to as many as sixteen thousand executions, stopping only with the French Revolution, according to de Soto.[295] Eventually, European governments were forced to retreat in the face of the flood of

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288 *Id.*

289 *Id.* at 48.

290 *See, e.g.*, *Common Law v. Civil Law Systems*, U.S. DEP'T OF ST., http://usinfo.org/enus/government/branches/messitte.html (last visited Feb. 19, 2014); Legal Systems, http://www.law.cornell.edu/wex/legal_systems (last visited Feb. 19, 2014).

291 *See* WILLIAM G. ROBBINS & JAMES CARL FOSTER, LAND IN THE AMERICAN WEST: PRIVATE CLAIMS AND THE COMMON GOOD 4 (2000) ("The struggle for control over western land has often been violent and tumultuous.").

292 DE SOTO, *supra* note 10, at 136.

293 *Id.* at 54.

294 *Id.* at 109.

295 *Id*. at 92.

extralegal businesses. Some nations adapted relatively well to a market economy (such as the United Kingdom), while in others, unrest and violence resulted (namely in Russia and France).[296] These examples demonstrate that it is at best problematic for developing countries to adopt a comprehensive, formalized property rights system. In fact, it is almost impossible in certain nations. Colonel Gadhafi burned all Libyan land titles in 1992,[297] placing the future of property law in post-Gadhafi Libya in question. And the problem is daunting in other nations. Only 7 percent of Indonesian land has a clear owner, as is discussed below.[298]

Besides the sheer difficulty of defining and adopting a comprehensive property system, other glaring differences between the American West and the developing nation experience include the contradictions of rural and urban adverse possessors, and the political mobilization needed to bring about lasting reform. A shantytown surrounding Mexico City is not the American West, where there were immense tracts of open land, not tiny parcels immediately adjacent to urban sprawl.[299] This difference between rural and urban squatters opens up a number of issues for which the U.S. property system does not have adequate analogies. Moreover, there were conflicting claims in the American West, but homesteaders were able to overcome the political power of elites through extensive, organized political opposition. Such grassroots mobilization was critical to the success of squatters in the West, but it is not clear how well marginalized groups in developing countries will be able to similarly overcome these political barriers absent broader rule of law reform incorporating popular sovereignty and free and fair elections. For example, in the United States, the prospectors and farmers enjoyed a favorable federal land policy, "educational opportunities, the right to vote (at least for males), and publicly financed infrastructure"[300]; they were not

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296 *Id.* at 106.

297 *Id.* at 90–91; *How Can Post-Gaddafi Libya Best Achieve Justice Without Descending into a Cycle of Vengeance?*, LIBYATV (June 17, 2011), http://liveword.ca/libya/2011/06/17/8415/.

298 DE SOTO, *supra* note 10, at 91.

299 *See* Thomas, *supra* note 18, at 189–90 (pointing out that there may be some relevance for the Homestead Act in Brazil with indigenous peoples in Amazonia).

300 Libecap, *supra* note 86, at 1167.

a socioeconomic group subjugated by an entrenched elite.[301] Not all of these factors are as plentiful, or indeed even present, across the developing world, including Indonesia.

B. *Analyzing Reform Efforts in Indonesian Land Law*

In order to determine the veracity of the views of the formalizers and their critics and the applicability of the developed world experience to emerging economies, the performance of the Indonesian titling program is considered as a case study. The Indonesian branch of the U.S. NGO Mercy Corps analyzed urban land implications for low-income urban dwellers in Jakarta.[302] Its report advocates that "[l]and is the catalyst ingredient upon which all other livelihood opportunities depend,"[303] and summarizes how well Indonesia has implemented needed reforms and what barriers to formalization still exist. Consequently, Mercy Corps presupposes the value of property rights formalization, stating in its report that: "[s]ecure land that is capable of being developed assures shelter; shelter allows for some form of housing; housing provides a place in which to live, oversee a family, earn a living; and onward up the ladder of well being."[304] The report goes on to detail that Indonesia is not optimizing its land to catalyze equitable development. The stated reasons for this failure include "[c]ontradictory land laws, convoluted administration, [and] high certification costs."[305] But implicit reasons include many of the

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[301] DE SOTO, *supra* note 10, at 91.

[302] *See Indonesia*, MERCY CORPS, http://www.mercycorps.org/indonesia (last visited Feb. 19, 2014).

[303] *Summary of Land Tenure Research Findings in Jakarta*, MERCY CORPS URBAN BULLETIN NO. 2, 2 (Mar. 2008) [hereinafter MERCY CORPS].

[304] *Id.* The Mercy Corps report notes that informal dwellings are not as bad nor as insecure as they may seem, arguing that Indonesia's poor enjoy some degree of tenure since land planning and ownership is not enforced. At the same time, they "are vulnerable to loss of livelihoods and assets, threats to security, and human rights violations due to the fact that they occupy unregistered lands, thus lacking formal ownership status." *Id.* Some scholars have also argued that land formalization helps the labor market in that people "no longer [feel as though] they have to stay at home to protect their property." Robbins, *supra* note 43, at 176 (citing Durand-Lasserve & Selod, *supra* note 120). Though this claim has been subsequently disputed by survey data, including in Indonesia, showing that many people holding informal property in fact feel relatively secure, citing the fact that in some cases they have squatted for more than twenty years without reprisals. *See* MERCY CORPS, *supra* note 303, at 4, 17, 23.

[305] MERCY CORPS, *supra* note 303, at 2.

barriers discussed in Part II, such as varying types of property rights, political elites wanting to maintain the status quo, and the difficulties in formalizing diverse cultural property traditions. Before moving on to discuss these findings, though, a brief outline of reform efforts in Indonesian land law is offered to provide a framework for discussion.

The history of reform of Indonesian land law stretches back decades, and is mirrored in the experience of other nations that have undertaken to formalize their informal sectors. The first push for formalization occurred when Indonesia enacted the Basic Agrarian Law (BAL) in 1960, which "was intended to bring all land registration under the administrative umbrella of the Indonesian National Land Agency (BPN)."[306] The BAL overruled both colonial and traditional customary laws to void former land registrations "established during the Dutch colonial period."[307] Yet in practice it failed to simplify the complex land holdings that are the norm in Indonesia. Land administration in Indonesia remains "divided among three principle agencies: the Ministry of Forests oversees all of Indonesia's forests," which comprise 70 percent of the total land area; BPN "administers the remaining lands (much of it urban); and the National Development Planning Agency (BAPENAS) maintains responsibility for overall land policy."[308] Partly as a result of this bureaucratic inefficiency and high barriers to reform, as of 2008 approximately 79 percent of Indonesian land remained unregistered.[309]

The Indonesian example confirms many of the barriers and difficulties in property rights formalization discussed in Part II and which were present in the U.S. context. These include: (1) formalizing property rights is a long and cumbersome process; (2)

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[306] *Id*. at 4; *see The Property Laws of the Republic of Indonesia*, INDOCASA, http://www.indocasa.com/php/indocasa_law.pdf (last visited Feb. 19, 2014); ERNA HERYANI & CHRIS GRANT, LAND ADMINISTRATION IN INDONESIA 6 (2004), *available at* http://www.fig.net/pub/jakarta/papers/ps_04/ps_04_3_heryani_grant.pdf.

[307] MERCY CORPS, *supra* note 303, at 4; *see Colonial Period of Indonesia*, INDONESIA-INVESTMENTS, http://www.indonesia-investments.com/culture/politics/colonial-period/item178 (last visited Feb. 19, 2014) (discussing the history of the Dutch occupation of Indonesia).

[308] MERCY CORPS, *supra* note 303, at 6; HERYANI & GRANT, *supra* note 306, at 7.

[309] *See* MERCY CORPS, *supra* note 303, at 7; WORLD BANK, LAND POLICY, MANAGEMENT AND ADMINISTRATION 1 (2005).

there are diverse interpretations of property rights dependent on cultural traditions and context; and (3) complicated procedures and high bureaucratic costs promote the growth of informal economies. First, despite extensive legislative attention, it is both a difficult and lengthy process to formalize the informal economy. Though one comprehensive property system was envisioned under BAL, "in practice, a multi-tiered legal system exists" for traditional disputes (*adat*) and colonial property rights.[310] These ongoing contradictions perpetuate unpredictable titling, tenure, and property enforcement, despite more than two thousand pieces of land use legislation aimed at simplifying the system.[311] This figure may be compared with the more than one thousand pieces of legislation that the U.S. Congress passed over more than a century to formalize property rights,[312] demonstrating that quantity alone will not lead to real reform. As a result, formalizing depends not on one or several laws, but rather a complex network of interconnecting customary norms, statutes, and local regulations that together comprise an effective property rights system. Even then, reform requires enforcement and the presence of myriad social factors, as discussed in Part II. As the Indonesian experience confirms, such a system is difficult to replicate in the developing world, despite numerous attempts to do so.

Second, there are many different levels and forms of property rights, and in many situations individual private property rights are antithetical to specific cultural practices. For example, many different levels of property rights are available in Indonesia. *Hak Milik* is a "right of ownership" over land including "the earth underneath, water, and air above it, as long as they are directly required in connection with the land use."[313] In contrast, *Hak Guna Bangunan* gives the property holder a "right to construct and occupy buildings on state or private land" for a fixed period of

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[310] MERCY CORPS, *supra* note 303, at 4; *see* HERYANI & GRANT, *supra* note 306, at 4.

[311] HUMAN RIGHTS WATCH, CONDEMNED COMMUNITIES: FORCED EVICTIONS IN JAKARTA 20 (2006), *available at* http://www.hrw.org/en/reports/2006/09/05/condemned-communities.

[312] *See* DE SOTO, *supra* note 10, at 48.

[313] MERCY CORPS, *supra* note 303, at 5; *see* HERYANI & GRANT, *supra* note 306, at 3 ("[There are] five types of basic tenure with Hak Milik the highest and nearest to freehold tenure.").

time.[314] *Hak Pakai* is a right of use that may be given to individuals but is nontransferable without express permission.[315] Other property rights also exist, such as *Hak Guna Usaha*, which applies to cultivation only, and *Hak Pengelolaan*, which is synonymous with a right of land management "given to autonomous regions and public bodies."[316] Property that is unregistered with the BAL only enjoys *Girik*, derived from colonial law, which allows for a "quasi-legal ownership status which is proven by a tax letter."[317] This bifurcation of property rights into classifications is distinct from the transfer of property rights in many Western nations including the United States, though even in common law jurisdictions property is far from a singular concept as was discussed in Part I.[318]

As a result of how the BAL is set up, there are relatively few people who enjoy formal property rights in Indonesia, and as a result little property may be used as collateral, limiting the amount of capital available for development purposes.[319] This brings us to the third issue—complicated procedures promote the growth of informal economies. In Indonesia, complex procedures and costly, long processing times curtail the ability of many urban residents to certify their land through the BPN. According to Mercy Corps, "[a] study in 2000 noted that the land registration process in Jakarta involves seventeen steps, eighteen different agencies . . .

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[314] MERCY CORPS, *supra* note 303, at 5; *see* HERYANI & GRANT, *supra* note 306, at 3.

[315] MERCY CORPS, *supra* note 303 at 5; *see* HERYANI & GRANT, *supra* note 306, at 3; *Property Laws of the Republic of Indonesia*, *supra* note 306, at 1.

[316] MERCY CORPS, *supra* note 303, at 5; *see* HERYANI & GRANT, *supra* note 306, at 3.

[317] MERCY CORPS, *supra* note 303, at 5.

[318] *See Introduction to Property Rights: A Historical Perspective*, UNIV. OF ILL., http://urbanext.illinois.edu/lcr/propertyrights.cfm (last visited Feb. 19, 2014).

[319] For example, there is evidence suggesting that the urban Indonesian poor in Jakarta are unable to use their land as a formal asset to build collateral. MERCY CORPS, *supra* note 303, at 27. *But see* Hans-Joahcim Dübel, *Contractual Savings for Housing*, *in* HOUSING FINANCE POLICY IN EMERGING MARKETS 93, 122 (Loïc Chiquier & Michael J. Lea eds., 2009) ("Indonesian State Savings Bank [has] implemented a 'community mortgage loan,' which is used by low-income persons working in the informal sector to obtain land and construct housing. The credit is granted not to individuals, but to entire communities . . . ."). Further research is needed specific to the Indonesia context analyzing the other links in the formalization chain.

and an average of two to three years to complete."[320] Nor is there a standard and predictable fee system in place since processes differ amongst the agencies, and costs depend on the characteristics of each parcel of land.[321] Squatters have no formal right to the land upon which they reside—they may apply for registration, but it is rarely granted. Even if the application is approved, poor government enforcement of property rights is common in Indonesia.[322] Due to these high costs, most urban Indonesians "certify their land through *kelurahan* (village) procedures,"[323] promoting the growth of local, informal dispute resolution that the Indonesian government has not attempted to codify, perhaps for the reasons listed above. Such a codification would help promote culturally relative, localized reform that could lead to the establishment of markets for diverse types of property rights, which could then be used for collateral.

Reforming this complex web of property ownership is problematic, made more difficult by the undefined and uncoordinated roles of the various land agencies.[324] The emphasis

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[320] MERCY CORPS, *supra* note 303, at 7; HUMAN RIGHTS WATCH, *supra* note 311, at 21(citing Mohammad Zaman, *International Comparative Review: Displacement of People and Resettlement*, NAT'L DEV. PLANNING AGENCY & NAT'L LAND AGENCY 25 (2000)).

[321] *See* HERYANI & GRANT, *supra* note 306, at 3.

[322] *See* MERCY CORPS, *supra* note 303, at 9; S. Ramesh, *Indonesia Govt Has Strict Laws Against Burning But Has Enforcement Issues: Balakrishnan*, CHANNEL NEWS ASIA (June 16, 2013, 6:46 PM), http://news.xin.msn.com/en/singapore/indonesia-govt-has-strict-laws-against-burning-but-has-enforcement-issues-balakrishnan (reporting on local-level enforcement issues as being paramount in addressing endemic Indonesian environmental problems); WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxiii ("Failure to give legal backing to land administration institutions that enjoy social legitimacy limits their ability to draw on anything more than informal mechanisms for enforcement."); *see also* Jude Wallace, *Indonesian Land Law and Administration*, *in* INDONESIA: LAW AND SOCIETY 191, 209 (Timothy Lindsey ed., 2008) (discussing Indonesian property law in the context of the national commercial law environment).

[323] MERCY CORPS, *supra* note 303, at 5; *see* Monica Martinez-Bravo, *The Role of Local Officials in New Democracies: Evidence From Indonesia* 3 (Cent. for Mon. and Fin. Studies, Working Paper No. 1302, 2013); *Access to Justice Assessment for Indonesia*, AM. BAR ASSOC. 10 (2012), *available at* http://www.americanbar.org/content/dam/aba/directories/roli/indonesia/indonesia_access_to_justice_assessment_2012.authcheckdam.pdf.

[324] MERCY CORPS, *supra* note 303, at 6; *see* WORLD BANK, CITIES IN TRANSITION 82–83, 99 (2003), *available at* http://elibrary.worldbank.org/content/book/9780821345917.

for reformers has been placed on privatization rather than legitimating localized regimes, which has resulted in little progress towards addressing endemic informality.[325] This state of affairs is compounded by bureaucratic inefficiency of the Indonesian property regime, as discussed in more detail in the next paragraph.

High bureaucratic barriers to property registration have led to an increase in the Indonesian informal economy. Approximately 80 percent of Indonesia's residential buildings are self-built, according to Mercy Corps.[326] This state of affairs feeds confusion and misinformation. For example, despite the fact that the great majority of land in Indonesia is held illegally, 80 percent of respondents to one survey reported that they "own their land," while 17 percent said that they "occupy land," and 3.5 percent have the "permission of a landowner."[327] Of these respondents, though, only 43 percent actually possess documentation from BPN "that guarantees land ownership . . . ."[328] Of the informal group, 27 percent are quasi-formal requiring "BPN certification before being formally recognized"; 63 percent "hold other informal documentation"; and 11 percent possess no documentation whatsoever.[329] However, of those respondents who do hold documentation, many informal residents only paid for "landmark," a document "stating the land's territorial boundaries" costing $5.50 USD as of 2008, which often cannot be used as collateral.[330] The respondents to the Mercy Corps survey cited several reasons for not securing formal ownership documentation, including: (1) "[i]nability to obtain formal [titling] documents . . . [to] land [that] is owned by another party"; (2) disregard of "land certification"; (3) the cost of BPN certification; and (4) lack of information.[331]

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325 *See, e.g.*, Efa Yonnedi, *Privatization, Organizational Change and Performance: Evidence from Indonesia*, 23 J. ORG. CHANGE MGMT. 537, 537 (2010) (reviewing the history of privatization in Indonesia).

326 Id. at 12.

327 *Id.* at 21.

328 *Id.*

329 *Id*. at 22.

330 *Id*. at 20; *see also* Dail Umamil Asri, *Participatory Planning Toward an Integrated Transportation Master Plan for Jabodetabek*, 5 PROC. OF THE E. ASIA SOC'Y FOR TRANSP. STUD. 2308, 2308 (2004), *available at* http://www.easts.info/on-line/proceedings_05/2308.pdf (discussing the benefits and drawbacks of increasing regional empowerment of property rights in Indonesia in the transportation context).

331 MERCY CORPS, *supra* note 303, at 22.

Whether or not Indonesians actually have a formal right to their property, inside these properties a great deal of commercial activity is taking place. The Mercy Corps survey found that 63 percent of respondents in Jakarta were low-income residents, 33 percent of whom also maintained home businesses.[332] Furthermore, the Mercy Corps report found that property location is predicated on an array of factors including proximity to family.[333] This is in contrast to the methodology of de Soto and his team, who minimized the importance of property location on value.[334] In fact, many Indonesians unsurprisingly choose where they want to live based on proximity to family, workplace, and affordable land prices.[335] This outcome is more in line with Robbins' findings, which suggest that "[t]he physical scale, density and location of . . . settlement[s] . . . have profound effects on the worth, fungibility and use of any property."[336]

These forces have contributed to the huge amount of unregistered Indonesian property, promoting high rates of property disputes, especially in areas of rapid growth such as Jakarta, and a biased land development process favoring private development and instituting high certification costs and frequent evictions.[337] Residential eviction, only occasionally with accompanying compensation, has been used as a mechanism for land clearance by the Jakarta Municipal Government.[338] Since urban residents are typically unable to prove formal ownership, they may be summarily evicted without notice or compensation,[339] which is an increasingly common practice in other nations such as Brazil, as was described in the introduction.[340] From 2001–2005, at least eighty-six cases of eviction occurred, impacting seventy-five thousand Indonesians.[341] In 2006 alone, 146 cases were

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332 *Id.* at 20.

333 *Id*.

334 *See* Thomas, *supra* note 17, at 189–91.

335 MERCY CORPS, *supra* note 303, at 20.

336 Robbins, *supra* note 43, at 185.

337 MERCY CORPS, *supra* note 303, at 22, 27.

338 *See, e.g.*, Lenny Tristia Tambun, *Jakarta Govt Will Not Compensate Houses Around Pluit Dam: Basuki*, JAKARTA GLOBE (May 9, 2013, 4:50 PM), http://www.thejakartaglobe.com/news/jakarta-govt-will-not-compensate-houses-around-pluit-dam-basuki/.

339 MERCY CORPS, *supra* note 303, at 12.

340 *See Brazil Police Storm Landless Settlement*, *supra* note 2.

341 MERCY CORPS, *supra* note 303, at 12.

reported,[342] with "[t]he highest rates . . . [being in] North Jakarta."[343] Consequently, though Indonesians formerly did not perceive security of tenure as a primary problem, they are becoming increasingly worried.[344] So far, though, most respondents stated that they were primarily concerned with environmental threats, including flooding and fires, followed by eviction and crime.[345] But as the number of evictions increases, so too may the importance of property formalization. If true reform is to occur, it must begin at the grassroots level. Organized groups could deter government or private actors from embarking on eviction programs for fear of sparking unrest and rioting. Above all, localized and culturally relative reforms should be enacted and different types of property rights legitimated if the broken Indonesian property system is to be mended, including addressing the growing autonomy of regional power centers in Indonesia under the ongoing decentralization program.[346]

The implications and urgency of land reform in Indonesia come into sharp relief as a result of the mining boom now underway. A single transaction reportedly moving towards approval by Indonesia's Ministry of Forestry would open some 1.2 million hectares of forest to Aceh, a multinational mining company, "for mining, logging and palm oil production . . . ."[347] In total, some "84 million hectares of land have taken the largest portion of the country's land, followed by forest concessions," meaning that, due to overlapping legislation, the Indonesian government has actually granted more land for mining concessions than exists in all of Indonesia.[348] For example, the Indonesian

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342 *Id.*; Open Letter from Jakarta Residents of Concern to the Rector and Students of Diponegoro University in Semarang (July 3, 2007), http://ecosocrights.blogspot.com/2007/08/open-letter-to-rector-and-students.html.

343 MERCY CORPS, *supra* note 303, at 22.

344 A large majority of Indonesian respondents to the Mercy Corps survey stated that they felt secure, including 100% "with formal documentation," 95.5% with quasi-title, and 70.5% "with informal documentation . . . ." *Id.* at 23. For a now somewhat dated compilation of takings cases in Jakarta, see ADVISORY GRP. ON FORCED EVICTIONS, UN-HABITAT, FORCED EVICTIONS—TOWARDS SOLUTIONS? 54–57 (2005), *available at* http://www.unrol.org/files/1806_alt.pdf.

345 *See* MERCY CORPS, *supra* note 303, at 24.

346 See, e.g., Heryani & Grant, supra note 306, at 11.

347 *Aceh Claims Deal to Open 1.2M ha of Protected Forest to Logging & Mining*, MONGA BAY (Mar. 14, 2013), http://print.news.mongabay.com/2013/0314-aceh-spatial-plan.html.

348 *See* Muninggar Sri Saraswati & Musthofid, *Indonesia's Concession Areas*

government recently granted a major land concession in Eastern Java to Exxon Mobil for fossil fuel and natural gas exploration.[349] This historic oil-producing region boasts a medley of property regimes, including agricultural lands owned by local citizens, communal property controlled by villages, and forested lands belonging to a state-owned forestry company.[350] But the growing power of the central state in Indonesia, combined with the allure of mining profits, means that oftentimes informal property rights are only provable by a tax payment letter, if that, making it relatively easy for the state to take over land and give it to private businesses.[351] After allegations of corruption and intimidation, public outrage led to campaigns seeking to curtail the sales and enhance local community management.[352] The Eastern Java example is far from an isolated incident—nearly two million hectares of land are threatened in Papua New Guinea alone as a result of turning "forest areas" into state land.[353] In summary, the impact of economic growth in Indonesia, particularly the rapid expansion of its mining sector, is taking advantage of already malleable local land laws to facilitate takings, at times without "just compensation."[354] Over time, these takings will likely have

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Exceed the Country's Total Area, JAKARTA POST, Sept. 28, 2002, *available at* http://www.thejakartapost.com/news/2002/09/28/concession-areas-exceed-country039s-total-area.html.

[349] *See* Erwin Suryana & Dianto Bachriadi, *Land Grabbing and Speculation for Energy Business: A Case Study of ExxonMobil Business Expansion in Bojonegoro of East Java, Indonesia*, Global Land Grabbing II Conf., Oct. 17–19, 2012, at 1, 5, 7.

[350] *Id*. at 10.

[351] *Id*. at 10–11. According to Suryana and Bachriadi, the acquisition process itself was undertaken at the local level through villages and sub-districts. *Id*. at 14–16. The land itself stays registered under the seller to avoid suspicion through the acquisition process, which can take five-to-six years. *Id*. at 15. This long process provides a disincentive to go through formal institutions, causing some farmers to prefer to deal directly with speculators who pay cash quickly. *Id*. at 16–17.

[352] *Id*. at 19–22.

[353] *See* UNIV. OF SYDNEY CENTER FOR PEACE & CONFLICT STUDIES: WEST PAPUA DESK, *The New Threat to West Papua's Forests: Oil Palm Plantations*, at 1,http://sydney.edu.au/arts/peace_conflict/docs/Papua_Desk_the_New_threat_to_West_Papua_forests_Oil_Palm.pdf (last visited Feb. 19, 2014).

[354] *See* Law No. 25 of 2007 art. 7 (1); I.B.R. Supancana, *Legal Issues Regarding Foreign Investment and the Implementation of the Japan-Indonesia Economic Partnership Agreement*, 4 JEAIL 131, 138 (2011). It is worth comparing the U.S. and Australian takings laws to the Indonesian example, given that these regimes are well developed and the latter is one of Indonesia's regional

significant environmental and human costs. This situation will likely not be dramatically improved without deeper property rights and broader legal reform efforts to help ensure a more sustainable path to economic development and clarified requirements for what constitutes just compensation.

The Eastern Java example in particular illustrates the myriad difficulties associated with reforming Indonesian property law. First, local land use traditions, including community property, were largely ignored in this sale.[355] Takings are not a new phenomenon in Indonesia—indeed they were prevalent during the colonial area such as with the 1870 Act,[356] and again following independence in 1957.[357] Contemporary takings, though, are made easier by informal land ownership and driven in part by the profits to be made from mining. Despite a coalition of farmers unions and civil society groups and a reform era from roughly 1998 to 2004, the procedure of mass takings has not yet been arrested—in fact, it has been reinforced with Act No. 2012.[358] Indeed, in some ways this ongoing debate in Indonesia is reminiscent of the takings reform aftermath of *Kelo v. City of New London*, which dealt with the taking of private property for economic development purposes.[359] The open, and as yet largely unaddressed question, is whether formalization might help curtail these practices or at least make it easier to attain just compensation by enforcing property rights against both the state and private sector interests.

The non-profit HuMa, active in myriad community building and environmental causes, provides some final helpful

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neighbors. U.S. CONST. amend. V. ("No person shall . . . be deprived of life, liberty, or property without due process of law; nor shall private property be taken for public use, without just compensation."); see AUSTRALIAN CONSTITUTION s 51(xxxi) ("The Parliament shall . . . have power to make laws . . . with respect to . . . the acquisition of property on just terms from any State or person for any purpose in respect of which the Parliament has power to make laws.").

355 *See* Suryana & Bachriadi, *supra* note 349, at 2.

356 *See id*. at 4.

357 *See* G. C. Christie, *What Constitutes Taking of Property in International Law*, 38 BYIL 307, 308 (1962) ("The property of Dutch nationals in Indonesia was first seized in December 1957 under the authority of various provisions of Dutch law, retained by Indonesia, which authorized seizure of property in times of national emergency.").

358 *See* Suryana & Bachriadi, *supra* note 349, at 2.

359 *See* Kelo v. City of New London, 545 U.S. 469, 480–83 (2005) (construing "public purpose" broadly under the Fifth Amendment).

perspectives on reform efforts. For one, national property laws have not been friendly to custom, often preferring instead a one-size-fits-all approach largely ignoring the diverse cultural traditions that may be illustrated by the more than seven hundred languages and dialects spoken throughout Indonesia.[360] Reform at multiple scales is needed, including addressing forest issues, agrarian problems, and urban property rights concerns. A reform roadmap is being undertaken in part by the Ministry of Forests in consultation with civil society groups including HuMa, but this remains in the planning stages.[361] This is partly because of political barriers put up by the mining industry and other key stakeholders that benefit from maintaining the property status quo, applying the discussion from Part II regarding vested elites in the Indonesian context.[362]

Instead of top-down reform, HuMa is working to foster local good governance through ecologically based legal reformation.[363] HuMa provides an example of an active civil-society program attempting to instill best practices from the bottom up consistent with polycentric principles. HuMa is currently working on the need for greater recognition of communal ownership and property transfer practices.[364] The organization is making some headway, but problems persist inhibiting reform, such as efforts regarding dispute resolution. Bringing cases is difficult since evidence of land tenure is often lacking due to informal local practice and periods of turmoil in which records were burned as discussed above. If evidence does exist, then criminal, civil, administrative, and even constitutional remedies may be available.[365] Otherwise,

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360 *See A Diverse Nation, About Indonesia*, EMBASSY OF INDONESIA. http://www.embassyofindonesia.org/about/people.htm (last visited Feb. 19, 2014).

361 *See* ARNOLDO CONTRERAS-HERMOSILLA & CHIP FAY, STRENGTHENING FOREST MANAGEMENT IN INDONESIA THROUGH LAND TENURE REFORM: ISSUES AND FRAMEWORK FOR ACTION iii, 1–9 (2005), *available at* http://www.forest-trends.org/documents/files/doc_107.pdf; Andiko, *Forest Conflict and Case Studies of Conflict Resolution, Role and Perspective of Forest Communities in the Indonesian Reform Process* (July 12, 2011), *available at* http://www.rightsandresources.org/documents/files/doc_2552.pdf.

362 *See* Deininger & Feder, *supra* note 87, at 238–39, 257.

363 *See About Us*, HUMA, http://huma.or.id/en/tentang-huma (last visited Feb. 19, 2014).

364 *See id*.

365 Act No. 18 (2004); Act. No. 41/199.

dispute resolution in the tradition of *adat* is often used.[366]

Ultimately at stake in Indonesia is not only the survival of local cultural practices, but the sustainable development of resources, and even Indonesia's contribution to global climate change, given that deforestation makes the country the third largest carbon polluter in the world.[367] The poor remain vulnerable to public- and private-sector interventions in Indonesia despite decades of land reform efforts. As has been shown, due process protections are lacking, while property holders are often subject to biased conflict resolution should their ownership be contested, and face myriad challenges to their security and well-being. The Indonesian case study has thus demonstrated the difficulties of informal land tenure, as well as the barriers to reform discussed in Part II. To help further consider the lessons from the Indonesian property regime, let us consider an illustrative example from another region of the world: South Africa.

C. *The South African Land Titling Experience*

As is the case in Indonesia, "there is considerable debate about the wisdom of formalizing property rights in Africa via titling efforts."[368] In particular, there is criticism "of state-led initiatives that create more individualized property rights in situations where communal rights may be more appropriate."[369] A new system of formalized individual property rights can undermine the governance of traditional communities that rely on a custom of shared ownership.[370] In South Africa, for example, a characteristic of certain communities of homeowners who occupy

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366 *See, e.g.*, Sayaka Takano, *The Development of ADR in Post-Suharto Indonesia: Adat and Dispute Resolution in Medan District Court*, L. & SOC. ASSOC. CONF. (June 3, 2012), http://citation.allacademic.com/meta/p558980_index.html.

367 *See* Jesse Zwick, *And The World's Third-Largest Carbon Polluter Is. . .*, NEW REPUBLIC (Oct. 27. 2009), http://www.newrepublic.com/blog/the-vine/copenhagen-not-just-about-us-and-china#; *see also Property Rights and Land Policy*, MCC, http://www.mcc.gov/pages/sectors/sector/property-rights-and-land-policy (last visited Feb. 19, 2014) ("In Indonesia, lack of clarity regarding licensing of rights to use land and other natural resources and unsettled village boundaries contribute to 'spatial uncertainty' which significantly hinders government land use planners and service agencies from effectively managing critical natural resources and deters sustainable investments.").

368 Boudreaux, *supra* note 73, at 318.

369 *Id*.

370 *See* Rose, *supra* note 239, at 32–34.

older homes is that they rely on informal savings clubs (*stokvel* or *umgalelo*)[371] rather than commercial banking institutions to finance needed improvements. Professors Richard Barrows and Michael Roth from the University of Wisconsin-Madison succinctly summarize the situation:

> Economists using a narrowly defined neo-classical model have derived the hypothesis, often treated as an empirically demonstrated proposition, that traditional African systems of "communal" land tenure are inefficient when land has scarcity value. By way of contrast, individualized tenure, typically defined as demarcation and registration of freehold title, is viewed as superior because owners are given incentives to use land most efficiently and thereby maximize agriculture's contribution to social well-being.[372]

This passage evokes the contested theoretical arguments that form the basis of titling projects for the poor in that some argue that a communal property system, "which is owned jointly by all members of a given society—each of whom holds rights to use the group's resources— . . . may not effectively internalize gains resulting from a rise in property values."[373] But that is not necessarily the case, as has been shown.[374] According to Karol Boudreaux, "[t]itling projects may be most effective where land values and returns on land are high and where collateral-based lending already exists."[375] But for the rural poor, formal titling may be less valuable due in part to transaction costs associated with implementing such a complex undertaking.[376] Moreover, the history of property reform in Africa, including in Ghana, Sierra Leone, and Liberia, shows how communal property rights have been subsumed to the state such that corporate investors now no

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[371] Boudreaux, *supra* note 73, at 331; Laura du Preez & Charlene Clayton, *You Can Bank on High Costs*, PERS. FIN., Aug. 21, 2004. *See also* Financial Diaries Project, *available at* http://www.yearofmicrocredit.org/docs/diaries/ UNDP (discussing how one South African woman used an umgalelo to save money to build a home).

[372] Boudreaux, *supra* note 73, at 316 (citing Richard Barrows & Michael Roth, *Land Tenure & Investment in African Agriculture*, 28 (2) J. MODERN AFR. STUD. 265, 265 (1990)).

[373] *Id*.

[374] *See infra* Part II.B.

[375] Boudreaux, *supra* note 73, at 318.

[376] *See id*.

longer must deal with indigenous communities.[377] As a compromise, "different legal tools, such as secure certificates . . . may provide many of the benefits of titling without the high costs."[378] The diverse array of property rights, especially communal relationships, shows that instituting a one-size-fits-all formalization program divorced from social norms and mores is ill-advised, as is explored further in Part IV.

IV. NEITHER MAGIC BULLET NOR LOST CAUSE: THE NEED FOR A DEEPER CONTEXTUAL UNDERSTANDING OF PROPERTY RIGHTS

As is made evident by the Indonesian case study and South African example, a single, neo-liberal, market-based definition of property is constricting, and can lead to biased implementation and local resistance.[379] At their core, Western markets treat property as a commodity, and thus ownership is predicated on having a claim to that property.[380] Despite the insistence of some formalizers, this is not a universally accepted view of property. There is a need for a more nuanced understanding of property allocation and ownership.[381] As has been shown, in some instances, informal property relations provide the basis for an active, functioning economy.[382] Moreover, certain areas may be economically suitable for economic development but socially or environmentally inappropriate, and the community may manage that property

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[377] *See, e.g.*, Jide James-Eluyode, *Collective Rights to Lands and Resources: Exploring the Comparative Natural Resource Revenue Allocation Model of Native American Tribes and Indigenous African Tribes*, 29 ARIZ. J. INT'L & COMP. L. 175, 186–87 (2012) (citing CONSTITUTION OF LIBERIA (1986), art. 22(b) ("[P]rivate property rights, however, shall not extend to any mineral resources on or beneath any land or to any land under the seas and water ways of the Republic of Liberia. All mineral resources in and under the seas and waterways shall belong to the Republic and be used by and for the entire Republic."); New Petroleum Law (2002), Ch. III. § 3.1 (Republic of Liberia) (reemphasizing state ownership rights by affirming that "[a]ll Hydrocarbon deposits belong to and are the properties of the Republic of Liberia . . . .")).

[378] *Id.* (citing Geoffrey Payne, *Contribution at Global Land Tool Networking Meeting: Reviewing Titling & Other Tenure Options* (Nov. 24–25, 2005), *available at* http://www.gpa.org.uk/Publications/ConferencePapers/Papers/Stockholm.pdf).

[379] *See* A. Saith, *From Universal Values to Millennium Development Goals: Lost in Translation*, 37 DEV. & CHANGE 1167, 1167 (2006).

[380] Robbins, *supra* note 44, at 190.

[381] *See id*. at 186–87 (citing F. VON BENDA-BECKMANN, THE PROPERTIES OF PROPERTY 2 (2006)).

[382] *See id*. at 178 n.6.

collectively.[383] Commentators attempt to answer the question of which system is preferable, informal or formal, without stepping back to ask whether our current knowledge of property rights is as universally applicable as some make it seem.[384] This final Part attempts to find common ground between competing camps and more fully explore the lessons of polycentric governance for designing titling interventions.

Before an intervention is undertaken, it is necessary to consider the complexity of various forms of property rights and ownership practices in each society in which formalization is proposed.[385] Property rights and claims may "include everything from perceived tenure to registered freehold" to group tenure and joint leases,[386] families, kin groups,[387] corporate groups like clans or companies, settlement councils, voluntary groups, savings societies, and collective farming.[388] Decisions to transform these varying, collective property rights must be understood in reference to the local cultural traditions in play.[389] Land tenure is complex. It is rarely vested in only one property holder, and is subject to competing sets of rights and claims. For example, a person may inhabit, occupy, build on, or otherwise use a property, and each of these activities comes with rights and claims that vary by culture and that may be organized formally or informally, be strong or weak, and be individual or communal. The property rights spectrum goes from formalized private land title, to longstanding and well-respected customary relationships. Reforming such

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383 *Id*. at 178.

384 *Id.* at 186.

385 *Id.* at 182 (arguing that the three forms of property, at their simplest, are: (1) Absolute—the institution, including the state, "or customary body (clan, tribe, etc.), that" ultimately defines property, how it "may be used," and what rights attach to it; (2) Residual—"the right, understanding, or claim most often associated with tenure . . . [and] is a freehold" including "the right to alienate property . . . [or] to use it as collateral"; and (3) Usufruct—a limited "right, understanding or claim to a property . . . limited by the nature of the use right as defined by either the residual and/or absolute holder of property rights" and may vary substantially between cultures).

386 *See* Clarissa Augustinus & Klaus Deininger, *Innovations in Land Tenure, Reform and Administration*, *in* LAND RIGHTS FOR AFRICAN DEVELOPMENT: FROM KNOWLEDGE TO ACTION 14, 14 (Esther Mwangi ed., 2005), *available at* http://www.capri.cgiar.org/wp/brief_land.asp.

387 Robbins, *supra* note 43, at 186.

388 *Id*.

389 *Id*.

complex systems in culturally relative terms is an exceedingly difficult but important proposition if real progress towards widespread poverty alleviation is to be made and the promise of titling be fulfilled. Toward this end, more research needs to be done to study formalizing group rights land management rather than solely studying individual property rights, in keeping with the findings of polycentric governance.

A polycentric approach envisions more than simply competing systems of multilevel regulations, or "a collective of partially overlapping and nonhierarchical regimes" that vary in extent and purpose.[390] It may be understood as an effort to marry elements of the interdisciplinary concepts of regime complexes and clusters, multilevel governance, and global governance together under a single conceptual framework so as to better study multidimensional problems such as property rights reform. Professor Ostrom created an informative framework of eight design principles for the management of common pool resources that helps to guide discussion. These include the importance of: (1) "clearly defined boundaries for the user pool . . . and the resource domain";[391] (2) "proportional equivalence between benefits and costs";[392] (3) "collective choice arrangements" ensuring "that the resource users participate in setting . . . rules";[393] (4) "monitoring . . . by the appropriators or by their agents";[394] (5) "graduated sanctions" for rule violators;[395] (6) "conflict-resolution mechanisms [that] are readily available, low cost, and legitimate";[396] (7) "minimal recognition of rights to organize";[397] and (8) "governance activities [being] . . . organized in multiple

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390 Kal Raustiala & David G. Victor, *The Regime Complex for Plant Genetic Resources*, 58 INT'L ORG. 277, 277 (2004).

391 SUSAN J. BUCK, THE GLOBAL COMMONS: AN INTRODUCTION 32 (1998).

392 Elinor Ostrom, *Polycentric Systems: Multilevel Governance Involving a Diversity of Organizations*, *in* GLOBAL ENVIRONMENTAL COMMONS: ANALYTICAL AND POLITICAL CHALLENGES INVOLVING A DIVERSITY OF ORGANIZATIONS 105, 118 tbl. 5.3 (Eric Brousseau et al. eds., 2012) (citing ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 90 (1990)).

393 BUCK, *supra* note 393, at 32.

394 *Id*.

395 *Id*.

396 *Id*.

397 Ostrom, *Multilevel Governance*, *supra* note 392, at 118 tbl.5.3.

layers of nested enterprises."[398] Not all of Professor Ostrom's design principles are applicable in the property rights reform context given that they were designed primarily for managing small-scale resources, such as forests and lakes.[399] However, some do have salience. Examples from the American West and Indonesia point to the need for effective, low-cost conflict resolution that can clearly establish group boundaries with graduated sanctions in place for rule violators. Moreover, these principles speak to the importance of recognizing and, in some cases, codifying group norms.

An effective polycentric management system for property rights would employ a system of nested enterprises using the tools of law and norms, market-based incentives, self-regulation, and public-private partnerships—some of which are alluded to in Professor Ostrom's principles—to design property rights reform.[400] The move toward regionalization in Indonesian property law may be seen as a step in this direction. But there are also important drawbacks of polycentric governance to consider, such as the fact that a highly fragmented system may "yield gridlock rather than innovation" because, in part, of a "lack of hierarchy."[401] Because such systems must meet standards of coherence, effectiveness, and sustainability, an unclear hierarchy may lead to inconsistency and systemic failures.[402] There is thus an important coordinating role for the state in property reform, as the formalizers maintain, including guaranteeing human rights protections. But there must be a balancing act maintaining a culturally relative design that recognizes, for example, the prevalence and utility of communal property rights so as not to crowd out potentially innovative bottom-up management efforts.

The rationale for formalization cannot be divorced from cultural context.[403] Property is "more than just an unconditional set of rights; it is a universe of social perceptions, values and

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398 *Id*.

399 *See id*. at 107.

400 This list was inspired by LESSIG, *supra* note 60, at 94.

401 Robert O. Keohane & David G. Victor, *The Regime Complex for Climate Change*, 9 PERSP. ON POL. 7, 15 (2011).

402 *Id.* at 3, 19–20.

403 *See* Claudio Acioly, Jr., *The Challenge of Slum Formation in the Developing World*, LAND LINES, Apr. 2007; Robbins, *supra* note 43, at 187.

practices that differ across cultures."[404] Again, the benefits from land registration depend on the quality of governance and the nature of the intervention.[405] As Robbins argues, "[w]hat informality references, whether and how it creates wealth . . . is more a function of the overall social relationships and context in which it is found than it is a function of some purported contrast with an abstract notion of formality."[406] This is particularly true in certain developing nations in which property is embedded in complex, social-ecological systems composed of multiple levels.[407] Thus, the range of possibilities and the implications of formalizing property rights can be more nuanced and profound than either side of the debate contends, given the different meanings and understandings associated with various forms of property.

Critics of formalization argue that property is more a social and political relationship than it is a right or a thing.[408] The maintenance of property itself is a part of social relations that are inseparable from the larger social and legal context.[409] As a result, property is increasingly the focus of "struggles at all levels of social organization, within and between families, communities, classes and states."[410] In other words, it is becoming a polycentric system featuring overlapping regimes and multiple levels of authority. To understand the practices and rights embedded in property formalization, we must analyze how the system behaves and how it affects the larger social, political, and economic contexts. This broader perspective is important for determining the likelihood that a given population will accept, or seek out, formalization. Undeniably, a community's willingness to embark on property rights formalization is dependent on its underlying organization—legal property holders are more likely than renters to accept formalization, and individual owners are often less

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404 Property is rarely unconditional, as seen in the United States takings context. *E.g.*, Kelo v. City of New London, 545 U.S. 469 (2005). Moreover, many conditions exist on land tenure, including "zoning laws, health and safety regulations, and eminent domain," to name a few. Robbins, *supra* note 43, at 182.

405 *See* Deininger & Feder, *supra* note 87, at 256.

406 Robbins, *supra* note 43, at 179.

407 *See* Ostrom, *Polycentric Approach for Coping*, *supra* note 109, at 420.

408 Robbins, *supra* note 43, at 181, 194.

409 *Id*. at 179.

410 VON BENDA-BECKMANN, *supra* note 381, at 2.

willing to organize as a community than those holding communal, informal claims.[411]

The meaning of property changes along with the purposes that a society expects it to serve.[412] Property is never free from social or political considerations, and "fostering one or another policy prescription for property forms is in effect favoring one or another vision of what the world should be."[413] The evolution of Western notions of property beginning in seventeenth century Europe mirrors this fact, showing that a collectivist interpretation became increasingly cumbersome in a more market-oriented economy in which joint ownership impeded the unfettered exchange of goods.[414] Public property rights gradually gave way to private property rights,[415] though this did not happen at the same rate universally.[416] Thus began the transition from property as a communal habitat in the West to a thing to be commercially exploited.[417] Such an interpretation has worked well for some nations but should not necessarily be a guide for others. This evokes the importance of a concept called juriculture in analyzing property rights, which is defined as the "axiological and behavioral formula" pertaining to the law, and which provides a comparative tool that "focuses on ontological and epistemological bases of law and concomitant legal theories."[418] Using juriculture as a conceptual framework could lead to a consensus-building model for property rights across cultures, but further research is needed to define implementation and best practices.

Summing up, those claims favoring formal titling are rooted

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411 Robbins, *supra* note 43, at 188 (citing UN HUMAN SETTLEMENTS PROGRAMME, *supra* note 7, at 94) ("[P]eople may be located in Inner city slums . . . . They may form different spatial types even in slums; e.g. they can be communities sited legally on public or private land as owner-occupiers or tenants; illegally sited on either public or private land as occupiers of self built homes and with perceptions or claims of some form of ownership or as tenants among other possibilities.").

412 *See* Robbins, *supra* note 43, at 180.

413 *Id*.

414 *Id.*

415 *See* KLAUS BOSSELMANN, THE PRINCIPLE OF SUSTAINABILITY: TRANSFORMING LAW AND GOVERNANCE 14–15 (2008).

416 *See id*. at 15–16.

417 *See* N. Geras, *Essence and Appearance: Aspects of Fetishism in Marx's Capital*, NEW LEFT ESSAYS, Jan. –Feb. 1971, at 69–80.

418 *See* SANDRA BUNN-LIVINGSTONE, JURICULTURAL PLURALISM VIS-À-VIS TREATY LAW 9, 35, 59 (2002).

in the notion that the more formal property is, the more growth results, and thus greater equality can be achieved.[419] But property is not only a thing or a concept based on exclusion—it is also a place, with real, and often conflicting, claims to it. Advocates for property rights formalization sometimes ignore the fact that those who are granted formal title over informal property do not have a level playing field, are at a disadvantage to repeat players, and may not even want individualized private property rights. "Even Adam Smith argued" that economic actors should "enter in positions of relative equality[,]" and that if this is not the case, then interventions are warranted.[420] Consequently, "[t]itling, registering, providing new forms of property rights without a clear understanding of the risks to those newly entering this system is irresponsible without knowledge of the context and market practices into which those newly owning property like housing are being placed."[421] At the same time, local property regimes are not always best since, in some cases, powerful political interests have distorted them or local practices do not respect certain base human rights as defined under international law. As a result, "just as there is a tendency among some commentators to privilege the rationality of the market, there is also a tendency among others to romanticize the local and the native."[422] The trick then is balancing local, culturally relative reform based on polycentric principles with formalized titling backed by the coercive power of the state acting as an umbrella institution. This is a difficult proposition, but a broader understanding about the nature of different forms of property claims, rights, and tenure systems within a juriculture framework is essential towards this end.[423] The formalizing of property rights even after titling is enacted is not automatic and is influenced by political, social, and economic factors as well as by the strength of local governance. Even minor revisions of property rights regimes can have far-reaching impacts on vulnerable groups.[424] Determining the appropriate distribution

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419 Robbins, *supra* note 43, at 194.

420 *See* EMMA ROTHSCHILD, ECONOMIC SENTIMENTS: ADAM SMITH, CONDORCET AND THE ENLIGHTENMENT 1, 4, 250 (2002).

421 Robbins, *supra* note 43, at 194.

422 *Id.* at 195.

423 *Id*.

424 *See* WORLD BANK POLICY RESEARCH REPORT, *supra* note 20, at xxiv–xxv.

of property rights, whether they be to an individual or a group,[425] should depend on the nature of the resource and on existing social relationships,[426] not on a universalized set of reforms that may or may not conform with local conditions.

CONCLUSION

Classic titling by itself will not give birth to capital markets, nor will it end poverty or informal markets. No one form of property is ideal across all contexts, but there is merit in the property rights formalization thesis. Studies across a number of countries suggest that registration of land leads to a number of positive outcomes, such as increased government revenue, decreases in private spending associated with protecting property, increased investment by owners into their properties, and empowerment of women.[427] Formalizers such as de Soto have made a critical impact on development economics by shifting the discussion to regulation and informality.[428] That being said, nations around the world have adopted the formalization hypothesis with varying degrees of success, as seen in Indonesia and South Africa.

The pace at which property rights formalization occurs may be dictated as "a simple cost-benefit calculus of the costs of devising and enforcing the rights, as compared to the alternatives under the status quo."[429] But this is too narrow a view since some of the gains are internal to the property owner (increased credit) while others are external (trading relationships and property registration systems). In the view of formalizers, even though "[t]he benefits of universal titling might exceed the costs," the system may still fail to spontaneously develop.[430] Thus, there is an

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425 *Id.* at xxiv (arguing that group rights "are more appropriate in situations characterized by economies of scale in resource management or if externalities exist that" are better managed at the collective level. But these rights must be tempered by "a clear definition of membership" in the group, well-defined responsibilities of group members, and a clear understanding regarding how decisions to modify rules may be made).

426 *Id.* at xxiv.

427 *See* Deininger & Feder, *supra* note 87, at 239, 256.

428 Woodruff, *supra* note 115, at 1216.

429 DOUGLASS C. NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC PERFORMANCE 51 (1990).

430 Woodruff, *supra* note 115, at 1217.

important role for government action to "determine who the owner of a given property is" and to enforce that claim by creating the "registration and information systems that are the backbone of formal property rights" systems.[431] As this Article has explained, however, this strategy is an oversimplification ignoring many important caveats, including: political opposition, diverse (and often unwritten) cultural practices, natural resource endowments, adherence to human rights, and the various levels and combinations of property rights that exist around the world. Instead of a single approach, the case has been made for a localized, culturally-relative design to titling in keeping with polycentric principles and the conceptual framework of juriculture.

De Soto claims to have "closed his books, and opened his eyes."[432] That is his prerogative, but we should strive to have both our books and our eyes open. Empirical evidence has modified classic land titling, much as it has the tragedy of the commons model. Studies have shown that titling alone is not enough; it must be followed by improved judicial efficiency, re-writing bankruptcy codes, and restructuring financial markets, among much else. Professor Jagdesh Bhagwati, for example, argues that property titling by itself is insufficient to bring prosperity to places of chronic poverty.[433] The results from Indonesia and South Africa indicate that formalization can bring about increased housing values, some job creation, and a degree of poverty alleviation. However, the policy represents only the beginning phases of a long journey to a world without poverty.[434] Further efforts are needed, such as deregulating leasing markets, lowering registration fees, empowering local communities, and limiting bureaucracy for property rights and business registration.

"For titling policies to have the greatest usefulness as tool[s] to empower the poor, they should be accompanied by complementary institutional reforms that reduce the costs of

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431 *Id*.

432 *Id.*

433 Dolan, *supra* note 85.

434 For a discussion of the benefits of property rights to economic development, see John Mukum Mbaku, *Providing a Foundation for Wealth Creation and Development in Africa: The Role of the Rule of Law*, 38 BROOK. J. INT'L L. 959, 1037 n.262 (2013) (citing JAMES GWARTNEY & ROBERT LAWSON, FRASER INST., ECONOMIC FREEDOM OF THE WORLD: 2004 ANNUAL REPORT 35–37 (2004)).

property transfers, make it easier to grow small businesses, and generate increased accountability and improved service provision at the local level."[435] Indeed, studies suggest that legal reform is only effective when the government can be held accountable.[436] Former U.S. Secretary of State Madeleine Albright agrees, arguing that if providing legal rights to land and property is insufficient, it is a necessary element in alleviating poverty.[437] There are also larger geopolitical reasons for why U.S. administrations have lauded formalization. Given a rising China featuring a state-led approach to economic development, propounding free market solutions such as formalization is important to give new life to the Washington Consensus and the virtues of private property rights.[438]

Legal scholars and economists recognize that property rights are a vital component of the legal environment for purposes of economic development.[439] It is now uncontroversial that countries with secure, clearly defined property rights experience more economic growth than do countries that lack these rights.[440] Thus, strengthening local property environments is critical to long-term economic success.[441] Institutional economists argue that legal

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435 Boudreaux, *supra* note 73, at 310.

436 *See* Deininger & Feder, *supra* note 87, at 257–58.

437 Robbins, *supra* note 43, at 176 (citing Madeline Albright, *It's Time for Empowerment*, *in* LEGAL EMPOWERMENT: A WAY OUT OF POVERTY 9 ((M.E. Brother & J.A. Solberg eds., 2006)).

438 *See, e.g.*, *China in Laos*, ECONOMIST, May 28, 2011, at 46; Peter F. Schaefer, *China's New Property Rights*, CATO INST., Apr. 14, 2004, *available at* http://www.cato.org/publications/commentary/chinas-new-property-rights.

439 *See, e.g.*, THE WORLD BANK, WORLD DEVELOPMENT REPORT 2005: A BETTER INVESTMENT CLIMATE FOR EVERYONE (2004), *available at* http://siteresources.worldbank.org/INTWDR2005/Resources/complete_report.pdf (stating that property rights are "one of the basic requirements for a healthy investment climate and for economic growth").

440 *See* Daron Acemoglu & Fabrizio Zilibotti, *Productivity Differences*, 116 Q. J. ECON. 563 (2001); Simeon Djankov et al., *The New Comparative Economics*, 31 J. COMP. ECON. 595 (2003); Erica Field, *Property Rights & Investment in Urban Slums*, 3 J. EUR. ECON. ASS'N 279 (2005).

441 Boudreaux, *supra* note 73, at 311; *cf.* Hanan G. Jacoby & Bart Minten, *Is Land Titling in Sub-Saharan Africa Cost-Effective?: Evidence from Madagascar*, 21 WORLD BANK ECON. REV. 461, 461 (2007) (finding that land titling has not been cost-effective); Camilla Toulmin, *Securing Land & Property Rights in Sub-Saharan Africa: The Role of Local Institutions*, *in* HOW TO MAKE POVERTY HISTORY: THE CENTRAL ROLE OF LOCAL INSTITUTIONS IN MEETING THE MDGS 51 (Tom Bigg & David Satherwaite eds., 2005), *available at* http://pubs.iied.org/pdfs/11000IIED.pdf.

institutions are the way to do this, and are crucial determinants of capitalism's success. Institutions do matter, as Professor Douglass North among others would agree, but they are not the whole story.[442] Other problems in developing countries must not be overlooked in the rush to formalization; addressing inadequate infrastructure, for example, would help address some of the worst vulnerabilities associated with the world's poor.[443] Corrupt, authoritarian government should be confronted, and civil society should be energized to build political coalitions that will institute lasting, comprehensive property reform.[444] Rather than generalized strategies, we need poverty alleviation driven by local, grounded, sustained, and context-specific polycentric efforts that promote economic growth and increased welfare, thereby realizing the promise, while avoiding the perils, of property rights formalization.

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442 *See* Dugger, *supra* note 39, at 453.

443 *See, e.g.*, *Infrastructure*, USAID, http://www.usaid.gov/what-we-do/economic-growth-and-trade/infrastructure (last visited Feb. 19, 2014) ("In many developing countries, basic infrastructure—power, water, sanitation, information and communications technologies, and roads—is failing, insufficient, or non-existent.").

444 Robbins, *supra* note 43, at 196.

FREEDOM FROM THE COSTS OF TRADE: A PRINCIPLED ARGUMENT AGAINST DORMANT COMMERCE CLAUSE SCRUTINY OF GOODS MOVEMENT POLICIES

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INTRODUCTION

Concern with the deleterious externalities of free trade is not a new phenomenon. In *The Communist Manifesto*, Karl Marx opined

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that "[t]he bourgeoisie . . . has resolved personal worth into exchange value, and in the place of numberless indefeasible freedoms, has set up that single, unconscionable freedom—Free Trade."[1] In recent decades, criticism of this "freedom" has taken a new cast, as scholars, government officials, communities, and activists have brought attention to the environmental and social costs associated with the mass distribution of goods over vast transportation networks.[2] Increasing consumer interest in local food systems and public pressure for cleaner transportation have led state and local governments to pass regulations that support local production and consumption, thereby reducing the externalities associated with goods movement.[3] One growing class of goods movement regulation forms part of efforts by states, such as California, to mitigate climate change, filling a vacuum left by a divided Congress.[4] In parallel fashion, a proliferation of state and local policies support local food markets and provide incentives for local food production in order to reduce the miles over which food travels and bolster local economies.[5] Yet, as state and local governments take the lead, their initiatives call into question the appropriate balance between state and federal regulation in areas that implicate the health and environmental impacts of trade across borders.[6]

For many of these localizing efforts, an odd judicial doctrine—the Dormant Commerce Clause—stands in the way. The Dormant Commerce Clause can be found nowhere in the text of the Constitution. Nonetheless, courts since the Marshall era have routinely employed the doctrine as a check on state and local regulation that burdens interstate commerce. The doctrine, applied by the federal courts in various different iterations, rests on the underlying premise that the Framers' "centralization of commercial regulatory authority in Congress implied judicially enforceable restraints on the states' regulation of interstate

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[1] KARL MARX & FRIEDRICH ENGELS, THE COMMUNIST MANIFESTO 16 *D. Ryazanoff ed., Eden Paul & Cedar Paul trans., Russell & Russell 1963) (1848).

[2] *See infra* Part I.A–B.

[3] *Id.*

[4] *See infra* Part II.A–B.

[5] *See infra* Part III.C.

[6] *See* William A. Fletcher, *Federalism and Climate Change: The Role of the States in Future Federal Regime,* 50 ARIZ. L. REV. 935, 935 (2008) (explaining that the climate change-related "initiatives of the states present interesting issues of federalism").

commerce."[7] Chief Justice Marshall christened the doctrine in *Willson v. Black Bird Creek Marsh Co.*,[8] when he referenced Congress's "power to regulate commerce in its dormant state."[9] In recent decades, the Supreme Court has used the Dormant Commerce Clause to invalidate state and local laws that sought to curb the influx of out-of-state waste;[10] to impose labeling requirements on apples;[11] to place restrictions on milk sales;[12] to exempt locally-produced beverages from excise taxes;[13] to restrict the withdrawal of groundwater for out-of-state use;[14] and to localize energy markets.[15] At the same time, the Court has carved out exceptions for governmental market participants[16] and crafted a balancing test, generally referred to as *Pike* balancing,[17] that has garnered criticism from both academics and jurists for its unpredictability,[18] inappropriateness,[19] and obfuscation of the

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[7] Brannon P. Denning, *Reconstructing the Dormant Commerce Clause Doctrine*, 50 WM. & MARY L. REV. 417, 421 (2008).

[8] 27 U.S. (2 Pet.) 245 (1829).

[9] *Id.* at 252 (remarking in dicta that a Delaware state law authorizing the building of a dam across a navigable creek was not "repugnant to the [federal] power to regulate commerce in its dormant state"). Five years earlier, in *Gibbons v. Ogden*, 22 U.S. (9 Wheat.) 1, 189 (1824), Chief Justice Marshall had less directly invoked the term "dormant" in connection with the federal Congress's exclusive power of interstate commerce under the Commerce Clause (explaining in dicta that the power to regulate commerce among the states "can never be exercised by the people themselves, but must be placed in the hands of agents, or lie dormant").

[10] City of Phila. v. New Jersey, 437 U.S. 617 (1978); Fort Gratiot Sanitary Landfill, Inc. v. Mich. Dep't of Natural Res., 504 U.S. 353 (1992); Or. Waste Sys. v. Dep't of Envtl. Quality, 511 U.S. 93 (1994); C&A Carbone, Inc. v. Town of Clarkstown, N.Y., 511 U.S. 383, 390 (1994).

[11] Hunt v. Wash. State Apple Adver. Comm'n, 432 U.S. 333 (1977).

[12] Dean Milk Co. v. City of Madison, 340 U.S. 349 (1951).

[13] Bacchus Imps. v. Dias, 468 U.S. 263 (1984).

[14] Sporhase v. Nebraska, 458 U.S. 941 (1982).

[15] New Eng. Power Co. v. New Hampshire, 455 U.S. 331, 335–36, 344 (1982) (holding that a law restricting exports of hydropower hoards resources for a state's economic advantage); New Energy Co. of Ind. v. Limbach, 486 U.S. 269, 279–80 (1988).

[16] *See* Dep't of Revenue v. Davis, 553 U.S. 328, 339 (2008).

[17] *See* Pike v. Bruce Church, Inc., 397 U.S. 137, 142 (1970) (articulating a balancing test for facially neutral laws such that, where harms to interstate commerce are incidental, the Court will uphold them unless the burden on interstate commerce clearly outweighs putative benefits).

[18] *See, e.g.*, T. Alexander Aleinikoff, *Constitutional Law in the Age of Balancing*, 96 YALE. L.J. 943, 972–83 (1987) (criticizing judicial balancing as "rudimentary" and lacking a well-developed methodology that would lead to predictable outcomes); James D. Fox, *State Benefits Under the* Pike *Balancing*

actual basis for the Court's decision.[20]

In this piece, we contend that Dormant Commerce Clause doctrine fails to account for, and requires reexamination in light of, the gross environmental and social externalities now known to be associated with contemporary goods movement. Although the Supreme Court's market participant exception and the balancing test have protected certain regulations from Dormant Commerce Clause strictures, they underscore rather than resolve the incoherence of the doctrine. Scholars have drawn out two motivating principles behind the doctrine—(1) protection of political process and federal stability and (2) promotion of unfettered free trade[21]—yet these principles lack sufficient support in theory or empirics. They also require rethinking in light of goods movement externalities and cooperative federalism prescriptions that would allow state and local governments greater freedom to experiment with regulatory approaches to the challenges they encounter. When examined through such a lens, it becomes apparent that, when the inevitable challenge to goods movement regulations reaches the Supreme Court, the Justices should resolve the instability in the Dormant Commerce Clause in light of contemporary policy concerns to create a safe space for environmentally and socially protective state regulations, even if such measures affect free trade across borders.

The need for a principled reconsideration of Dormant Commerce Clause doctrine has become particularly acute. In September 2013, the Ninth Circuit vacated and remanded a district court's decision to enjoin a progressive Californian goods

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Test of the Dormant Commerce Clause: Putative or Actual?, 1 AVE MARIA L. REV. 175, 198–206 (2003) (describing the diverse approaches to Dormant Commerce Clause balancing and very different outcomes reached by the federal circuit courts).

[19] *See* CTS Corp. v. Dynamics Corp. of Am., 481 U.S. 69, 95 (1987) (Scalia, J., concurring) (criticizing the *Pike* balancing test for engaging the Court in an "inquiry [that] is ill suited to the judicial function and should be undertaken rarely if at all"); S. Pac. Co. v. Arizona *ex rel.* Sullivan, 325 U.S. 761, 788 (1945) (Black. J., dissenting) (criticizing the balancing test for positioning the Court as a "super-legislature"); Aleinikoff, *supra* note 18, at 984–86 (arguing that "balancing also implicates deeper questions about the role of the Court and the nature of judicial review").

[20] *See, e.g.*, Denning, *supra* note 7, at 456 (arguing that Dormant Commerce Clause cases that purportedly employed a balancing test "often seemed to turn on something other than a frank comparison of benefits and burdens").

[21] *See infra* Part II.C.

movement policy—the Low Carbon Fuel Standard (LCFS).[22] The Ninth Circuit reviewed consolidated decisions by Judge O'Neill of the Eastern District of California, who held that the LCFS enacted by the California Air Resources Control Board (CARB) violated the Dormant Commerce Clause.[23] The Ninth Circuit held that LCFS ethanol provisions did not facially discriminate against out-of-state commerce by scoring fuels based on carbon emissions associated with the full well-to-wheel lifecycle of ethanol-based fuels. The court also found that the LCFS's initial crude-oil provisions did not discriminate against out-of-state crude oil in purpose or practical effect and that the LCFS as a whole did not violate the Dormant Commerce Clause's prohibition on extraterritorial regulation.[24] Accordingly, the Ninth Circuit concluded that the district court erred in applying strict scrutiny and remanded the case with instructions for the district court to apply the *Pike* balancing test to the crude-oil provisions, and to determine whether the ethanol provisions discriminate in purpose or effect and, if not, to apply the *Pike* balancing test to them as

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[22] Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013), *reh'g en banc denied*, 740 F.3d 507 (9th Cir. 2014), *cert denied*, 134 S.Ct. 2875. The Ninth Circuit originally heard oral arguments on October 16, 2012, but a resolution was delayed after the sudden passing of panel member and beloved Ninth Circuit Judge Betty Binns Fletcher. For information on the hearing and the delay, see Richard Frank, *Previewing this Week's Constitutional Battle Over California's Low Carbon Fuel Standard*, LEGAL PLANET (Oct. 15, 2012), http://legalplanet.wordpress.com/2012/10/15/previewing-this-weeks-constitutional-battle-over-californias-low-carbon-fuel-standard/, and Bob Egelko, *Judge's Death May Alter Fuel Standard Ruling*, S.F. CHRON. (Oct. 25, 2012), http://www.sfgate.com/science/article/Judge-s-death-may-alter-fuel-standard-ruling-3982612.php.

[23] Rocky Mountain Farmers Union v. Goldstene, 843 F. Supp. 2d 1071, 1088 (E.D. Cal. 2011) (granting motion for summary judgment by plaintiffs Rocky Mountain Farmers Union et al. as to their claim that the LCFS facially discriminates against out-of-state corn ethanol and enjoining enforcement of the LCFS upon finding that plaintiffs are likely to succeed on the merits of their Dormant Commerce Clause claims), *rev'd and remanded*, Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013); Rocky Mountain Farmers Union v. Goldstene, Nos. CV–F–09–2234 LJO DLB, CV–F–10–163 LJO DLB, 2011 WL 6936368, at *17 (E.D. Cal. Dec. 29, 2011) (granting motion for summary judgment by plaintiffs National Petrochemical & Refiners Association et al. as to their Dormant Commerce Clause claims that the LCFS facially discriminates against out-of-state corn ethanol, engages in impermissible extraterritorial regulation, and discriminates against out-of-state crude oil in purpose and effect), *rev'd and remanded*, Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013); *see also* discussion *infra* Part III.A.

[24] Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013).

well.[25] The ultimate disposition of this case could shape prospects for similar policies already under development or consideration in twenty-two other states.[26]

California's LCFS regulatory program recognizes that combating climate change requires a holistic approach to addressing the carbon emissions associated with the full lifecycle of products. It aims to reduce the total carbon emissions associated with producing, distributing, and utilizing fuels used in California by at least ten percent by 2020.[27] The regulation assesses a "carbon intensity" score for each transportation fuel based on the carbon emissions associated with the total well-to-wheel lifecycle of the fuel.[28] Although the LCFS program does not bar regulated parties from using out-of-state (specifically Midwestern and Brazilian) fuels sold on its market, it does assign them a higher default carbon intensity score.[29] In the case of ethanol, the higher default score for Midwestern fuels is due to factors such as the emissions associated with transporting the fuels from their initiation as feedstocks to Californian fuel blenders, the relatively lower efficiency of Midwestern production, and the more carbon-

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[25] *Id.*

[26] For a map and explanation of LCFS-type rules under consideration or development in U.S. states and regions, see *Low Carbon Fuel Standard*, CTR. FOR CLIMATE AND ENERGY SOLUTIONS, http://www.c2es.org/us-states-regions/policy-maps/low-carbon-fuel-standard (last visited Dec. 16, 2012). Oregon has already passed LCFS legislation, H.B. 2186, 75th Leg., Reg. Sess. (Or. 2009), and is in the process of developing implementing regulations. On December 7, 2012, the Oregon Environmental Quality Commission adopted regulations requiring fuel suppliers to record the carbon intensity of their fuels, enacting the first stage of the contemplated LCFS program. *See Oregon Takes Next Step Forward on Clean Fuels*, E2 ENVTL. ENTREPRENEURS (Dec. 7, 2012), http://www.e2.org/jsp/controller?docId=30543. For more information on Oregon's LCFS program, see OR. DEP'T OF ENVTL. QUALITY, OREGON LOW CARBON FUEL STANDARDS (2011), *available at* http://www.deq.state.or.us/aq/committees/docs/lcfs/reportFinal.pdf.

[27] *See Low Carbon Fuel Standard: Question and Answer Guidance Document (Version 1.0)*, CAL. AIR RESOURCES BOARD 2, 4 (June 10, 2011) http://www.arb.ca.gov/fuels/lcfs/LCFS_Guidance_%28Final_v.1.0%29.pdf.

[28] *Id.* at 2.

[29] Under the LCFS program a "carbon intensity" score for a transportation fuel is based on the amount of greenhouse gases produced throughout the lifecycle of a fuel per unit of energy delivered. *See* CAL. CODE REGS. tit. 17, § 95481(a)(16). Each regulated entity is required to ensure that the overall carbon intensity score for its fuel pool meets the annual carbon intensity target set by CARB. *See Low Carbon Fuel Standard: Question and Answer Guidance Document*, *supra* note 27, at 2.

intensive forms of electricity used to power production of ethanol in the Midwest.[30] Because regulated parties must comply with decreasing carbon intensity schedules, industry groups that have challenged the LCFS in federal court have claimed that California violates the Dormant Commerce Clause by using its regulatory power to encourage the use of in-state fuels, which have lower default carbon intensity scores, to the detriment of interstate fuel trade.[31] Judge O'Neill agreed, reasoning that "CARB's goal to combat global warming may be 'legitimate,' however, it cannot 'be achieved by the illegitimate means of isolating the State from the national economy.'"[32]

The district court's reasoning evades a stark truth embodied in holistic regulatory programs like the LCFS: the harms associated with the full lifecycle of products like transportation fuels do not remain localized. Rather, through mechanisms like climate change, impacts accrue across the global commons and may even be felt greatest elsewhere, as in coastal states like California. As the Ninth Circuit recognized, this global interconnectivity makes it the prerogative of a state like California to "create a market that recognizes the harmful costs of products with a high carbon intensity."[33] In seeking to address the negative externalities embodied in the lifecycle of fuels sold in its marketplace, California rightfully and specifically discriminates against dirty production processes and transportation pathways, both for the health of its citizenry and for the global commons. The fact that these processes and pathways might have geographic correlates

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[30] *See* "carbon intensity lookup tables," CAL. CODE REGS. tit. 17, § 95486 (2012), at Table 6. Ironically, as the Ninth Circuit's majority opinion pointed out, CARB assigned Midwestern ethanol the lowest level of transport emissions due to the close proximity of Midwestern ethanol plants to sources of corn. As opposed to transporting already refined fuels, Californian ethanol producers typically import the much bulkier and heavier corn feedstocks to in-state refiners, thus incurring higher transport-related emissions. Transport of Brazilian ethanol comes in closer to Midwestern ethanol because of the relative efficiency of shipping by ocean tanker. *See* Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070, 1083 (9th Cir. 2013).

[31] Plaintiffs advanced a similar argument with respect to the crude oil provisions. *See infra* Part III.B.

[32] Rocky Mountain Farmers Union v. Goldstene, 843 F. Supp. 2d 1071, 1088–89 (E.D. Cal. 2011), *rev'd and remanded*, Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013) (quoting City of Phila. v. New Jersey, 437 U.S. 617, 627 (1978)).

[33] Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070, 1097 (9th Cir. 2013).

should not be a reason to undermine California's laudable, scientifically-based efforts. As product labeling movements such as "fair trade" have long recognized,[34] increasing global interconnectivity only makes it more imperative for market actors and shapers to address the harms embodied in goods. Viewed in this light, the Dormant Commerce Clause appears anachronistic at best.

I. GOODS MOVEMENT

As the case of California's LCFS makes clear, attention to the local and global externalities associated with goods movement necessitates a fundamental rethinking of Dormant Commerce Clause jurisprudence. This piece seeks to take a first step toward that goal. Part I takes a critical look at the production-consumption nexus by elucidating the externalities associated with distribution systems. It also contours the geographic scope of goods movement and the social and environmental impacts of various components of distribution networks. Part II unpacks Dormant Commerce Clause jurisprudence, historicizing it and critiquing its current doctrinal structure and its motivating principles. Part III examines the application of the Dormant Commerce Clause to several contemporary goods movement cases and argues for the need to carve out space for sub-national regulations that may burden interstate trade in order to promote legislatively recognized environmental and social benefits. Part IV argues that the theories of cooperative federalism and environmental justice provide principled grounds for removing Dormant Commerce Clause strictures on contemporary goods movement policies. These theories underscore the need to provide constitutional legitimacy for regulation that empowers states and localities to counter the harms of goods movement and to grow rich and diverse local economies. Building from these theories, this piece concludes with the suggestion that courts dispense with the Dormant Commerce Clause entirely or at the very least expound on the Ninth Circuit's recent attempt to curtail the reach of strict scrutiny. If courts

[34] For a history of the fair trade movement, tracing its origins to the aftermath of WWII, see generally Paulette L. Stenzel, *The Pursuit of Equilibrium as the Eagle Meets the Condor: Supporting Sustainable Development Through Fair Trade*, 49 AM. BUS. L.J. 557 (2012). *See also generally* Paulette L. Stenzel, *Mainstreaming Fair Trade and Resulting Turmoil: Where Should the Movement Go From Here?*, 37 WM. & MARY ENVTL. L. & POL'Y REV. 617 (2013).

faithfully weigh the full empirical benefits of goods movement policies against actually discernable, rather than merely hypothetical, economic harms, they may begin to incidentally ring the death knell for this outmoded body of jurisprudence.

A. *A Critical Look at the Production-Consumption Nexus*

Together, the transportation and agriculture sectors account for approximately 35 percent of greenhouse gas emissions in the United States.[35] In 2011, transportation was the second largest source of carbon dioxide (CO_2) emissions in the United States, pumping 1745 million metric tons into the atmosphere.[36] In that same year, "the [a]griculture sector was responsible for emissions of 461.5 [million metric tons] of CO_2 equivalents, or 6.9 percent of total U.S. greenhouse gas emissions."[37] Agricultural soil management linked to large-scale, export-driven modes of food production was the largest contributor to nitrous oxide (NOx) emissions in the United States, generating 247.2 million metric tons of this highly potent greenhouse gas in 2011.[38] The average household's yearly food consumption footprint, or lifecycle greenhouse gas emissions, is 8.1 tons of carbon dioxide equivalents (CO_2e), 83 percent of which is associated with the production phase.[39]

The long-range transportation of agricultural goods adds another substantial slice to the total pie of greenhouse gases emitted during the lifecycle of a food product. Eleven percent of these greenhouses gases are emitted in transporting food between its points of production and consumption.[40] Studies of food distribution systems in the United States have found that food products are transported an average of 1640 km for delivery alone

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[35] EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990–2011, ES-21 (2013).

[36] *Id.* at ES-5.

[37] *Id.* at 6-1.

[38] *Id.* at ES-6.

[39] Christopher L. Webber & H. Scott Matthews, *Food Miles and the Relative Climate Impacts of Food Choices in the United States*, 42 ENVTL. SCI. & TECH. 3508, 3508 (2008) (referring to carbon dioxide equivalents as "CO_2e").

[40] *Id.* (referring to the distance between the points of food's production and consumption as "food-miles" and, though recognizing food-miles as a problem, suggesting that shifting to less emissions-intensive diets—particularly diets that are vegetable based—can be as or more effective in reducing emissions than localizing diets).

and transported an average of 6760 km over the entire lifecycle of a food product's supply chain.[41] In addition to distance, factors that can critically affect the greenhouse emissions associated with food distribution include transportation mode, fuel type, load size, and trip frequency.[42] While there is debate over the greenhouse gas emissions associated with food distribution, "[c]oncerns about fossil fuel use and greenhouse gas . . . emissions have increased scrutiny of the environmental impacts of transportation in the food system and the distance food travels to consumers."[43] Accounting for emissions associated with food-miles and various forms of distribution networks and patterns is a critical area of further study, as emissions vary widely depending on the elements of the supply chain and the manner of transport.[44]

These figures illuminate a central issue in the climate change conundrum: the geographic scope of the production-consumption nexus. Large-scale industry, geographic specialization designed to capture comparative advantage, and increasingly cheap mass transportation have exploded the distance between producer and consumer.[45] For every conceivable supply line, producers and consumers are now connected by "growing flows of freight," which "have been a fundamental component of contemporary changes in economic systems at the global, regional and local scales."[46]

Despite the fact that much of our modern economic and global trade frameworks hinge on the spatial interdependencies of production and consumption, critical study of the consequences of the distribution systems themselves has been largely neglected in the social science literature.[47] Recently, however, concerns related

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[41] *Id.*

[42] *See* STEVE MARTINEZ ET AL., U.S. DEP'T OF AGRIC., LOCAL FOOD SYSTEMS: CONCEPTS, IMPACTS, AND ISSUES 48 (2010), *available at* http://www.ers.usda.gov/media/122868/err97_1_.pdf.

[43] *Id.*

[44] *Id.*

[45] *Id.* at 1 (explaining this trend in the context of food production: "[f]ollowing World War II, the U.S. food system shifted from local to national and global food sources. Regional and global specialization—spurred by lower transportation costs and improvements in refrigerated trucking—reinforced transition to nonlocal food systems.").

[46] Markus Hesse and Jean-Paul Rodriguez, *The Transport Geography of Logistics and Freight*, 12 J. TRANSPORT GEOGRAPHY 171 (2004).

[47] *Id.* (explaining that "[u]p to recently, geography did not pay much attention to logistics and freight transportation, as the focus was mainly on

to both global climate change and the localized public health impacts of freight transport have put the study of "goods movement" on the academic and public policy agendas.[48]

In particular, the problem of the producer-consumer disconnect has become a central concern of the environmental movement, capturing the attention of activists, policymakers, and scholars. Political and social support for local food systems, for instance, has clearly grown over the last two decades, given increasing regulation at federal, state, and local levels. Federal legislation and regulatory mandates by the U.S. Department of Agriculture have created a number of federal local food system programs, often implemented in partnership with state and local agencies and combining environmental stewardship with economic development goals.[49] Meanwhile, the number of state legislative bills focused on local foods increased from just over twenty in 2004 to nearly 180 in 2009.[50] The legislatures of cities as big as

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passengers and individual mobility issues").

[48] *See, e.g.*, NAT'L ENVTL. JUSTICE ADVISORY COUNCIL, REDUCING AIR EMISSIONS ASSOCIATED WITH GOODS MOVEMENT: WORKING TOWARDS ENVIRONMENTAL JUSTICE 1 (2009) [hereinafter NEJAC], *available at* http://www.epa.gov/environmentaljustice/resources/publications/nejac/2009-goods-movement.pdf ("In June 2007, EPA requested that the NEJAC 'provide advice and recommendations about how the Agency can most effectively promote strategies, in partnership with federal, state, tribal, and local government agencies, and other stakeholders, to identify, mitigate, and/or prevent the disproportionate burden on communities of air pollution resulting from goods movement.'"); Andrea Hricko, *Global Trade Comes Home: Community Impacts of Goods Movement*, 116 ENVTL. HEALTH PERSPS. A78 (2008) (providing an overview of air pollution exposure and other community-level impacts of global goods movement); Laura Perez et al., *Global Goods Movement and the Local Burden of Childhood Asthma in Southern California*, 99 AM. J. PUB. HEALTH S622 (2009) (analyzing links between asthma and emissions from automobiles and ships in two Southern Californian communities); *Climate Change and Goods Movement: Freight Planning Fact Sheet,* CAL. DEP'T OF TRANSP., http://www.dot.ca.gov/hq/tpp/offices/ogm/environment/Climate_Change_and_GM_Fact_Sheet_030112.pdf (last visited Mar. 27, 2014); *Environmental Justice—2012 Implementation Report*, FED. HIGHWAY ADMIN., http://www.fhwa.dot.gov/environment/environmental_justice/ej_at_dot/2012_implementation_report/ (last visited Aug. 26, 2013) (detailing the agency's participation in a federal interagency Goods Movement Committee, established in 2012).

[49] For an overview of federal programs aimed at encouraging local food system development, see Lauren Kaplin, *Energy (In)Efficiency of the Local Food Movement: Food for Thought*, 23 FORDHAM ENVTL. L. REV. 139, 145–47 (2012).

[50] *Healthy Community Design and Access to Healthy Food Database*, NAT'L CONF. STATE LEGISLATURES, http://www.ncsl.org/issues-research/health/healthy-community-design-and-access-to-healthy-foo.aspx (last visited Mar. 27, 2014).

New York[51] and states as large as California[52] have passed laws aimed at encouraging local food systems.[53] Similarly, with respect to transportation, concerns with both climate change and the public health impacts of local and regional air pollution have prompted regulation at the federal and state levels.[54] Despite federal regulation in both of these areas, some state and local governments "have moved much more aggressively" to address climate change, as well as the local environmental stressors related to the movement of goods.[55]

B. *The Scope and Consequences of Goods Movement*

"Goods movement," also known as "freight transport," has recently become a trope in the environmental and public health literature.[56] The National Environmental Justice Advisory Council (NEJAC), a federal advisory committee to EPA, defines the term

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[51] For an overview of New York City's recently enacted food laws, see Mark Izeman, *NYC Enacts New Local Food Laws*, SWITCHBOARD (Aug. 17, 2011), http://switchboard.nrdc.org/blogs/mizeman/nyc_enacts_new_local_food_laws.html.

[52] *See, e.g.*, Cal. Assembly Bill 1616 (2012) (California Homemade Food Act) (preventing local governments from banning cottage food business based in private homes and setting food safety standards for home-based food entrepreneurs); Nick Sibilia, *California Legalized Selling Food Made at Home and Created Over a Thousand Local Businesses*, FORBES (Jan. 29, 2014, 5:19 PM), http://www.forbes.com/sites/instituteforjustice/2014/01/29/california legalized-selling-food-made-at-home-and-created-over-a-thousand-local-businesses/ (reporting that over twelve hundred homemade food businesses have been approved in the year and a half since AB 1616's passage). California has also been a leader in setting standards for farm animal welfare. California Proposition 2, a voter initiated statute scheduled to go into effect on January 1, 2015, prohibits the confinement of farm animals in a manner that prevents them from lying down, standing up, fully extending their limbs, or turning around freely. CAL. HEALTH & SAFETY CODE § 25990 (West 2010 & Supp. 2014). The Proposition was followed by a companion bill, Cal. Assembly Bill 1437 (Huffman) (2010), prohibiting the sale in California of eggs derived from hens that were confined in contravention of Proposition 2's standards.

[53] For an overview of state and municipal local food system laws passed in Maine, South Dakota, and elsewhere, see Kaplan, *supra* note 49, at 147–48.

[54] *See, e.g.*, Corporate Average Fuel Economy Standards, 40 C.F.R. 85, 86, 600 (2012); Cal. Assembly Bill 1493 (Pavley Act), CAL. HEALTH & SAFETY CODE § 43018.5(a) (West. 2006) (directing CARB to adopt "regulations that achieve the maximum feasible and cost-effective reduction of greenhouse gas emissions from motor vehicles").

[55] Daniel Farber, *Climate Change, Federalism, and the Constitution*, 50 ARIZ. L. REV. 879, 880 (2008).

[56] *See* sources cited *supra* note 48.

as the distribution of freight (including raw materials, parts, and finished consumer products) by all modes of transportation, including marine, air, rail, and truck; "[g]oods movement facilities, also called freight facilities, include seaports, airports, and land ports of entry (border crossings), rail yards and rail lines, highways and high truck traffic roads, and warehouse and distribution centers."[57]

The mass movement of goods through these expansive arteries carries with it troubling consequences. EPA has recently brought attention to the social and environmental effects of goods movement, tasking NEJAC with investigating and addressing the "disproportionate burden on communities of air pollution resulting from goods movement."[58] Concerns associated with goods movement include: the health effects of local and regional air pollution from freight transport, the disruptive impact on communities of freight distribution networks, and the global impacts of greenhouse gas emissions from the freight transportation sector.[59]

The scale of goods movement has increased substantially over the last several decades and, without intervention, is expected to continue accelerating. From 1980 to 2006, container shipments quintupled at the ten largest U.S. container ports.[60] The Federal Highway Administration (FHWA) forecasted that between 2006 and 2035, freight tonnage hauled by trucks would increase by 80 percent, rail tonnage by 73 percent, water transport tonnage by 51 percent, and intermodal tonnage by 73 percent.[61] Perhaps most disconcertingly, in light of air transport's particularly intensive greenhouse gas emissions, the FHWA predicted that air cargo tonnage would quadruple over this thirty-year period.[62]

Policy studies and regulatory efforts at the federal and state levels have begun to unmask the ugly truth of goods movement for global climate change. The FHWA found that greenhouse gas emissions from the transportation sector increased by nearly 19

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57 NEJAC, *supra* note 48, at 1.

58 *Id.*

59 *See generally id.*

60 *See Environmental Justice—2012 Implementation Report*, *supra* note 48.

61 U.S. FED. HIGHWAY ADMIN., FREIGHT FACTS AND FIGURES 2007 11 (2007), *available at* http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/07factsfigures/.

62 *Id.*

percent between 1990 and 2010.[63] This figure would probably be even higher if not for an 8 percent decrease in transportation sector GHG emissions from 2007 to 2010 that was likely "the result of the economic downturn and higher fuel prices, which led to a decrease in vehicle miles traveled and fuel consumption."[64] The FHWA found that nearly 38 percent of transport-related greenhouse gas emissions came from combustion of diesel fuel in sources such as heavy-duty trucks, freight-rail, and aircraft,[65] which are three of the primary modes of moving goods within the United States.[66] California, through programs such as the 2002 "Pavley Bill"[67] and the 2006 "Global Warming Solutions Act,"[68] is leading the way among states with regulatory programs to combat the mounting greenhouse gas emissions associated with the transportation sector.

International shipping, most of which occurs in ocean-going vessels, also accounts for a large slice of emissions associated with goods movement. In fact, estimates of global goods transportation demonstrate that approximately 90 percent of goods traded

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[63] U.S. FED. HIGHWAY ADMIN., FREIGHT FACTS AND FIGURES 2012 73 (2012), *available at* http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/12factsfigures/pdfs/fff2012_highres.pdf.

[64] *Id.*

[65] *Id*. at 74. The remaining 62 percent of transportation emissions result gasoline-fueled passenger vehicles and light duty trucks. Part of this category is associated with small-scale goods movement and distance driven to obtain non-locally produced and disseminated foods and other goods.

[66] *See generally* JIMMY DOBBINS, JOHN MACGOWAN & MARTIN LIPINSKI, CTR. FOR INTERMODAL FREIGHT TRANSP. STUDIES, OVERVIEW OF THE U.S. FREIGHT TRANSPORTATION SYSTEM 2–3 (2007), *available at* http://www.memphis.edu/ifti/pdfs/cifts_freight_baseline.pdf (finding that "[n]early all products that consumers use in the United States are transported via truck at some point in the transportation journey"). Trucking, which accounts for 60.1 percent of the volume and 69.5 percent of the value of U.S. freight movement, "truly forms the 'skeleton' of the intermodal transportation network." *Id.* Rail accounts for 10.2 percent of freight by volume and 3.0 percent by value. *Id.* By contrast, aircrafts are used to transport primarily high value goods, "account[ing] for less than 1 percent of freight tonnage and slightly more than 10 of total freight value." *Id.* A fourth mode of freight transport often excluded from goods movement discussion—the massive national network of oil and gas pipelines—accounts for a surprising 18.1 percent of freight by volume and 6.9 percent by value. *Id.*

[67] Cal. Assembly Bill 1493 (Pavley) (2002).

[68] Cal. Assembly Bill 32 (2006); *see also* Low Carbon Fuel Standard, CAL. CODE REGS. tit. 17, §§ 95480–95490 (2012), adopted pursuant to Cal. Assembly Bill 32.

worldwide are transported by ocean-going vessels, and an even more staggering 99 percent of U.S. global trade by volume (and 80 percent by weight) is transported on ships.[69] Compared to other modes of transport, shipping is the most efficient method for moving large volumes of goods; however, its prevalent and increasing use is a significant risk to local port cities and communities because of the tremendous amounts of other pollutants they emit while nearing and idling in port.[70] In high-traffic coastal regions the deleterious effect of shipping emissions on air quality is dramatic: daily ship emissions in Southern California, for example, account for over 85 percent of the total sulfur oxide (SOx) emissions from all goods movement sources in the region;[71] the NOx emissions exceed those of the region's six million cars by over 25 percent.[72]

In addition to their particular vulnerability to the impacts of climate change, poor and minority communities endure a disproportionate share of the localized environmental and health problems created by goods movement systems. Many goods movement arteries, such as State Route 99 and I-5 in California's San Joaquin Valley,[73] flow next to areas populated by low-income and minority communities. Ports and distribution centers, hubs that organize the flow of goods carriers, are frequently situated proximate to these already vulnerable populations and concentrate the pollution of diesel-based transport in their immediate environs. "Mira Loma, San Bernardino, Wilmington, Long Beach, Commerce, and Oakland are [among leading] examples of environmental justice communities [in California] that are affected by emissions generated from marine port and locomotive related activities, distribution centers, and other transportation facilities associated with freight hubs."[74] One need only drive down a short

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[69] Dinesh C. Sharma, *Ports in a Storm*, 114 ENVTL. HEALTH PERSPS. A222, A223 (2006).

[70] *See* INT'L MARITIME ORG., SECOND IMO GHG STUDY 124 (2009), *available at* http://www.imo.org/blast/blastDataHelper.asp?data_id=27795&filename=GHGStudyFINAL.pdf.

[71] CAL. AIR RES. BD., FINAL EMISSION REDUCTION PLAN FOR PORTS AND GOODS MOVEMENT IN CALIFORNIA (2006).

[72] Sharma, *supra* note 69, at A224.

[73] REG'L TRANSP. PLANNING AGENCIES OF THE SAN JOAQUIN VALLEY ET AL., SAN JOAQUIN VALLEY REGIONAL GOODS MOVEMENT ACTION PLAN 3 (2007), *available at* http://www.sjvcogs.org/pdfs/2011/GMplan.pdf.

[74] NEJAC, *supra* note 48, at 7.

stretch of I-5 to witness Walmart and Target trucks streaming to and from distribution centers past economically disadvantaged communities, many of which also have significant populations of ethnic and racial minorities.

Recently, EPA has begun to use geographic information system (GIS) technologies and census information to map the relationship between goods movement systems and minority communities. EPA's analysis revealed a strong correlation between minority populations and goods movement networks.[75] For instance, the population living next to Barr Rail Yard in Chicago is 97 percent African American. In contrast, the general population of Chicago is only 18 percent African American.[76] Goods movement facilities are often also located near existing industrial and agricultural facilities, compounding the local air pollution problems that residents endure. EPA cites as an example East Houston, "where more than 20 percent of the [metropolitan] area's largest industrial emission sources are located." East Houston is also the home of the Port of Houston and located at the intersection of four major highways. Its communities, "which are predominantly minority and low-income," unsurprisingly live with "the highest concentration of air pollutants" in the metropolitan area.[77]

Goods movement networks, including both heavily trafficked transportation arteries and distribution hubs, carry localized environmental, public health, and quality of life trade-offs. Aside from greenhouse gases, burning fossil fuels emits complex mixtures of co-pollutants that result in adverse local and regional air quality impacts.[78] Mixtures of diesel emissions include organic and black carbon, coarse and fine particulate matters, toxic metals, and gases such as nitrogen oxides, sulfur, volatile organic compounds, and carbon monoxides. Diesel exhaust, emitted by freight carriers such as trucks and trains, includes over forty EPA-classified hazardous air pollutants considered to be "cancer-

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[75] *Id.*

[76] *Id.*

[77] *Id.*

[78] For a discussion of the equity implications of co-pollutant emissions from greenhouse gas sources, see Seth B. Shonkoff et al., *Minding the Climate Gap: Environmental and Equity Implications of Climate Change Mitigation Policies in California*, 2 ENVTL. JUST. 173 (2009). *Cf.* Daniel A. Farber, *Pollution Markets and Social Equity,* 39 ECOLOGY L.Q. 1 (2012).

causing" by the California Environmental Protection Agency.[79]

A 2004 study by CARB revealed that nearly 60 percent of the two million people residing near the Ports of Los Angeles and Long Beach, areas heavily exposed to diesel exhaust from roadways, rail yards, and ports, have a cancer risk greater than one hundred per one million people.[80] This risk increases with proximity to the diesel-emissions source: the populations living closest to these ports had an elevated cancer risk of up to two hundred in one million.[81] Studies have also shown that populations living near heavily-trafficked roadways are more likely to suffer from cardiovascular and respiratory illness, including asthma,[82] as well as pregnancy hypertension, resulting in increased incidence of preterm births.[83] For instance, a 2005 study of 208 children in ten Southern California communities found a strong correlation between risk of respiratory illness and local exposures to outdoor nitrogen dioxide and other highway-related air pollutants.[84]

California has taken an early lead among states in policy and regulatory planning to reduce emissions associated with goods

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[79] NEJAC, *supra note* 48, at 4.

[80] CAL. AIR RES. BD., ROSEVILLE RAIL YARD STUDY 8 (2004) (cited in NEJAC, *supra* note 48, at 5).

[81] *See id*.

[82] *See, e.g.*, HEALTH EFFECTS INST., TRAFFIC-RELATED AIR POLLUTION: A CRITICAL REVIEW OF THE LITERATURE ON EMISSIONS, EXPOSURE, AND HEALTH 10 (2010), *available at* http://pubs.healtheffects.org/getfile.php?u=553 (concluding "that the evidence is sufficient to support a causal relationship between exposure to traffic-related air pollution and exacerbation of asthma" and suggestive "of a casual relationship with onset of childhood asthma, nonasthma respiratory symptoms, impaired lung function, total and cardiovascular mortality, and cardiovascular morbidity"); Tegan K. Boehmer et al., *Residential Proximity to Major Highways—United States, 2010*, CDC MORBIDITY & MORTALITY WKLY REP., Nov. 22, 2013, at 46, 46 ("[N]umerous epidemiologic studies have consistently demonstrated that living close to major roads or in areas of high traffic density is associated with adverse health effects, including asthma, chronic obstructive pulmonary disease, and other respiratory symptoms . . . ; cardiovascular disease risk and outcomes . . . ; adverse reproductive outcomes . . . ; and mortality.").

[83] Takashi Yorifuji et al., *Residential Proximity to Major Roads and Preterm Births*, 22 EPIDEMIOLOGY 74, 79 (2011); Takashi Yorifuji et al., *Residential Proximity to Major Roads and Adverse Birth Outcomes: A Hospital-Based Study*, ENVTL. HEALTH, Apr. 18, 2013, at 1, 6, *available at* http://www.ehjournal.net/content/pdf/1476-069X-12-34.pdf.

[84] W. James Gauderman et al., *Childhood Asthma and Exposure to Traffic and Nitrogen Dioxide*, 16 EPIDEMIOLOGY 1 (2005).

movement.[85] These plans are only beginning to account for the potential of Dormant Commerce Clause, state law, and federalism-related challenges to derail them.[86] As a result, representatives of regulated industries burdened by the regulations have begun to initiate litigation to dampen their impact or strike them down.[87]

II. UNPACKING DORMANT COMMERCE CLAUSE JURISPRUDENCE

The Dormant Commerce Clause is an odd feature of constitutional jurisprudence in that it is a "clause" that cannot be found anywhere in the text of the Constitution. Instead, the "Dormant" Commerce Clause refers to the converse of Article I, Section 8 of the Constitution, which grants Congress the power to regulate "Commerce with foreign Nations, and among the several States, and with the Indian Tribes."[88] The Dormant Commerce Clause doctrine imputes from that clause a prohibition on the regulation of interstate commerce by any entity other than the federal government. Why this converse clause exists jurisprudentially and how it operates to police the interplay of state and federal regulation is a matter of continuing scholarly discussion, as this Section illustrates. Nonetheless, today it has become almost routine for the Court to employ the Dormant Commerce Clause to "strik[e] down state regulation that, in its view, improperly interferes with the free flow of interstate

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[85] *See* NEJAC, *supra* note 48, at 10.

[86] *See Industries Rebut California's Claim of No LCFS Bias Against Crude Oil*, INSIDEEPA.COM (Aug. 9, 2013), http://insideepa.com/Shared-Newsletter-Stories/Clean-Energy-Report/industries-rebut-californias-claim-of-no-lcfs-bias-against-crude-oil/menu-id-986.html (discussing industry's rejection of CARB's claim that its July 24, 2013 "regulatory advisory" mooted Dormant Commerce Clause claims by "clarifying that regulated parties that used crude oil supplied to California refiners in 2011 will not be required to adjust their 2011 'net credit balances' under the LCFS").

[87] *See, e.g.*, Rocky Mountain Farmers Union v. Goldstene, 843 F. Supp. 2d 1071, 1078 (E.D. Cal. 2011) (challenging LCFS on Dormant Commerce Clause grounds), *rev'd and remanded*, Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013); Chamber of Commerce of U.S. v. EPA, 642 F.3d 192 (D.C. Cir. 2011) (dismissing for lack of standing industry challenge to EPA's grant to California of a waiver under the Clean Air Act to set its own greenhouse gas emissions standards for new automobiles); POET, LLC v. State Air Res. Bd., 217 Cal. App. 4th 1214 (Cal. App. 5th Dist. 2013) (challenging LCFS on state-law grounds).

[88] U.S. CONST. art. I, § 8, cl. 3 ("The Congress shall have Power . . . To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes . . . .").

commerce."[89]

In this Section, we seek to unpack the "how" and "why" of Dormant Commerce Clause jurisprudence. First, we examine the two-tiered inquiry that courts impose in subjecting state and local regulation to the Dormant Commerce Clause sieve. Next, we review scholarly literature suggesting that the motivating rationale behind these tests lacks sufficient theoretical and empirical support. Careful analysis reveals that courts have elaborated the Clause in an attempt to address political and economic circumstances that are inapplicable to and disconnected from the conditions motivating contemporary goods movement policies. As both scholars and dissenting justices have argued, courts today may be ill positioned to sit as super-legislatures in cases where state and local regulations are challenged on Dormant Commerce Clause grounds.[90] It is particularly incumbent on courts to refrain from employing outmoded Dormant Commerce Clause strictures to regulation that seeks to internalize the social and environmental externalities of goods movement.

A. *Dormant Commerce Clause Tests*

While the Court's Dormant Commerce Clause jurisprudence is notoriously messy,[91] scholars have discerned two judicially imposed tests that currently organize its application. The first test governs "state legislation that discriminates against interstate commerce," which is typically *per se* unconstitutional.[92] Courts have carved out an exception from this test to immunize the state's

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[89] Fletcher, *supra* note 6, at 937.

[90] *See, e.g.*, CTS Corp. v. Dynamics Corp. of Am., 481 U.S. 69, 95 (1987) (Scalia, J., concurring); S. Pac. Co. v. Arizona *ex rel*. Sullivan, 325 U.S. 761, 788 (1945) (Black, J., dissenting) (arguing that in striking down an Arizona railroad safety legislation as imposing an impermissible burden on interstate commerce, the Court erroneously acted as a "super-legislature"); T. Alexander Aleinikoff, *Constitutional Law in the Age of Balancing*, 96 YALE. L.J. 943, 984–86 (1987) (explaining that "[a] common objection to balancing as a method of constitutional adjudication is that it appears to replicate the job that a democratic society demands of its legislature," and arguing that defenders of balancing "must suggest reasons why judgments assigning a social value to legislation are within the province and capacity of the courts"); Denning, *supra* note 7, at 454–56 (reciting arguments against judicial competence to engage in balancing under the Dormant Commerce Clause).

[91] *See, e.g.*, Denning, *supra* note 7, at 427 (discussing the "incoherence and inconsistency in the history of the [Dormant Commerce Clause]").

[92] Farber, *supra* note 55*,* at 893.

proprietary interests from Dormant Commerce Clause restrictions.[93] The second test, articulated in *Pike v. Bruce Church, Inc.*,[94] balances the costs and benefits of facially neutral regulations that burden interstate commerce. If the regulation in question does not manifest a protectionist purpose and its effects on interstate commerce "are only incidental," courts uphold it "unless the burden imposed on such commerce [the protectionist effect] is *clearly excessive* in relation to the putative local benefits."[95] In practice, this balancing test has proved unworkable, as the Supreme Court has effectively collapsed both tests into a single screen that roots out "protectionist" legislation. An unfortunate consequence of the Court's approach, this "protectionist" screen has halted numerous attempts at state and local level stewardship of natural resources and protection of public health.[96]

A Dormant Commerce Clause inquiry first requires identifying whether the regulation at issue is discriminatory on its face. A policy that discriminates on its face is *per se* unconstitutional and thus subject to strict scrutiny, a very difficult judicial standard to overcome.[97] Courts strike down the regulation at issue unless the enacting legislature can prove that (1) the regulation was motivated by a valid (non-protectionist) purpose, and (2) that purpose cannot be served by non-discriminatory alternatives.[98] *New Energy Co. of Indiana v. Limbach*[99] exemplifies the first test. An Ohio regulation contained a provision awarding a tax credit against an Ohio fuel sales tax for ethanol produced either in Ohio or in a state with similar tax advantages

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[93] *Id.*

[94] Pike v. Bruce Church, Inc., 397 U.S. 137, 142 (1970).

[95] *Id.* at 142 (emphasis added).

[96] *See*, *e.g.*, Sam Kalen, *Dormancy Versus Innovation: A Next Generation Dormant Commerce Clause*, 65 OKLA. L. REV. 381, 400 (2013) ("[The Court's] somewhat convoluted approach to the modern [Dormant Commerce Clause] now hampers state and local efforts to shape their communities and corresponding economies, as well as to respond incrementally to environmental threats that are both local and global.").

[97] *See* City of Phila. v. New Jersey, 437 U.S. 617 (1978) (finding that a New Jersey statute prohibiting importation of waste to conserve scarce landfill space was discriminatory on its face, subject to strict scrutiny, and not saved by its putative benefits to public health, safety, and welfare).

[98] *See* New Energy Co. of Ind. v. Limbach, 486 U.S. 269, 278 (1988).

[99] *Id.*

for ethanol.[100] Writing for a unanimous Court, Justice Scalia reasoned that the tax provision "explicitly deprives certain products of generally available beneficial tax treatment because they are made in certain other States, and thus on its face appears to violate the cardinal requirement of nondiscrimination."[101] The Court similarly struck down regulations limiting out-of-state sales of groundwater,[102] requiring reciprocity agreements for milk sales,[103] prohibiting transportation of minnows for sale out of state,[104] and prohibiting the importation of solid and liquid waste for in-state disposal.[105]

While clearing the strict scrutiny hurdle has become particularly difficult, the Court has also broadened the scope of regulations to which it applies. Facial discrimination can now encompass discriminatory treatment, even if facially unintended or non-explicit. The Court has thus explained that "'discrimination' simply means differential treatment of in-state and out-of-state economic interests that benefits the former and burdens the latter."[106] Thus, any differential treatment of an article of commerce by virtue of its "origin or destination out of State" can trigger strict scrutiny.[107] Lower courts have followed suit in broadening the sweep of strict scrutiny.[108] The Ninth Circuit, for

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100 *Id.* at 271.

101 *Id.* at 274.

102 Sporhase v. Nebraska, 458 U.S. 941, 960 (1982).

103 Great Atl. & Pac. Tea Co. v. Contrell, 424 U.S. 366, 366 (1976).

104 Hughes v. Oklahoma, 441 U.S. 322, 338 (1979).

105 City of Phila. v. New Jersey, 437 U.S. 617, 629 (1978).

106 Or. Waste Sys. v. Dep't of Envtl. Quality, 511 U.S. 93, 99 (1994).

107 C&A Carbone, Inc. v. Town of Clarkstown, N.Y., 511 U.S. 383, 390 (1994).

108 *See, e.g.*, Tri-M Group, LLC v. Sharp, 638 F.3d 406, 429 (3d Cir. 2011) (striking down Delaware Department of Labor regulations for facially discriminating against out-of-state contractors); Family Winemakers of Cal. v. Jenkins, 592 F.3d 1, 14 (1st Cir. 2010) (striking down a Massachusetts statute conferring sales benefits on small wineries under strict scrutiny upon finding that the statute was discriminatory in "practical effects" and "purpose" despite "Massachusetts's professed neutrality"); Piazza's Seafood World, LLC v. Odom, 448 F.3d 744, 751 (5th Cir. 2006) (striking down a Louisiana statute that imposed labeling requirements on catfish under strict scrutiny upon finding it to be facially discriminatory); Ben Oerhrleins & Sons & Daughter, Inc. v. Hennepin Cnty., 115 F.3d 1372, 1385 (8th Cir. 1997) (remanding and ordering the district to subject the provisions of a county ordinance that restricted transport of waste to out-of-state processors to the Court's strict scrutiny standard as articulated in *Or. Waste Systems* and *C&A Carbone*); Atl. Coast Demolition & Recycling, Inc. v. Bd. of Chosen Freeholders of Atlantic Cnty., 48 F.3d 701, 718 (3d Cir. 1996)

instance, subjects regulations to strict scrutiny if they "discriminate against out-of-state interests in [one of] three different ways: (1) facially, (2) purposefully, or (3) in practical effect."[109] Once a court decides that strict scrutiny applies, the regulation faces an exceedingly small chance of survival.

Furthermore, the Court has narrowed the categories of regulations it exempts from strict scrutiny under this first Dormant Commerce Clause test. A century ago, courts authorized states to restrict or ban goods movement under their police power to protect against the spread of "disease, pestilence, and death"[110] and to conserve the state's limited natural resources.[111] Over time, however, courts began to erode these exemptions as premised on outdated logic. The Supreme Court substantially narrowed the first exemption, generally referred to as the quarantine exemption, in *Philadelphia v. New Jersey*.[112] It did so by striking down a New Jersey statute that expressly forbade the importation of garbage from out of state.[113] First, the Court reasoned that "solid and liquid wastes, whether wholesome or not, were articles of commerce," thereby doing away with quarantine cases which had "relied on a

(striking down a NJ solid waste flow control ordinance under strict scrutiny upon finding it discriminatory in practical effect). *But see* Selevan v. N.Y. Thruway Auth., 584 F.3d 82, 95 (2d Cir. 2009) (refusing to find that the New York Thruway Authority's toll policy discriminated against out-of-state interests upon applying the Second Circuit's test whereby "a plaintiff 'must identify an[] in-state commercial interest that is favored, directly or indirectly, by the challenged statutes at the expense of out-of-state competitors'" (citing Grand Rivers Enters. Six Nations, Ltd. v. Pryor, 425 F.3d 158, 169 (2d Cir. 2005))).

[109] Nat'l Ass'n of Optometrists & Opticians Lenscrafters, Inc. v. Brown, 567 F.3d 521, 524–25 (9th Cir. 2009) (quoting LensCrafters, Inc. v. Robinson, 403 F.3d 798, 802 (6th Cir. 2005) (internal quotations omitted)).

[110] Bowman v. Chi. & Nw. Ry. Co., 125 U.S. 465, 489 (1888); *see also* Asbell v. Kansas, 209 U.S. 251, 256 (1908) ("[T]he statute before us is an inspection law and nothing else; it excludes only cattle found to be diseased; and, in the absence of controlling legislation by Congress, it is clearly within the authority of the state, even though it may have an incidental and indirect effect upon commerce between the states."); Reid v. Colorado, 187 U.S. 137, 151–52 (1902) (upholding a Colorado statute prohibiting the importation of livestock from specified dates and territory to prevent the introduction of disease as valid under the state's police power).

[111] *See, e.g.*, Geer v. Connecticut, 161 U.S. 519, 535 (1896) (upholding a state fine on the out-of-state conveyance of woodcock, ruffled grouse, or quail).

[112] *See* Robert R.M. Verchick, *The Commerce Clause, Environmental Justice, and the Interstate Garbage Wars*, 70 S. CAL. L. REV. 1239, 1276 (1997) (arguing that City of Phila. v. New Jersey, 437 U.S. 617 (1978), redefined and thereby "abolished" the quarantine exemption).

[113] *Id.*

narrower definition of commerce to reach their results."[114] This capacious definition of commerce sweeps broad categories of regulation within Dormant Commerce Clause reach, even if they are expressly designed only to protect public health and safety from noxious goods and substances.

Second, the *Philadelphia* Court drew a new line for the quarantine exemption, disallowing any regulations that "discriminat[ed] against articles of commerce coming from outside the State unless there is some reason, *apart from their origin*, to treat them differently."[115] That is, a state cannot impose barriers on the importation of noxious articles solely because they come from outside the state unless they are materially different from those produced within the state. With this logic, the Court substantially narrowed the quarantine exception as a significant exemption to strict scrutiny. Though the Court left open the question of what constitutes a material difference apart from origin,[116] *Philadelphia* signaled to courts to look disapprovingly on any state regulation that restricts the flow of goods across borders.[117]

Though the logic of the quarantine exemption may not hold in an era with exceedingly porous borders, the values that motivate it should remain in force. In eroding the quarantine exemption, the Court has also virtually eliminated protection of public safety as a sufficient ground for state regulation that touches on commerce. In fact, the Court has only allowed one state regulation to withstand strict scrutiny in the last two decades. In *Maine v. Taylor*,[118] the

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[114] *Id.*; *City of Phila.*, 437 U.S. at 621–22 (rejecting the state court's narrower definition of commerce for Dormant Commerce Clause purposes).

[115] *City of Phila.*, 437 U.S. at 626–29 (emphasis added) (allowing the quarantine exception to apply only where a challenged regulation "simply prevented traffic in noxious articles, whatever their origin").

[116] Courts could find that factors that a legislature seeks to discourage, such as transport or production-related pollution, make goods produced in different geographies materially different with respect to a given market, even if this difference is a geographic correlate. *See* Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070, 1090 (9th Cir. 2013) (finding that the fact that the LCFS considered location "only to the extent that location affects the actual GHG emissions attributable to a default pathway" did not constitute discrimination on the basis of geography as it reflected actual differences in the embodied carbon intensity of fuels).

[117] *See* Farber, *supra* note 55, at 894 ("Under *Philadelphia v. New Jersey*, state efforts to control the flow of goods across state lines are highly suspect.").

[118] 477 U.S. 131 (1986).

Court permitted Maine to bar the importation of live baitfish, because Maine authorities had no practical mechanism to ensure that imported fish would be free of "parasites and non-native species" that might pose environmental harm to local ecology.[119] Unlike earlier quarantine cases, the Court did not simply exempt the regulation from Dormant Commerce Clause strictures, but rather analyzed it and allowed it to stand under strict scrutiny.[120] Despite Justice Blackmun's assurance that the Commerce Clause "does not elevate free trade above all other values,"[121] *Maine* is remarkable because it is an outlier in a lineage of Dormant Commerce Clause cases in which the Court routinely subordinates non-market goals whenever it detects differential treatment of out-of-state economic interests.[122]

The natural resource exemption has met a similar fate. The Court eroded the grounds for the natural resource exemption when it rejected the notion, on which many of these early cases were premised, that the state's power to regulate its natural resources derived from the state's ownership of its natural resources. In *Hughes v. Oklahoma*,[123] the Court abandoned the natural resource exemption for protection of a state's wildlife. It reasoned that the concept that a state owned its natural resources "was no more than a 19th-century legal fiction expressing 'the importance to its people that a State have power to preserve and regulate the exploitation of an important resource.'"[124] Similarly, in *Sporhase v. Nebraska*,[125] the Court refused to apply the natural resource exemption for Nebraska's regulation of out-of-state transfer of groundwater.[126] It explained that Nebraska's claimed control over

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119 477 U.S. at 152.

120 *Id.* ("The District Court and the Court of Appeals both reasoned correctly that, since Maine's import ban discriminates on its face against interstate trade, it should be subject to . . . strict [scrutiny] requirements.").

121 *Id.* at 151.

122 *See* Gen. Motors Corp. v. Tracy, 519 U.S. 278, 307 n.15 (1997) ("[I]f a State discriminates against out-of-state interests by drawing geographical distinctions between entities that are otherwise similarly situated, such facial discrimination will be subject to a high level of judicial scrutiny even if it is directed toward a legitimate health and safety goal.").

123 441 U.S. 322 (1979).

124 *Id*. at 335 (overturning Geer v. Connecticut, 161 U.S. 519 (1896)).

125 458 U.S. 941 (1982).

126 *Id.* at 941, 958 (overturning a so-called "reciprocity" provision of the challenged law, which required that "the state in which the water is to be used grants reciprocal rights to withdraw and transport ground water from that state

groundwater resources is both "based on the legal fiction of state ownership" and insufficient to exempt the regulation from strict scrutiny.[127] Asserting that water is unequivocally an article of commerce,[128] the Court struck down the challenged provision under the strict scrutiny test applied to facially discriminatory state legislation.[129] As with the quarantine exemption, the erosion of the natural resource exemption undermines the principles of federalism by undercutting a state's unique efforts to advance environmental protection and conservation as a counterweight to free market values.[130]

Without the shield of the quarantine or natural resources exemption, many of the proposed goods movement policies are vulnerable to the blunt tool that is the Dormant Commerce Clause. As the historical precedent makes clear, it has become excruciatingly difficult for a law to survive strict scrutiny on the basis of an environmental or public health benefit. Many goods movement policies, which arguably serve both purposes, would be subject to strict scrutiny simply because they refer to metrics like the transport miles between producer and consumer or the freight instrumentality used to move the goods.

Though goods movement regulations are unlikely to pass a strict scrutiny test, they could survive the balancing test applied to facially neutral statutes. A facially neutral, non-discriminatory state regulation is presumed to be constitutional, and thus courts shift the burden of proof onto the challenger to demonstrate that injury to interstate commerce outweighs the benefit to states' valid non-protectionist interests.[131] As explained in *Pike v. Bruce Church*,[132] the test should favor protective regulations that have only incidental effects on commerce:

> Where the statute regulates evenhandedly to effectuate a legitimate local public interest, and its effects on interstate commerce are only incidental, it will be upheld unless the

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for use in Nebraska").

127 *Id.* at 951.

128 *Id.* at 954.

129 *Id.* at 941–42.

130 *See* Christine A. Klein, *The Dormant Commerce Clause and Water Export: Toward a New Analytical Paradigm*, 35 HARV. ENVTL. L. REV. 131, 148 (2011) ("After *Sporhase*, the Court continued to strike down state laws purporting to regulate or restrict the interstate transport of natural resources.").

131 *See* Minnesota v. Clover Leaf Creamery, 449 U.S. 456, 472 (1981).

132 397 U.S. 137 (1970).

> burden imposed on such commerce is clearly excessive in relation to the putative local benefits.[133]

In *Pike*, the Court considered the validity of an Arizona law requiring that all Arizona-grown cantaloupes be packaged and processed in an in-state facility. The Court struck down the law as an excessive burden on commerce, chiefly because it required a "business operation[] to be performed in the home State that could more efficiently be performed elsewhere," a type of restriction that the Court has "declared to be virtually per se illegal."[134] The Court was also swayed by the absence of countervailing health and safety concerns on the benefits side of the equation. Professor Donald H. Regan describes the *Pike* test in its express formulation as "'weak' protectionist effect balancing," a characterization suggesting that a protectionist effect should not, in itself, tip the scales.[135] The problem for goods movement regulation is that even when purportedly applying the *Pike* test, the Court tends to employ a much harsher form of balancing that shifts the burden to the enacting legislature when the Court locates sufficient protectionist effects of the challenged regulation. This "'strict' protectionist effect balancing" places much greater weight on free market values and undoes the presumption of constitutionality for beneficial state regulation.[136]

Strict protectionist effect balancing is much less friendly to socially and environmentally protective regulation. The Court articulated this more stringent balancing test in *Hunt v. Washington State Apple Advertising Commission,*[137] when it invalidated a North Carolina law that barred imported apples from displaying grading labels from their state of origin, even if their states' standards exceeded those of the USDA.[138] For cases where a challenged regulation has only protectionist effects, even if it is neither facially discriminatory nor has a discriminatory purpose, the Court shifts the presumption of validity away from the challenged regulation. The *Hunt* Court explained that when it locates discriminatory effects,

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133 *Id.* at 142.

134 *Id.* at 145.

135 Donald H. Regan, *The Supreme Court and State Protectionism: Making Sense of the Dormant Commerce Clause*, 84 MICH. L. REV. 1091, 1106 (1986).

136 *Id.*

137 432 U.S. 333 (1977).

138 *Id.* at 351–52.

> the burden falls on the State to justify [the challenged regulation] both in terms of the local benefits flowing from the statute and the unavailability of nondiscriminatory alternatives adequate to preserve the local interests at stake.[139]

The Court identified three types of protectionism that trigger such burden-shifting: increasing costs for out-of-state businesses coming into the state, stripping other states of their competitive advantages, and advantaging in-state businesses.[140] At the same time, the Court gave short shrift to the consumer protection benefits of the regulation, despite acknowledging the "long line of decisions from this Court holding that the States possess 'broad powers' to protect local purchasers from fraud and deception in the marketing of foodstuffs."[141] Since *Hunt*, the Court permits regulations to survive balancing only if it cannot identify an "approach with 'a lesser impact on interstate activities'" that can accomplish goals deemed valid under the *Pike* test.[142] Furthermore, the Court refuses to find that states and municipalities can cure regulations of constitutional defects by either (1) disadvantaging both in-state and out-of-state producers,[143] or (2) incentivizing local producers through a subsidy program rather than penalizing out-of-state producers through taxes.[144] This jurisprudential development has effectively collapsed the "balancing" test into the strict scrutiny test.

Scholars, as well as judges, including Justice Scalia, have extensively criticized the Court's balancing test as unpredictable in its results and excessive in its application to nondiscriminatory

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139 *Id.* at 353.

140 *Id.* at 350–52.

141 *Id.* at 349.

142 *See* Minnesota v. Clover Leaf Creamery Co. 449 U.S. 456, 472–73 (1981) (upholding a ban on plastic milk cartons that imposed "relatively minor" burdens on interstate commerce and allowed the free flow of milk cartons across the state's borders while producing substantial benefits in terms of "promoting conservation of energy and other natural resources and easing solid waste disposal problems").

143 *See, e.g.*, Dean Milk Co. v. City of Madison, 340 U.S. 349, 354 n.4 (1951) (considering it "immaterial that Wisconsin milk from outside the Madison area is subjected to the same proscription as that moving in interstate commerce" in invalidating a city ordinance that required all milk sold in Madison to be pasteurized at an approved plant within 5 miles of the city).

144 *See, e.g.*, West Lynn Creamery, Inc. v. Healy, 512 U.S. 186 (1994) (invalidating a Massachusetts milk tax and subsidy regime that taxed all the raw milk sold by all milk dealers to Massachusetts retailers and dispersed the revenue as a subsidy to only Massachusetts dairy farmers).

legislation. Farber summarizes these criticisms:

> If a state law does not discriminate against interstate commerce . . . the federal courts should not second-guess the state legislature about the balance between a statute's costs and benefits. Moreover, ill-advised but nondiscriminatory statutes are subject to a built-in political check, because the adversely affected local industry will lobby for repeal . . . . Finally . . . the judicial balancing in these cases is unhappily reminiscent of the era in which courts routinely overturned statutes they considered unwise . . . .[145]

Ironically, the *Pike* Court actually employed something much more akin to strict protectionist effect balancing even while articulating the test that bears its name.[146] Even the Court has conceded that "several cases that have purported to apply the undue burden test (including *Pike* itself) arguably turned in whole or in part on the discriminatory character of the challenged state regulation[s]."[147]

In practice, regardless of the test purportedly applied, the outcome may turn on the reviewing court's ability to impute a protectionist motive to the enacting legislature, as opposed to an actual weighing of costs and benefits.[148] Regan has identified such discriminatory motive review behind the Court's decision to overturn the challenged statutes in *Pike v. Bruce Church*, *Hunt v. Washington State Apple Advertising Commission*, and *Dean Milk Co. v. City of Madison*.[149] Once a court imputes a discriminatory motive from burdensome effects on interstate commerce, it is highly unlikely that it will allow a regulation to stand despite its benefits.

Convincing a court to review a statute under a balancing test will consequently prove of little value to supporters of goods movement restrictions unless courts are willing to faithfully weigh

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145 Farber, *supra* note 55, at 895.

146 Pike v. Bruce Church, Inc., 397 U.S. 137, 145 (1970) (finding that the State's interests were not sufficiently compelling to cure the statute's presumptive constitutional defects); *see* Regan, *supra* note 135, at 1220 (asserting that *Pike* "is not a balancing opinion" at all).

147 Gen. Motors Corp. v. Tracy, 519 U.S. 278, 298 n.12. (1997).

148 *See* Dep't of Revenue v. Davis, 553 U.S. 328, 360 (2008) (Scalia, J., concurring) (arguing that the Court should "abandon the *Pike* balancing enterprise altogether and leave these quintessentially legislative judgments with the branch to which the Constitution assigns them").

149 *See* Regan, *supra* note 135, at 1209–33.

the social and environmental benefits of legislation against economic costs. Fuel standards and renewable portfolio standards[150] like those currently being enacted in California are all facially neutral policies.[151] Indeed, most currently contemplated rules concerning goods movement, unless they make reference specifically to the out-of-state origin of goods, would be facially neutral and, therefore, subject to the balancing test. Food localization policies, on the other hand, may be facially discriminatory by definition: to directly address the issue they either must confer benefits or impose costs explicitly on the basis of geographic location of food sources. If courts use both tests to root out imputed purposeful protectionism, the Dormant Commerce Clause would effectively chill both classes of goods movement regulation.[152]

Recently, the Supreme Court has signaled a greater willingness to allow protective regulation in which public benefits outweigh economic costs. Unfortunately, it has channeled this more deferential review into a longstanding but narrow class of cases in which the enacting legislature acts as a market participant.[153] This exception to the *per se* test protects discriminatory restrictions on the flow of goods in interstate commerce if they implicate the state's proprietary interests. The 2008 case *United Haulers Ass'n, Inc. v. Oneida-Herkimer Solid Waste Mgmt. Auth.*[154] considered the constitutionality of local flow control ordinances, which required that all local waste haulers deliver their waste to a state-created public benefit corporation for processing and disposal.[155] Departing from its attitude toward

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150 For a discussion of potential Dormant Commerce Clause challenges to renewable portfolio standards, see Anne Havemann, *Surviving the Commerce Clause: How Maryland Can Square Its Renewable Energy Laws with the Federal Constitution*, 71 MD. L. REV. 848 (2012).

151 *See infra* notes 209–43 and accompanying text.

152 *See, e.g.*, Rocky Mountain Farmers Union v. Goldstene, 843 F. Supp. 2d 1071, 1088 (E.D. Cal. 2011) (striking down California's Low Carbon Fuel Standard), *rev'd and remanded*, Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013).

153 *See, e.g.*, Dep't of Revenue v. Davis, 553 U.S. 328, 350, 352–53 (2008) (dismissing Dormant Commerce Clause challenge to Kentucky's income tax structure exempting interest on bonds issued by Kentucky from state income tax but not on bonds issued by other states because the state acted as a market participant).

154 550 U.S. 330 (2007).

155 *Id.* at 347 (upholding challenged municipal flow control ordinances,

similar flow control attempts,[156] the Court upheld the ordinances as a valid exercise of the state's police power, based on two distinctions: (1) the facilities in question were owned by the state, and (2) both in- and out-of-state haulers were subject to the same restrictions. The state's propriety interest as a participant in the waste disposal market links *United Haulers* to the seminal case in this area, *Hughes v. Alexandria Scrap Corp.*[157] In *Hughes,* the Court in 1976 upheld a statute that discriminated against out-of-state scrap dealers because the state was itself participating in the market to bid up prices.[158] The Court appears willing to suspend Dormant Commerce Clause restrictions when the state acts simultaneously as both market participant and regulator of its proprietary or quasi-proprietary interests.

Although this latest development has led the Court to uphold flow-control ordinances in the area of waste movement, it remains unclear whether it may prove useful to states in enacting current goods movement policies intended to curtail air emissions. For one, the state's proprietary interest in this area is less clear-cut. Though the state subsidizes many transport-related instrumentalities, such as railroads and highways, it typically lacks the ownership elements of financial interest and control that it possessed in *United Haulers*, in which the waste disposal facility at issue was a state-operated, profit-generating business entity. While it is possible that the Court could recognize a sufficient state proprietary interest in markets that the state helps to create—such as emerging carbon markets—the Court has not yet been willing to take this leap. More disconcertingly, the market participant exception may, in fact, amplify the dangers of the free market system that it purports to hold at bay. Verchick explains that

> [t]he doctrine does not soften the commitment to an unfettered market because it is completely consistent with that approach. The doctrine furthers the approach by encouraging states to

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which required all businesses to bring waste to a public benefit corporation, as a valid exercise of local police power under the rationale that "any arguable burden the ordinances impose on interstate commerce does not exceed their public benefits").

156 *See* C&A Carbone, Inc. v. Town of Clarkstown, N.Y., 511 U.S. 383, 390 (1994).

157 426 U.S. 794 (1976).

158 *Id.* at 810 ("Nothing in the purposes animating the Commerce Clause prohibits a State, in the absence of congressional action, from participating in the market and exercising the right to favor its own citizens over others.").

> give up their traditional regulatory roles in the area of waste transportation and to enter the fray of the market as one of many economic actors.[159]

By encouraging local governments to enter the economic playing field and compete with private actors, the exception may discourage them from aggressively pursuing their traditional role in safeguarding public health, safety, and the environment. In doing so, the market participant exception could ironically undermine the very health and environmental benefits that *United Haulers* celebrates.[160] As Dormant Commerce Clause tests are historically contingent and changing, it is nonetheless possible that courts will expand on *United Haulers* to carve out space for beneficially protective sub-national regulation beyond the confines of this narrow exception.

B. *Placing the Tests in Historical Context*

A brief sketch of the historical development of the Dormant Commerce Clause shows that the Court's Dormant Commerce Clause tests have evolved over time in response to extant political and economic circumstances. Understanding the contexts in which they arose historicizes the tests and demonstrates how and why the contemporary Dormant Commerce Clause framework should again evolve with changing societal conditions.

An early Dormant Commerce Clause case, *Cooley v. Bd. of Wardens of the Port of Philadelphia*,[161] shows the Court grappling to develop an operative principle to organize the boundaries between state and federal power in the still nascent U.S. economy. The case involved a challenge to a Pennsylvania law requiring that every ship or vessel entering or leaving the port of Philadelphia hire a local pilot, or pay a fine, with proceeds going to the "Society for the Relief" to support retired pilots as well as their widows and

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159 Verchick, *supra* note 112, at 1281.

160 550 U.S. at 346–47 ("The ordinances are more than financing tools. They increase recycling in at least two ways, conferring significant health and environmental benefits upon the citizens of the Counties. First, they create enhanced incentives for recycling and proper disposal of other kinds of waste. . . . Second, by requiring all waste to be deposited at Authority facilities, the Counties have markedly increased their ability to enforce recycling laws. . . . For these reasons, any arguable burden the ordinances impose on interstate commerce does not exceed their public benefits.").

161 53 U.S. 299 (1851).

children.[162] At the same time, the regulation exempted vessels that "engaged in the Pennsylvania coal trade" from paying the fee.[163] In upholding the regulation against Dormant Commerce Clause challenges, Justice Benjamin Curtis first explained that the "mere grant of such a power to Congress, did not imply a prohibition on the states to exercise the same power."[164] According to Justice Curtis's formulation, the Dormant Commerce Clause is not equivalent to preemption: federal jurisdiction over interstate navigation does not, in itself, displace state power to regulate in the area. Rather, the Dormant Commerce Clause would require a distinct "decision rule"[165] to police the boundaries of state authority if it is to have its own jurisprudential force.

During an era before the development of U.S. transcontinental railroads and mass movement of goods between the states, Justice Curtis was able to formulate a test that cleanly bifurcated the subjects of regulation into non-overlapping local or national spheres. Curtis wrote that "[w]hatever subjects of this power are in their nature national, or admit only of one uniform system, or plan of regulation, may justly be said to be of such a nature as to require exclusive legislation by Congress."[166] By contrast, regulation whose subject "is local and not national . . . is likely to be the best provided for, not by one system, or plan of regulations, but by as many as the legislative discretion of the several States should deem applicable to the local peculiarities of the ports within their limits."[167] As Brannon Denning explains, Curtis' national-local test at the time artfully mediated a polarized Court, in which Justices were starkly divided in their support for exclusive federal dominion over commerce on the one hand and extreme states' rights on the other. While "*Cooley* successfully finessed the question of the operative proposition" behind the Dormant Commerce Clause at that time,[168] the nation's entrance into an era

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162 *Id.* at 311.

163 *Id.* at 312.

164 *Id.* at 320 ("It is the opinion of a majority of the court that the mere grant to Congress of the power to regulate commerce, did not deprive the States of power to regulate pilots, and that although Congress has legislated on this subject, its legislation manifests an intention, with a single exception, not to regulate this subject, but to leave its regulation to the several States.").

165 Denning, *supra* note 7, at 423.

166 Cooley v. Bd. of Wardens of the Port of Phila., 53 U.S. 299, 319 (1851).

167 *Id*.

168 Denning, *supra* note 7, at 436.

of mass goods movement soon demanded a new formulation.

As the states began extensively regulating and taxing interstate commerce, the Court had to recognize its distinction between local and national regulatory subjects as no longer tenable. Its next formulation, an "indirect/direct burdens test,"[169] fared little better. Under this test, the Court invalidated nondiscriminatory regulations that burdened interstate commerce "directly" but permitted those with only incidental or indirect effects, under the state's police power.[170] As Professor Barry Cushman explains, the test at the time served to "insulate state and local regulatory and taxing initiatives from [D]ormant Commerce Clause attack" at a time when "federal efforts to regulate intrastate activities were the exception rather than the rule."[171] By the 1930s, however, courts "paid only lip service to the test."[172] According to Donald Regan, in his 1986 seminal article on "movement-of-goods cases," the modern Dormant Commerce Clause era began with the abandonment of the indirect-direct burdens test in favor of a set of tests organized to "forbid[] states from engaging in protectionism."[173] The following section identifies and critiques the principles underlying these contemporary tests, most notably the anti-protectionist rationale. The illogic and unpredictability of Dormant Commerce Clause doctrine become particularly acute when it confronts this era's environmental, social, and economic exigencies.

C. *Principles Motivating Dormant Commerce Clause Jurisprudence*

Though the Constitution is, of course, silent on the matter, scholars have proposed several rationales for the Supreme Court's apparent eagerness to intervene in defining the acceptable boundaries of state regulation when it produces interstate economic effects. Ninth Circuit Judge William Fletcher offered the explanation that when the Supreme Court strikes down state regulation as an impermissible burden on interstate commerce, it

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169 *Id*. at 437–40.

170 *Id*. at 438–39.

171 *Id.* at 439 (quoting Barry Cushman, *Formalism and Realism in Commerce Clause Jurisprudence*, 67 U. CHI. L. REV. 1089, 1121 (2000)).

172 Regan, *supra* note 135, at 1094.

173 *Id.*

does so "as a surrogate for Congress."[174] Given the "institutional factors that make it difficult for Congress to act, the Court acts on its behalf" to either "authorize or to forbid the state regulation in question."[175] While this account helps to explain the judicial inclination to review these statutes, additional scholarship has begun to unpack the principles motivating judges who deploy the Dormant Commerce Clause.

Robert Verchick offers two rationales that organize the motives expressed by scholars and judges who breathe jurisprudential life into the Dormant Commerce Clause. He describes the first of these as the "process protection rationale."[176] Under this rationale, "the doctrine protects outside residents from burdensome laws passed by state governments in which those residents have no political representation."[177] It posits that the Dormant Commerce Clause is a vehicle for enforcing democratic principles by enabling the courts to strike down laws that burden foreign parties, to whom lawmakers are not accountable, in order to benefit local parties, to whom their elected positions are due. Verchick's second rationale, the "free market rationale," "posits that state restrictions on interstate commerce should be reviewed by courts so as to protect the country's interest in a national free market."[178] According to Verchick, the free market rationale embodies, on the one hand, an anti-protectionist instinct that markets should be free of localist policies, and, on the other hand, the values of laissez-faire economics, which support a market "unfettered" by any barriers to the free flow of goods.[179]

Despite ambitious scholarly attempts to organize, rationalize, and justify principles motivating the Clause, each of these proffered principles falls short of vindicating the application of the Clause to contemporary goods movement regulations. Professor Brannon Denning reasons that the "alleged incoherence and unpredictability of the [D]ormant Commerce Clause doctrine . . . is rooted in the Supreme Court's search, through the years, for a stable set of rules enabling it to distinguish permissible from impermissible state regulations of interstate commerce and

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174 Fletcher, *supra* note 6, at 937.
175 *Id.*
176 Verchick, *supra* note 112, at 1251.
177 *Id.* at 1250.
178 *Id.* at 1267.
179 *Id.* at 1268.

commercial actors."[180] Denning refers to the principles motivating the Clause as "constitutional operative proposition[s]."[181] Denning and Regan would both give teeth to the Clause only so as to prevent state regulations that "produce friction among states, incite retaliation, and undermine political union."[182] Verchick would defend the Clause only as a mechanism to support process protection values and root out economic protectionism.[183]

These accounts do not go far enough. The Dormant Commerce Clause is an inappropriate tool for vindicating these values in the context of sub-national goods movement policies. As such policies grow in number and popularity, the Court's Dormant Commerce Clause jurisprudence grows increasingly misaligned with contemporary democratic impulses and with the social, economic, and environmental exigencies that they respond to. Lacking a coherent operative principle, the Dormant Commerce Clause should give way to state and local policies that encourage diverse local economies and protect social and environmental interests jeopardized by the mass movement of goods. Examined in light of contemporary exigencies, each of the proffered rationales motivating Dormant Commerce Clause jurisprudence proves unconvincing.

First, the political process rationale possesses both a procedural and a substantive dimension. Procedurally, it motivates the judicial role in reviewing legislative enactments thought to represent a breakdown in the democratic process within the legislative branches. Criticism directed against this procedural dimension takes aim at "judicial activism" and questions the wisdom of placing complicated policy choices in the hands of a non-technically minded judiciary. In its substantive dimension, the political process rationale motivates the judiciary to safeguard the political interests of out-of-state economic actors burdened by overreaching state regulation, whose interests are not represented within the enacting legislature. Of particular concern is the protection of out-of-state producers who also lack "virtual representation"—that is, there are no surrogate in-state producers who would be equivalently burdened by the regulation and could

180 Denning, *supra* note 7, at 417.
181 *Id.* at 423.
182 *Id.* at 418.
183 Verchick, *supra* note 112, at 1306.

represent these out-of-state interests.[184]

There is good reason to question the substantive process protection rationale. First, in practice, the Court appears "not only unpersuaded by such representation arguments, but oblivious to them."[185] Second, it is unclear in practice that out-of-state interests impacted by even a facially discriminatory law will not have sufficient in-state representation via consumers. As Mark Tushnet explains, the "burden of the discriminatory law . . . does not simply fall on the foreign shipper kept out of the market; it falls on local consumers as well."[186] Even if consumer interests are "badly organized" in contrast to concentrated industry, "they are at least present in every case, and sometimes their presence may substantively reduce unease about the adequacy of the political process."[187] It is disconcerting that the Court would police the political process so tightly in the Dormant Commerce Clause context with respect to the exclusion of out-of-state economic interests, when it permits as constitutional the mass disenfranchisement of very visible in-state population groups.[188] Finally, and most persuasively, socially and environmentally protective legislation that safeguards the welfare of a local population can be understood as the proper result of a well-functioning democratic process. Rather than representing a breakdown of democratic values, protective legislation that represents the most pressing interests of a populace, which has decided that the benefits of protective regulation outweigh the

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184 *See generally id.* at 1251–55. For cases in which the Court employs a substantive process protection rationale, see, for instance, Hunt v. Wash. State Apple Adver. Comm'n, 432 U.S. 333, 350–52 (1977) (striking down a North Carolina labeling ordinance where the affected out-of-state apple producers did not have in-state virtual representation) and Minnesota v. Clover Leaf Creamery Co., 449 U.S. 456, 473 n.17 (1981) (explaining, in upholding a Minnesota statute banning the sale of milk in plastic, nonreturnable containers, that "[t]he existence of major in-state interests adversely affected by the Act is a powerful safeguard against legislative abuse").

185 Verchick, *supra* note 112, at 1266.

186 Mark Tushnet, *Rethinking the Dormant Commerce Clause*, 1979 WIS. L. REV. 125, 133 (1979).

187 *Id.*

188 *See, e.g.*, Jessie Allen, *Documentary Disenfranchisement*, 86 TUL. L. REV. 389, 408–12 (2011) (discussing the Court's framework for constitutionalizing felon disenfranchisement); Avi Bresman, *Toward a More Elaborate Typology of Environmental Values: Liberalizing Criminal Disenfranchisement Laws and Policies*, 33 NEW ENG. J. ON CRIM. & CIV. CONFINEMENT 283 (2007) (connecting felon enfranchisement to the goals of the environmental movement).

economic costs, is precisely what we want from our state and local legislative processes. Striking down such legislation on process-protection grounds could just as well sacrifice diffuse in-state consumer and popular interests in health and welfare in favor of the interests of organized economic actors seeking to safeguard their market share.

Next, the "free market" rationale breaks down into two motivating principles: the "unfettered market" motive[189] and the "antiprotectionism" motive.[190] The first is more easily dispensed with. Verchick argues that the notion of an

> 'unfettered market' is less grounded in the Constitution's structure and is arguably further from the Framers' intent. Instead, the protection of an unfettered market must rely on independent values favoring efficiency, a healthy economy, and the economic status quo.[191]

Although, according to Verchick, "the unfettered market view has become the lodestar" of contemporary Dormant Commerce Clause cases concerning the interstate flow of waste, it remains open to criticism as to whether this represents a legitimate object of judicial intervention. Regan refers to the unfettered market principle as one that objects to protectionism on the basis of its "inefficien[cy]."[192] Calling "efficiency" a "treacherous notion," Regan points out that so-called protectionist laws objected to on these grounds actually attempt "to correct [inefficiency] partly by requiring internalization and partly by prohibiting outright certain specially obnoxious modes of production."[193] Twenty-five years later, with far greater awareness of externalities associated with goods movement, the market efficiency argument holds even less weight. The existence of these gross externalities represents a classic example of a market failure.[194] By forcing market actors to

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189 Verchick, *supra* note 189, at 1270.

190 *Id.* at 1269.

191 *Id.* at 1270.

192 Regan, *supra* note 135, at 1115.

193 *Id.* at 1115–16; *see, e.g.,* Oregon Bottle Bill, OR. REV. STAT. §§ 459A.700–.740 (2011) (promoting internalization by requiring beverage producers to pay refunds to Oregonians who return used containers) .

194 For an exposition of environmental externalities as market failures, see Kenneth Gillingham & James Sweeney, *Market Failures and the Structure of Externalities*, *in* HARNESSING RENEWABLE ENERGY (Boaz Moselle et. al. eds., 2010). Gillingham and Sweeney define "market failures" as "the ways in which privately optimal choices deviate from economically efficient choices." *Id.* at 69.

internalize these externalities, protective regulation actually bolsters well-functioning, fair, and efficient markets. Moreover, scholars have appropriately criticized the unfettered market principle for motivating the judiciary to uphold market-based values over other widely held values, such as distributive justice, health and welfare-protection, and protection of fundamental rights—a bold implicit assumption of societal preferences.[195]

Finally, what Verchick and Regan both refer to as the "antiprotectionism" motive in the free-market rationale deserves further consideration. The antiprotectionist motive is akin to the process protection motive with the exception that for the former, the "relevant power is economic," and for the latter, it is political.[196] For Verchick, this rationale should only support the use of the Dormant Commerce Clause to weed out laws that manifest a discriminatory or "protectionist purpose."[197] The case *Dean Milk Co. v. City of Madison*,[198] which struck down a city ordinance banning the sale of milk pasteurized more than five miles outside the center of the city, provides an example of the application of this principle. The Court reasoned that the milk ban was "erecting an economic barrier protecting a major local industry against competition from without the State."[199] According to Verchick, the Court, as when motivated by the process protection rationale, properly exercised closer scrutiny because it was motivated by "concern[] with imbalances of power between local and foreign actors" and possible injustice that could ensue.[200]

Scholars including Regan and Richard B. Collins have similarly celebrated the Dormant Commerce Clause as a vehicle for ensuring economic union, which could be threatened by protectionist regulation.[201] As Collins explains, the "doctrine's essential purpose is to promote interstate commercial harmony by restraining state interference in the affairs of other states."[202] As a result, it has oriented such policies as interstate tax codes in a way

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195 *See, e.g.*, Verchick, *supra* note 112, at 1289.
196 *Id.* at 1270.
197 *Id.* at 1269.
198 340 U.S. 349 (1951).
199 *Id.* at 354.
200 Verchick, *supra* note 112, at 1270.
201 Richard B. Collins, *Economic Union as a Constitutional Value*, 63 N.Y.U. L. REV. 43 (1988).
202 *Id.* at 109.

that "may have also contributed to the interstate mobility of corporations, and has shielded a national transportation network against constricting state laws."[203] Similarly, for Regan, some regulation that manifests a protectionist purpose is "hostile in its essence"[204] and can "cause resentment and invite protectionist retaliation," thereby undermining the "political union" of states.[205] Although rarely evoked in the modern era, antiprotectionism has motivated the Court to strike down state regulations that violate the so-called "extraterritoriality doctrine" by effectively regulating outside of the state's boundaries. When courts invoke the extraterritoriality doctrine, they express fear that overreaching state regulation will lead to economic Balkanization and conflicting, piecemeal regulation.[206] Justice Cardozo gave this viewpoint a romantic cast when he struck down a provision of the New York Milk Control Act in *Baldwin v. G.A.F. Seelig, Inc.*[207] The overturned provision banned, under the state's police power, the sale of milk in New York State "unless the price paid to producers was one that would be lawful upon a like transaction within the state."[208] Cardozo opined that

> [t]he Constitution was framed under the dominion of a political philosophy less parochial in range. It was framed upon the theory that the peoples of the several states must sink or swim together, and that in the long run prosperity and salvation are in union and not division.[209]

Despite these noble sentiments, there are at least two reasons for calling the anti-protectionism rationale into question.

First, it makes little sense for the Court to apply favorable presumptions to protect interstate markets that it has refused to apply to prevent discrimination in civil rights cases. Verchick has elaborated this argument by analogizing Dormant Commerce Clause cases to Equal Protection cases. In the latter line of cases,

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203 *Id.* at 127.

204 Regan, *supra* note 135, at 1113.

205 *Id.* at 1114.

206 *See, e.g.*, Healy v. Beer Inst., Inc., 491 U.S. 324, 335–36 (1989) (explaining that the ban on extraterritorial regulation "reflect[s] the Constitution's special concern both with the maintenance of a national economic union unfettered by state-imposed limitations on interstate commerce and with the autonomy of the individual States within their respective spheres").

207 294 U.S. 511 (1935).

208 *Id*. at 519.

209 *Id.* at 523.

the Court has steadfastly refused to overturn laws that are discriminatory in their effect rather than in their intent.[210] In the Dormant Commerce Clause context, the Court routinely overturns facially neutral statutes, such as the flow control ordinance at issue in *Carbone*, on the basis of imputed discriminatory effects even though the statutes often burden both in-state and out-of-state economic interests.[211] The Court's willingness to strike down state regulations on the basis of hypothetical and highly attenuated disparate effects on in- and out-of-state commercial actors contrasts sharply with the Court's attitude in Equal Protection Cases, where the Court requires convincing proof of discriminatory motive. Verchick reasonably asks: "Why should one protect a free market more vigilantly than free speech, freedom of religion, or civil rights?"[212] Not only has the Court failed to offer a convincing rationale for these different standards, but it has also refrained from acknowledging and addressing the glaring inconsistencies.

Second, even if it were possible to narrow the use of the clause to solely root out purposeful protectionism, contemporary economic politics render this rationale anachronistic. Both Verchick and Regan argue that Dormant Commerce Clause strictures should police only purposeful protectionism.[213] Yet neither scholar offers evidence to support their hypothesis that laws manifesting a protectionist purpose could incite the retaliatory trade wars that may have been cause for concern during eras with weaker interstate trade. Instead, they simply infer that the economic union requires the same safeguarding today that it did in the Marshall Court era.

Evidence, however, points the other way, in favor of protecting diverse local economies from the homogenizing and far more powerful interstate commercial sphere. Exemplifying the contemporary strength of interstate commerce, the national

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210 *See, e.g.*, Pers. Adm'r of Mass. v. Feeney, 442 U.S. 256, 272–74 (1979); Village of Arlington Heights v. Metro. Hous. Dev. Corp, 429 U.S. 252, 264–65 (1977) ("[O]fficial action will not be held unconstitutional solely because it results in a racially disproportionate impact. . . . Proof of racially discriminatory intent or purpose is required to show a violation of the Equal Protection Clause.").

211 *See*, *e.g.*, C&A Carbone, Inc. v. Town of Clarkstown, N.Y., 511 U.S. 383 (1994); Dean Milk Co. v. City of Madison, 340 U.S. 349 (1951).

212 Verchick, *supra* note 112, at 1285.

213 *See* Verchick, *supra* note 112, at 1269; Regan, *supra* note 135, at 1112–15.

corporation Amazon.com has successfully displaced local retailers by loop-holing its way out of state sales taxes, thereby outcompeting local businesses on prices.[214] Even as governments move to close down interstate tax loopholes, national retailers like Amazon.com continue to ring the death knell for many local brick and mortar retailers, employing tactics such as placing mass distribution centers to facilitate same-day delivery of goods purchased online.[215] Given the substantial national political and economic power of corporations that operate in this interstate space, regulations that support healthy local economies seem like a valid counterbalance.

As explained in Part IV, our federal system is also premised on the role of diverse experimentation among the states with different modes of regulation. One state's experimentation has the potential to inspire horizontally, prompting similar regulation in other states if it proves successful. It can also inspire vertically, laying the groundwork for comprehensive federal regulation. Where balkanization does occur, the federal government is empowered to create uniform standards, and the doctrine of preemption will ensure that state standards do not conflict with them.[216]

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[214] Recently, the Senate passed a proposed piece of legislation that would require companies selling goods on the internet to collect sales tax. *See* The Marketplace Fairness Act of 2013, H.R. 684, 113th Cong. (2013).

[215] *See* Farhad Manjoo, *I Want It Today*, SLATE (July 11, 2012, 5:53 PM), http://www.slate.com/articles/business/small_business/2012/07/amazon_same_day_delivery_how_the_e_commerce_giant_will_destroy_local_retail_.html (describing the threat that Amazon.com's strategic move from state sales tax avoidance to same-day delivery poses to local retail); *see also* Hannah Dreier, *Amazon Tax: California Residents to Start Paying Sales Tax*, HUFFINGTON POST (Sept. 3, 2012, 9:27 PM), http://www.huffingtonpost.com/2012/09/13/amazon-tax-california-res_n_1882441.html (explaining that Amazon.com's concession to charge its California customers state sales tax in order to set up local distribution centers and provide faster delivery will likely increase the national corporation's share of the California retail market).

[216] *See, e.g.*, Campbell v. Hussey, 368 U.S. 297, 301 (1961) (finding a Georgia law purporting to regulate tobacco grown in that state invalid on the ground that the Federal Tobacco Inspection Act "pre-empted the field and left no room for any supplementary state regulation concerning those same types [of tobacco sold at auction]"). *Cf.* David B. Spence & Paula Murray, *The Law, Economics, and Politics of Federal Preemption Jurisprudence: A Quantitative Analysis*, 87 CAL. L. REV. 1125 (1999) (discussing the historical development of the Court's preemption doctrine and critiquing its role in hampering local efforts to address health, environmental, and safety concerns); William W. Buzbee, *Asymmetrical Regulation: Risk, Preemption, and the Floor/Ceiling Distinction*,

Simply put, the Dormant Commerce Clause is not the right tool for vindicating Equal Protection and other constitutional values. If a state regulation manifests animus against a protected class, it should be reviewed under the Equal Protection Clause; if it trammels on fundamental rights and freedoms, it should be reviewed under substantive due process;[217] and if it impedes a federal regulatory scheme, it should be reviewed under the doctrine of preemption. Courts should remain faithful to Justice Curtis's original formulation of the Dormant Commerce Clause when he effectively cautioned that it should not serve as a surrogate for preemption.[218] When the judiciary sits as a "super-legislature" in Dormant Commerce Clause cases, it risks infusing the regulatory arena with non-constitutional values about economic efficiency and outdated fears of federalist disintegration. The policy concerns associated with goods movement cut the other way, in favor of diverse, small-scale economies and protection of local populations and the environment through the democratic process.

III. PUBLIC POLICY PRESCRIPTIONS

With this critique in mind, we turn now to several examples of contemporary goods movement policies. This Section will provide examples of the three categories of policies targeting goods movement through the transportation and food production sectors. The first type attempts to reduce emissions created by modes of transporting the goods or food. The second type seeks to account for emissions associated with the full lifecycle of

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82 N.Y.U. L. REV. 1547 (2007) (distinguishing between "floor" and "ceiling" preemption and arguing that the former, by which the federal government sets minimum standards while allowing for more stringent state and common law action, better fosters institutional diversity and state experimentation).

[217] Though only procedural protections are explicit in the text of the Constitution, courts have long inferred a substantive element in the Due Process Clause, "one 'barring certain government actions regardless of the fairness of the procedures used to implement them.'" Planned Parenthood v. Casey, 505 U.S. 833, 846 (1992) (quoting Daniels v. Williams, 474 U.S. 237, 331 (1986)). Substantive due process protects "those fundamental rights and liberties which are, objective, deeply rooted in this Nation's history and tradition and implicit in the concept of ordered liberty, such that neither liberty nor justice would exist if they were sacrificed." Washington v. Glucksberg, 521 U.S. 702, 720–21 (1997).

[218] Cooley v. Bd. of Wardens of the Port of Phila., 53 U.S. 299, 320 (1851) ("[T]he mere grant to Congress of the power to regulate commerce, did not deprive the states of power to regulate pilots.").

transportation fuels. The third type seeks to localize the production of food in smaller operations, thereby decreasing production emissions and the amount of transportation needed to bring the food to the consumer. These three categories of policies are all vulnerable to Dormant Commerce Clause strictures insofar as courts use the Clause to weed out legislation they deem "protectionist."

A. *Reducing Transportation Emissions: Examples from California*

California is currently enacting some of the most innovative and comprehensive goods movement policies in the nation. California inaugurated its goods movement agenda in 1998 when then-Governor Pete Wilson published the "Statewide Goods Movement Strategy."[219] From its initial focus on "improving the goods movement transportation system,"[220] California's strategy has evolved into a comprehensive program to enhance all aspects of the state's goods movement industry and infrastructure. California's 2007 "Goods Movement Action Plan," assembled by the Business, Transportation and Housing Agency and the California Environmental Protection Agency, articulates the state's strategy as a two-pronged effort to simultaneously enhance the "efficient, safe delivery of goods to and from our ports and borders" and reduce "the environmental impacts from goods movement activities . . . to ensure protection of public health."[221] The Action Plan contemplates over $20 billion of public expenditures on infrastructure projects and emission reduction strategies extending over a decade. Proposals to both pay these substantial costs and reduce goods movement impacts include a combination of traditional regulations, incentives, general obligation bonds, federal funding, user-based fees, and market-based approaches.[222]

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[219] CAL. DEP'T OF TRANSP., STATEWIDE GOODS MOVEMENT STRATEGY (1998), *available at* http://www.dot.ca.gov/hq/tpp/publications_files/Final_GM_Strategy.pdf.

[220] *Id.* at 1.

[221] BUS., TRANSP. & HOUS. AGENCY & CAL. ENVTL. PROT. AGENCY, GOODS MOVEMENT ACTION PLAN IN CALIFORNIA, at V-1 to V-26 (2007) [hereinafter CALIFORNIA ACTION PLAN], *available at* http://www.arb.ca.gov/gmp/docs/gmap-1-11-07.pdf.

[222] *Id.* at VII-11.

California has already begun to put its goods movement scheme into practice. In 2006, CARB adopted Resolution 06-14, approving the Emission Reduction Plan for Ports and Goods Movement in California.[223] This plan covers all goods movement, both land and water-based, and seeks to reduce total statewide international and domestic goods movement emissions to the greatest extent possible to enable the attainment of National Ambient Air Quality Standards (NAAQS) and to "reduce localized risk in communities adjacent to goods movement facilities."[224] Additionally, CARB hopes to reduce statewide diesel particulate matter emissions from goods movement by 85 percent by 2020 and to reduce NOx emissions from international goods movement in the southern Californian coastal communities by 30 percent from projected year 2015 levels and 50 percent from projected year 2020 levels.[225] CARB is in the process of implementing a number of specific policies to attain these goals. Some, but not all, of these could face Dormant Commerce Clause challenges.[226]

CARB's rules that regulate the type of fuel used by ocean-going vessels have already been dragged through the muddy waters of the Dormant Commerce Clause. First adopted in 2008,[227] and amended in 2011,[228] a regulation entitled "Airborne Toxic Control Measure for Fuel Sulfur and Other Operational Requirements for Ocean-going Vessels within California Waters and 24 Nautical Miles of the California Baseline" stipulates requirements for the chemical composition of ship fuels burned within "Regulated California Waters."[229] While the regulations

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223 CAL. AIR RES. BD., Res. 06-14 (Apr. 20, 2006).

224 CAL. AIR RES. BD., FINAL EMISSION REDUCTION PLAN FOR PORTS AND GOODS MOVEMENT IN CALIFORNIA (2006), *available at* http://www.arb.ca.gov/gmp/docs/gmap-1-11-07.pdf (citing from page three of document before pagination appears).

225 *Id.*

226 California state agencies may already be aware of regulatory constraints posed by the both the Dormant Commerce Clause and the doctrine of preemption. *See* CALIFORNIA ACTION PLAN, *supra* note 221, at VII-11 ("[F]ederal or international restrictions on State regulation of some goods movement source (e.g. locomotives and ships) takes away the option of regulations in some instances.").

227 CAL. CODE REGS. tit. 13, § 2299.2 (2009).

228 CAL. CODE REGS. tit. 17, § 93118.2 (2012).

229 The regulations contain an express exemption for ocean-going vessels that are merely passing through the regulated zone. *Id.* § 93118.2(c)(1). The regulations also contain a sunset clause, providing for their termination when the

applied relatively far out to sea, they were motivated largely by the need to address the heavy burden of particulate matter and sulfur oxides borne by communities adjacent to California ports.[230] Some 40 percent of national imports enter the country at the Californian ports of Long Beach and Los Angeles, much of them carried in vessels using highly polluting, low-grade bunker fuel.[231] CARB estimated that between 2009 and 2015, the regulations would result in 3500 fewer premature deaths, nearly 100,000 fewer asthma attacks, and reduced cancer risks.[232] In 2011, a Ninth Circuit panel in *Pacific Merchant Shipping Association v. Goldstene* upheld the regulations against both preemption and Dormant Commerce Clause challenges.[233] The court found that the regulations, which imposed only attenuated burdens on interstate commerce, were not discriminatory and that these burdens were outweighed by "the exceptionally powerful state interest" in controlling the harmful effects of air pollution resulting from ocean-going vessels.[234]

CARB has also adopted regulations requiring ships berthing at the largest California ports[235] to reduce at-berth emissions yearly at an increasing rate, culminating in 80 percent reductions by 2020.[236] The rule applies only to vessels making twenty-five or more visits to California ports a year.[237] Vessels may reduce emissions either through "Reduced Onboard Power Generation" (e.g., cold-ironing and the use of shore-based power) or "Equivalent Emissions Reduction" with differential compliance schedules and regulations mandated for each option.[238] These regulations will impose significant costs on out-of-state companies

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federal government enacts emission reduction requirements that are at least as stringent. *Id.* § 93118.2(j).

230 *See* Pac. Merch. Shipping Ass'n v. Goldstene, 639 F.3d 1154, 1160 (9th Cir. 2011), *cert. denied*, 133 S. Ct. 22 (2012); *see also id.* at 1178 ("[T]he central purpose of the Vessel Fuel Rules is to protect the health and well-being of the state's residents from the harmful effects of the fuel used by ocean-going vessels.").

231 *Id*. at 1159.

232 *Id*. at 1160.

233 *Id*.

234 *Id.* at 1181.

235 CAL. CODE REGS. tit. 17, § 93118.3(c)(6) (2012) (including the Ports of Los Angeles, Long Beach, Oakland, San Diego, San Francisco, and Hueneme).

236 *Id.* § 93118.3(d)(1)(C).

237 *Id.* § 93118.3(b)(3)(E).

238 *Id.* § 93118.3(d).

bringing their goods to or through California by sea. If this category of regulations faces a Dormant Commerce Clause challenge, a reviewing court will likely examine it under a balancing test, as in *Pacific Merchant*. The result, nonetheless, will likely hinge on the degree of protectionism imputed to the statutes. A finding of implied protectionist motive, excessive burdens on commerce, or less burdensome alternatives could lead a court to strike down these regulations despite their tremendous putative health and environmental benefits.

Beyond the regulations specifically contemplated under its Goods Movement Action Plan, California is taking aggressive steps to reduce the contributions of goods movement to global warming.[239] In 2006, then-Governor Arnold Schwarzenegger signed into law California Assembly Bill 32, the "Global Warming Solutions Act" (AB 32).[240] AB 32 set a goal of reducing statewide greenhouse gas emissions to 1990 levels by 2020, thereby leading the "transition to a sustainable, clean energy future."[241] In 2008, CARB adopted a "Scoping Plan" pursuant to AB 32, laying out the full panoply of regulatory, incentive-based, and other measures "designed to reduce overall greenhouse gas emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health."[242] The Scoping Plan provides that CARB will develop and implement additional goods movement regulations to reduce emissions from "trucks, ports, and other related facilities."[243] One such measure, the "Regulation to Reduce Greenhouse Gas Emissions from Heavy-Duty Vehicles," requires efficiency-promoting retrofits and hybridization of tractor-trailer trucks.[244] To the extent that the regulations control the flow of goods across borders, affect the competitive position of non-

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[239] For an analysis of the Dormant Commerce Clause vulnerabilities of California's greenhouse gas trading scheme erected under AB32, see Douglas A. Kysar & Bernadette A. Meyler, *Like a Nation State*, 55 UCLA L. REV. 1621 (2008).

[240] A.B. 32, 2006 Leg. (Cal. 2006) (codified at CAL. HEALTH & SAFETY CODE §§ 38500–38599 (West 2011)).

[241] CAL. AIR RES. BD., CLIMATE CHANGE SCOPING PLAN: A FRAMEWORK FOR CHANGE 5 (2008), *available at* http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

[242] *Id.* at ES-1.

[243] *Id.* at 52.

[244] CAL. CODE REGS. tit. 17, §§ 95300–95312 (2012).

Californian truck manufacturers, or accomplish their goals through taxes and subsidies that differentiate between in-state and out-of-state vehicles, they may face Dormant Commerce Clause challenges.[245] As it is unlikely that California can achieve this aggressive efficiency overhaul of its trucking industry without spillover effects across borders, Dormant Commerce Clause review may end up entrenching a preventable, dirty status quo.

B. *Curtailing Emissions from Well to Wheel*

A newer and increasingly important area of goods movement regulation directly targets the externalities embedded throughout the lifecycle of goods sold in the marketplace. California's LCFS, adopted by CARB pursuant to AB 32,[246] has become an iconic example of lifecycle-based regulation for transportation fuels. The LCFS regulates transportation fuels sold in California by assigning them a "carbon intensity" based on GHG emissions associated with all phases of a fuel's lifecycle—including its extraction (including land use changes associated with the feedstock), refinement, and transportation to Californian fuel blenders.[247] Providers receive credits or deficits based on their fuel's comparison to the statewide average level, which they can then trade.[248] To save providers the time and costs of calculating individualized carbon intensity scores, CARB uses a peer-reviewed model, known as CA-GREET, to calculate default scores for major fuels used in the state, which it lists in a series of

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[245] Challenges to states' vehicle emissions standards have thus far primarily concerned the California exemption under the CAA; however, plaintiffs have begun to raise Dormant Commerce Clause challenges, though courts have not yet reached the merits of such claims. *See, e.g.*, Cent. Valley Chrysler-Jeep, Inc. v. Goldstene, 529 F. Supp. 2d 1151 (E.D. Cal. 2007); Green Mountain Chrysler Plymouth Dodge Jeep v. Crombie, 508 F. Supp. 2d 295 (D. Vt. 2007).

[246] CAL. CODE REGS. tit. 17, § 95480 (2012).

[247] *See id.* § 95481(a)(16) (defining "carbon intensity" as "the amount of lifecycle greenhouse gas emissions, per unit of energy of fuel delivered, expressed in grams of carbon dioxide equivalent per megajoule (gCO_2E/MJ)"); *id.* § 95481(a)(38) (defining "lifecycle greenhouse gas emissions" as the "aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes) . . . related to the full fuel lifecycle, including all stages of fuel and feedstock production and distribution . . .").

[248] *See id.* § 95485 (detailing the calculation of LCFS credits and deficits as well as their acquisition, banking, borrowing, and trading).

tables.[249] California's model is based on that which the federal EPA uses for lifecycle analysis in its Renewable Fuel Standard.[250] CARB also permits providers to calculate individualized carbon intensity scores.[251] Fuels are classified by both type (i.e. ethanol, compressed natural gas, etc.) and geographic origin (i.e. California, Midwest, and Brazil).[252] In order to meet its goal of reducing the statewide average transportation-related emissions by 10 percent by 2020, CARB also provides a compliance schedule for transportation gasoline and diesel fuels with declining average carbon intensity scores, which regulated parties must meet by lowering the carbon intensity of their fuels or purchasing credits.[253]

Unlike regulations that seek to reduce consumption-side greenhouse gases, by, for instance, reducing vehicle miles traveled and raising tailpipe emissions standards, the LCFS is targeted at the supply side of the equation. Though CARB did not explicitly frame the LCFS as a goods movement policy, it embodies the characteristics of one, both in accounting for distribution of the fuel itself and in seeking to reduce the full range of greenhouse gas emissions associated with California's freight industry. Lifecycle-based accounting has applications far beyond fuels, potentially encompassing a panoply of consumer goods, from foods to durables. One could imagine a future in which states and localities pass regulations that internalize harms, such as emissions associated with production and transport, into the price of goods sold in their marketplaces.

In reviewing the LCFS under the Dormant Commerce Clause, the district court found for plaintiffs that the LCFS discriminates against out-of-state ethanol producers on its face because it

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249 *See id.* § 95486(b)(1), Table 6.

250 *See* Regulation of Fuels and Fuel Additives: Identification of Additional Qualifying Renewable Fuel Pathways Under the Renewable Fuel Standard Program, 78 Fed. Reg. §§ 14190, 14209 (Mar. 5, 2013) (to be codified at 40 C.F.R. pt. 80).

251 *See* CAL. CODE REGS. tit. 17, §§ 95486(c), (e)(2) (2012) (permitting regulated parties to propose modifications to one or more inputs to the default model where the proposed pathway has a carbon intensity at least 5 grams of CO_2E_e/MJ less than the default pathway and is expected to supply more than 10 million gasoline-equivalent gallons per year in California); *id.* § 95486(d) (permitting regulated parties to propose individualized, new pathways).

252 *See, e.g.*, *id.* § 95486, at Table 6.

253 *See id.* § 95482, at Tables 1–2.

explicitly assigns a higher carbon intensity to fuels produced in the Midwest.[254] However, these higher LCFS carbon intensity scores do not discriminate based on geography as such, but rather reflect the more emissions-intensive production processes used in the Midwest, where producers tend to use dirtier, largely coal-based sources of electricity to power less efficient refineries. While the carbon intensity score also incorporates transportation-related emissions, Midwestern ethanol producers fare better than Californians in this respect, because Midwestern producers ship their already refined fuel to Californian blenders, while Californians import the much bulkier feedstock.[255] Similarly, the regulations' 2011 Provisions for crude oil assigned carbon intensity scores with the goals of directing investment to lower carbon intensity fuels and preventing fuel shuffling, or the shifting of higher carbon intensity fuels to other markets.[256] In operation, the provisions assigned one major Californian oil (TEOR, or oil extracted using thermal-enhanced oil-recovery techniques) a lower carbon intensity than its actual value and lower than many other high carbon intensity crude oils.[257] Californian TEOR received this advantage not because of its in-state origin but because it had a significant market share prior to the regulations.[258] Nonetheless, in a pair of decisions, the district court subjected both the ethanol and crude oil regulations to strict scrutiny.[259] In dicta, the district court supported its holding with the proposition that "CARB may not

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[254] Rocky Mountain Farmers Union v. Goldstene (*Rocky III*), 843 F. Supp. 2d 1071, 1088–90 (E.D. Cal. 2011), *rev'd and remanded sub. nom.* Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013). For the LCFS table of default carbon intensity scores categorized by fuel type and region, see CAL. CODE REGS. tit. 17, § 95486 (2012), at Table 6.

[255] *See supra* Introduction.

[256] *See Corey*, 730 F.3d at 1085, 1098.

[257] *See id.* at 1098–99.

[258] *Id.* at 1085, 1098 (explaining that under the 2011 crude oil provisions, California TEOR was assessed a 2006 baseline carbon intensity of 8.07 gCO_{2e}/MJ rather than its individual carbon intensity because it was classified as an "existing" source, as it made up greater than two percent of California's crude-oil market in 2006; California TEOR happened to be the only HCICO to qualify for this preferential treatment by virtue of its market share).

[259] *See Rocky III*, 843 F. Supp. 2d at 1085–94 (applying strict scrutiny to the LCFS ethanol provisions); Rocky Mountain Farmers Union v. Goldstene, Nos. CV–F–09–2234 LJO DLB, CV–F–10–163 LJO DLB, 2011 WL 6936368, at *10–17 (E.D. Cal. Dec. 29, 2011) (applying strict scrutiny to the LCFS 2011 crude oil provisions), *rev'd and remanded sub. nom.* Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013).

impose a barrier to interstate commerce based on the distance that the product must travel in interstate commerce"[260] and suggested that it would find any geographic-based distinctions highly suspect, even if they reflected real differences in associated emissions.

Commendably, the Ninth Circuit majority found error in the district court's analysis as to the determination that the ethanol regulations were facially discriminatory and the determination that the crude oil provisions were discriminatory in purpose and practical effect.[261] It remains to be seen, however, whether the district court will vindicate its initial application of strict scrutiny on remand by finding that the ethanol regulations discriminate in purpose or practical effect and applying a similarly fatal strict protectionist effect balancing test.[262] The district court could also import the motivation behind its original decision into the *Pike* balancing test and determine that the LCFS imposes an excessive burden on commerce. Though the Ninth Circuit's method of screening for discrimination survived a petition for rehearing en banc over a full-throated dissent,[263] it still remains vulnerable to reversal by the Supreme Court upon petition for certiorari.[264] In considering similar LCFS programs, courts in other circuits could also find a fatal flaw, as did the Ninth Circuit dissent, in the use of region-wide classifications such as "Midwest" and "California" to allow easy assignment of carbon intensity scores rather than forcing regulated parties through the much more arduous, but more precise, process of calculating individualized scores for each fuel source.[265] While the Ninth Circuit majority found CARB's reliance on regional classifications and averages reasonable and non-discriminatory, it is not clear that other circuits would follow

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[260] *Rocky III*, 843 F. Supp. 2d at 1089.

[261] *See Corey*, 730 F.3d at 1078.

[262] *See* Camps Newfound/Owatonna, Inc. v. Town of Harrison, Me., 520 U.S. 564, 582 (noting that strict scrutiny "is an extremely difficult burden, 'so heavy that facial discrimination by itself may be a fatal defect'" (quoting Or. Waste Sys. v. Dep't of Envtl. Quality, 511 U.S. 93, 101 (1994))).

[263] *See* Rocky Mountain Farmers Union v. Corey (*Corey II*), 740 F.3d 507 (9th Cir. 2014) (denying petition for rehearing en banc).

[264] *See id.* at 511 (Gould, J., concurring in denial of rehearing en banc) ("[T]he tone and substance of the dissent is perhaps aimed at encouraging Supreme Court review. A petition for writ of certiorari from the parties who sought rehearing is likely forthcoming . . . .").

[265] *See Corey*, 730 F.3d at 1108 (Murguia, J., dissenting in part).

its lead. On the other hand, the propagation of LCFS-type regulation in other states[266] may make Supreme Court review more likely and open up the possibility for the Court to offer a reasoned basis for clawing back the anachronistic expansion and "archaic formalism"[267] of strict scrutiny in Dormant Commerce Clause cases.

As the Ninth Circuit majority realized, the application of strict scrutiny to lifecycle assessment-based policies represents a staggering threat to environmental progress on goods movement issues.[268] The circuit court recognized that lifecycle-based policies like the LCFS may be necessary to avoid "perverse shifts" to more emissions-intensive fuels that could occur if regulators were unable to account for emissions produced throughout a fuel's lifecycle.[269] The district court's logic would essentially make it unconstitutional to account for the externalities of transportation in the price of a product itself, whether that product was transported from within or without a state. As with the noxious garbage at issue in *Philadelphia*, California regulators would be forced to treat ethanol produced in California as functionally equivalent to ethanol produced in the Midwest, despite the greater environmental harms that the latter produces.[270]

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266 *See, e.g.*, *Corey II*, 740 F.3d at 511 (noting proposed legislation in Oregon and Washington as an illustration of the "cascade of similar laws throughout the country" that may flow from California's LCFS example); Erick Smith, *Gov. Inslee Says Suspicions About Low-Carbon Fuel Standards Are Politically Motivated, Yet Doesn't Rule Out Executive Order*, WASH. STATE WIRE (Jan. 17, 2014), http://washingtonstatewire.com/blog/gov-inslee-says-suspicions-about-low-carbon-fuel-standards-are-politically-motivated-but-doesnt-rule-out-executive-order/.

267 *Corey II*, 740 F.3d at 510 n. 1 (Gould, J., concurring in denial of rehearing en banc) ("The dissent's insistence that strict scrutiny should be applied to the regulatory provisions here, absent a finding of discriminatory purpose or effect, is a type of 'archaic formalism' that should not be encouraged by the Supreme Court." (quoting *Corey*, 730 F.3d at 1107)).

268 *Corey*, 730 F.3d at 1107.

269 *Id.* at 1081.

270 In *Clean Air Markets v. Pataki*, a district court relied on *City of Philadelphia* to strike down state restrictions on transfers of allowances to upwind states under a national sulfur dioxide trading scheme. 194 F. Supp. 2d 147 (N.D.N.Y. 2002). Even though New York sought to control the harms to New York's public health and environment that the sulfur dioxide allowance market itself made possible, the court accused the State of "isolat[ing] itself from a problem common to many by erecting a barrier against the movement of interstate trade." *Id.* at 161 (quoting City of Phila. v. New Jersey, 437 U.S. 617, 626 (1978)).

Such reasoning would sweep any policy that seeks to account for such embodied social and environmental harms into the stranglehold of strict scrutiny. Taken to the extreme, a state or locality would be blocked from pursuing measures that reward producers who minimize their distance from consumers or require the reflection of harmful production processes in the price or, potentially, the labeling of a product. These perverse results highlight the need to reexamine the motivating principles and doctrinal structure of the Dormant Commerce Clause to reconcile it with modern needs and values. Rather than representing "illegitimate means of isolating the State from the national economy,"[271] goods movement policies like the LCFS bring much needed attention to the externalized costs embedded along the often geographically disbursed chain of custody of products. The Ninth Circuit's thorough and well-reasoned opinion in *Rocky Mountain Farmers* reflects this truth and, if it both endures and persuades judges in other Circuits, could chill future Dormant Commerce Clause attacks on lifecycle-based regulations.

C. *Localization and Downsizing of Food Systems*

The local food movement continues to gain traction with the American public and is consequently attracting the eye of local legislators and regulators. Admittedly, a large component of the movement's draw is social and economic, rather than environmental; nonetheless, the energy use and greenhouse gas emissions generated by the conventional food production and distribution system also support the case for localizing food production.[272] Although making "local" a proxy for good environmental performance, and by implication "global" a proxy for bad, may oversimplify the issue and overemphasize the importance of proximity, localized, small-scale production carries recognized environmental benefits.[273] The relatively smaller

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[271] Rocky Mountain Farmers Union v. Goldstene, 843 F. Supp. 2d 1071, 1088–89 (E.D. Cal. 2011) (quoting *City of Phila.*, 437 U.S. at 626–27), *rev'd and remanded*, Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013).

[272] Rich Pirog et al., *Food, Fuel, and Freeways: An Iowa Perspective on How Far Food Travels, Fuel Usage, and Greenhouse Gas Emissions*, LEOPOLD CTR. (June 2001), http://www.leopold.iastate.edu/pubs-and-papers/2001-06-food-fuel-freeways.

[273] *See, e.g.*, C. Clare Hinrichs, *The Practice and Politics of Food System Localization*, 19 J. RURAL STUD. 33, 35 (2003) (citing reduced greenhouse gas

environmental footprint of local, small-scale production is largely attributable to the fact that having fewer acres or stock to care for makes stewardship easier and more important to a given farmer's livelihood.[274] Because of the social movement associated with local food markets, this area is ripe for creative policymaking (i.e. something more than increasing subsidies by local governments) that incentivizes local production.

Though not many creative policies have yet been implemented and tested, some significant study of the options is underway. In particular, a study of the environmental impact of the food lifecycle in the United Kingdom provides some insight into the targets at which effectual policies should aim to reduce emissions from food transport and production.[275] That study calculated the environmental costs of the average grocery store trip for a U.K. household, finding that farm emissions, domestic road transport to retail outlets, and domestic shopping transport amount to a hidden environmental cost of £2.91 per person per week (11.8 percent of the price paid).[276] The study examined a number of options for reducing this impact and found that purchasing local food, coupled with choosing to walk, bicycle, or bus to the retail store reduces the environmental cost by more than one-third.[277] These results suggest that policies designed to promote local farming, population density, mixed-use developments, and public transportation will reduce the environmental impact of the goods consumed by the average citizen on a weekly basis.

With respect to promoting local food systems in the United States, the success that advocates in states such as Iowa have enjoyed forebodes future Dormant Commerce Clause challenges. Iowan food system organizers and advocates began by emphasizing local direct marketing venues, such as farmers' markets and community supported agriculture (often referred to as "CSA"), and, after some success, have begun to target institutional procurement of foods.[278] Although these initial, generally non-

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emissions from transportation as one such benefit).

274 *See id.* at 35.

275 J.N. Pretty et al., *Farm Costs and Food Miles: An Assessment of the Full Cost of the UK Weekly Food Basket*, 30 FOOD POL'Y 1 (2005).

276 *See id.* at 15–16.

277 *See id.* (finding that "local food + walk/cycle" saves £1.11, "local food + home delivery" saves £0.93, and "local food + bus" saves £1.06).

278 Hinrichs, *supra* note 273, at 39.

regulatory measures are solidly constitutional, as the policy push in Iowa scales up and targets state spending and eventually legislation and regulation, it could face Dormant Commerce Clause problems. As a preliminary matter, any policy that provides explicit benefits exclusively to local producers is particularly vulnerable to Dormant Commerce Clause challenge based on imputed protectionist intent. Exacerbating this problem is the potential that the definition of "local foods" will subtly shift from food raised in "this county or one nearby" to food raised "in Iowa," as the policy discussion reaches the state level.[279] Under this broader definition of "local," the environmental benefits become less clear and policies may appear even more protectionist and discriminatory.[280] As this movement is still building momentum, reexamining the Dormant Commerce Clause's relationship to local food system initiatives is particularly important, lest these nascent initiatives become mired in constitutional mud.[281]

IV. A PRINCIPLED ARGUMENT FOR STATE AND LOCAL GOODS MOVEMENT REGULATION

Scholarship to date that has examined Dormant Commerce Clause barriers to state and local environmental regulation has generally focused on forecasting the results of judicial review and providing lessons to policymakers in circumventing constitutional scrutiny.[282] This Article aims to move the dialogue a step further

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279 *Id.*

280 *See id.* (arguing that this shift to a broader definition of "local" might be driven by the desire to create "alternative markets for Iowa producers" and increase the "circulation and profile" of healthy and environmentally friendly local foods).

281 Portending such challenges, California's cage-free egg law, Cal. Assembly Bill 1437 (2010), is currently facing a lawsuit joined by five states, alleging that the Bill violates the Dormant Commerce Clause by regulating animal welfare standards extraterritorially. *See* Jacob Bunge & Jesse Newman, *States Join Suit to Block California Egg Law*, WALL ST. J. (Mar. 6, 2014), http://online.wsj.com/news/articles/SB10001424052702303369904579423351872186772?mg=reno64-wsj&url=http%3A%2F%2Fonline.wsj.com%2Farticle%2FSB10001424052702303369904579423351872186772.html; Frank Morris, *States Fight California's Chicken Cage Law. But It's Really About Bacon*, NAT'L PUB. RADIO (Mar. 7, 2014), http://www.npr.org/blogs/thesalt/2014/03/07/286811197/poultry-farmers-to-fight-back-on-california-cage-free-egg-law.

282 *See, e.g.*, Farber, *supra* note 55; Kysar & Meyler, *supra* note 239; Havemann, *supra* note 150.

and offer an alternative vision for this area of jurisprudence. Our examination of Dormant Commerce Clause doctrine and its motivating principles calls into question the value of applying an anti-protectionist screen to contemporary goods movement policies. So far, however, this Article has only offered a negative argument against application of a doctrine that embodies the free-market values and anti-protectionist concerns of a prior era. In this final Section, we offer two affirmative normative rationales—cooperative federalism and environmental justice—for curtailing Dormant Commerce Clause scrutiny of goods movement policies that localize production and consumption and internalize the costs of freight transport.

The Dormant Commerce Clause barrier to effective state and local level environmental regulation stands in direct opposition to the federalist conception of states as "laboratories of democracy." Though Justice Brandeis did not articulate that particular phrase until 1932,[283] the notion that, in a federal system, states should have the freedom to implement new and unique policies that reflect regional values dates all the way back to the Federalist Papers. In the Federalist No. 46, Madison discusses the degree to which the federal and state legislatures will be dependent on each other.[284] He suggests that local preferences will dictate the agenda on the state level, which will ultimately boil up to influence legislators' decisions as representatives of their state at the federal level. By contrast, he expresses skepticism that substantial influence will flow in the other direction, from the federal to the local level.[285]

This view would suggest that Constitutional limits on states' regulatory power, such as the Dormant Commerce Clause, should be interpreted narrowly, maximizing states' freedom to test new policy ideas. It is widely understood that national politics are much more centrist and moderate than state politics,[286] which suggests

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283 New State Ice Co. v. Liebmann, 285 U.S. 262, 310 (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.").

284 THE FEDERALIST NO. 46 (James Madison).

285 *See id.*

286 *See* ALAN I. ABRAMOWITZ, THE DISAPPEARING CENTER: ENGAGED CITIZENS, POLARIZATION, AND AMERICAN DEMOCRACY 9–11 (2010) (describing how, since the 1970s, the number of states and Congressional districts that are dominated by one political party has dramatically increased).

that the most innovative policies that push conventional regulatory boundaries will generally emerge first at the state level. In the process, states support the effective operation of the federal government by first vetting the effectiveness, legality, and societal acceptance of potential national policies.

Advocates for less stringent federal environmental regulation often invoke these federalist ideals. In the early 1990s, free market environmentalists took the extreme position that providing individual actors maximal freedom to bargain, with the government intervening only to enforce property rights at the state and local levels, can move society closer to an optimal level of pollution.[287] More recently, "climate federalism" has gained supporters on both sides of the political aisle.[288] Climate federalism, while recognizing that the global scale of climate change creates a jurisdictional mismatch for state-level regulation, puts much stock in the experimental value of state policies.[289] Proponents stress that the best and most cost-effective method for reducing greenhouse gas emissions is not self-evident, nor is it yet known.[290] Even if there were bipartisan agreement on the quantity of emissions to reduce from a particular sector, there would still be myriad ways to implement those goals.[291] Accordingly, not only should states be free to reduce emissions as their constituents and regulators see fit, but their choices could also provide valuable insight to the federal government in directing national policy.[292]

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[287] *See* TERRY L. ANDERSON & DONALD R. LEAL, FREE MARKET ENVIRONMENTALISM 167–69 (1991).

[288] *See, e.g.*, Daniel Esty, *Pivotal States and the Environment, in* THE PIVOTAL STATES: A NEW FRAMEWORK FOR U.S. POLICY IN THE DEVELOPING WORLD 290 (Robert Chase, Emily Hill & Paul Kennedy eds., 1999); Jonathon H. Adler, *Hothouse Flowers: The Vices and Virtues of Climate Federalism*, 17 TEMP. POL. & CIV. RTS. L. REV. 443 (2008); .

[289] *See* Adler, *supra* note 288, at 447, 450; Daniel A. Farber, *Preventing Policy Default: Fallbacks and Fail-Safes in the Modern Administrative State*, 121 YALE L.J. ONLINE 499 (2012) (arguing that state-level initiatives are realizing a vision of climate governance).

[290] Adler, *supra* note 288, at 450.

[291] *Id*.

[292] In addition to California, state legislatures in Minnesota and Hawaii have recently implemented economy-wide emissions targets. A number of other states have initiated regulatory programs in the form of climate change commissions, climate action plans, mandatory greenhouse gas reporting registries, and sector-specific reduction standards. These forms of legislation engage administrative agencies in the design and implementation of regulatory programs to achieve their goals. *See State Legislation from Around the Country*, CTR. FOR CLIMATE

At the same time, successful state experimentation can spur coordinated legislation in other states, overcoming the incrementalism of any one state's efforts to combat climate change by building a gradually broadening sphere of climate-rectifying policies.[293] In this way, legislative efforts by any one state provide a step forward in the march toward urgently needed action on climate change.

The Tenth Amendment grounds the Constitution in the theory of federalism by providing that "powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people."[294] The Amendment implies that where state regulation is not expressly preempted (as is the case with regard to the Commerce Clause, as Justice Curtis so aptly pointed out),[295] it presumptively merits room to flourish. In recent years, the Court has construed the Commerce Clause more narrowly than it had since the *Lochner* era, effectively curtailing the federal government's regulatory power.[296] Yet the Court has refrained from allowing state regulation to fill the ensuing regulatory void, maintaining aggressive enforcement of the Dormant Commerce Clause even as it shrinks the reach of Congress's regulatory authority. It would run afoul of the principles manifested in the Tenth Amendment to carve out a vacuum between state and federal jurisdiction by simultaneously cutting back the federal government's regulatory powers under the affirmative Commerce Clause and state regulatory power under the Dormant Commerce Clause. Even the Supreme Court has recognized the tension between the Dormant Commerce Clause and federalism, invoking Justice Brandeis' notion of states as laboratories of experimentation in social and economic policy in staying several challenges to state

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AND ENERGY SOLUTIONS, http://www.c2es.org/us-states-regions/key-legislation (last visited Dec. 15, 2012). *See also* Farber, *supra* note 289, at 507 ("By 2006, every state had taken steps of some kind to address climate change.").

293 For a similar exposition of climate federalism, see Rocky Mountain Farmers Union v. Corey, 740 F.3d 507, 511–12 (9th Cir. 2014) (Gould, J., concurring in denial of rehearing en banc).

294 U.S. CONST. amend. X.

295 Cooley v. Bd. of Wardens of the Port of Phila., 53 U.S. 299, 319–20 (1851).

296 *See, e.g.*, Nat'l Fed'n of Indep. Bus. v. Sebelius, 132 S. Ct. 2566 (2012); United States v. Morrison, 529 U.S. 598 (2000); United States v. Lopez, 514 U.S. 549 (1995).

regulation.[297]

Environmental statutes, moreover, have actualized a working theory of cooperative federalism, which supports a strong role for the states and localities alongside the federal government as innovators and guardians of public health and the environment. Cooperative federalism contemplates a framework through which federal, state, and local governments work together to accomplish common objectives. In the 1970s, Congress inaugurated an era of cooperative federalism for environmental law.[298] As Dan Farber points out, the statute that initiated and defined the environmental decade—the 1969 National Environmental Policy Act (NEPA)—itself lays out a vision of cooperative federalism as essential to the accomplishment of ambitious environmental goals.[299] "Recognizing the profound impact of man's activity on the interrelations of all components of the natural environment," section 101(a) of NEPA

> declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments . . . to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.[300]

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[297] *See, e.g.*, Dep't of Revenue v. Davis, 553 U.S. 328, 338 (2008) (remarking that "the Framers' distrust of economic Balkanization was limited by their federalism favoring a degree of local autonomy"); West Lynn Creamery, Inc. v. Healy, 512 U.S. 186, 217 (1994) (Rehnquist, J., dissenting) (noting of the policy of "sink-or-swim . . . laissez-faire economics" that "it is the Court which has imposed the policy under the dormant Commerce Clause, a policy which bodes ill for the values of federalism which have long animated our constitutional jurisprudence"); Reeves, Inc. v. Stake, 447 U.S. 429, 441 (1980); *see also* Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070, 1087 (9th Cir. 2013).

[298] *See* Robert L. Glicksman, *From Cooperative to Inoperative Federalism: The Perverse Mutation of Environmental Law*, 41 WAKE FOREST L. REV. 719, 719 (2006) ("In a rash of legislation adopted over the next decade, Congress established a framework in which the federal and state governments would work together to protect health, the environment, and natural resources, such as wildlife, from the adverse effects of pollution-generating and developmental activities by both private and public entities.").

[299] Farber, *supra* note 55, at 921.

[300] National Environmental Policy Act of 1969, 42 U.S.C. § 4331 (2006).

Not only does NEPA provide a vision of cooperative governmental spheres, but it also subordinates rivalries to environmental exigencies. Section 101(b) calls on the federal government to "use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources" for the ends of sustained environmental stewardship.[301] As NEPA manifests, Congress has long relied on cooperative federalism to further its environmental goals.

Cooperative federalism has since become the norm in defining areas of environmental regulation. The Clean Air Act (CAA),[302] "the nation's first modern, major pollution control statute,"[303] exemplifies this approach, empowering the federal Environmental Protection Agency to set national standards that the states implement according to their own contextually tailored plans. Robert L. Glicksman argues that the cooperative federalism that the CAA set into motion has eroded over time. According to Glicksman, "judicial, legislative, and administrative activity" has contracted federal power. Though "many state and local governments have reacted to the shackles imposed on federal authority to protect the environment and conserve natural resources by engaging in . . . experimentation," the three branches of the federal government have reacted perversely to these developments by simultaneously cabining state and local regulatory authority. Rather than perpetuating this trend through the Dormant Commerce Clause, the judiciary should look to the principles of cooperative federalism and stewardship embodied in statutes such as NEPA and the CAA to support innovative roles for the states and localities in environmental regulation.[304] Local leadership is critical to federalism not only because it fills a regulatory vacuum, but also because it helps to empower those most closely affected by the externalities of goods movement to

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301 *Id.* § 4331(b).

302 42 U.S.C. § 7401 (2006).

303 Glicksman, *supra* note 298, at 720.

304 *See, e.g.*, Jessica Bulman-Pozen & Heather K. Gerken, *Uncooperative Federalism*, 118 YALE L.J. 1256, 1276 (2009) ("Environmental regulation has long been cooperative federalism's stomping ground. Since the 1970s, states have implemented and enforced most of the United States's major environmental statutes. This arrangement—born in part of principle and in part of necessity—lends the states considerable leverage, which they have sometimes used to challenge and reshape federal policy.").

remediate the systems that perpetuate these harms. In this way, the environmental justice view complements cooperative federalism in emphasizing the critical role that communities and social groups play in redressing the uneven distribution of harms caused by the goods movement industry and infrastructure. Environmental justice proponents challenge the distributional patterns of environmental benefits and burdens in society, which tend to lie along race, class, and gender-based lines, producing and perpetuating socioeconomic inequalities.[305] In the environmental justice view, unfettered market dynamics are more likely to deepen than heal these inequities. As Verchick explains, "[l]ike any human system, free markets will always reflect the biases and power imbalances of broader society."[306] By this view, unchecked market processes will channel benefits toward those with capital and burdens towards those without. Free trade is not free at all; rather it is encumbered with latent structural inequalities and carries dramatic costs for society's most vulnerable members.

Empirical studies of goods movement support these environmental justice critiques. For instance, vehicles and equipment used to move goods typically rely on diesel fuels, which emit complex mixtures including black carbon, toxic metals, and particulate matter, as well as ozone precursors including NOx, SOx, and volatile organic carbons.[307] As detailed in Part I.B, these and other emitted gases, individually and in combination, produce significant deleterious health and environmental effects. Communities living adjacent to goods movement arteries, including ports, rail yards, and major roadways, bear a disproportionate share of air, water, and noise pollutant exposures that freight transport produces, paying with their health and the vitality of their communities.[308] These communities, studies have shown, also tend to be low-income and minority.[309] Thus, on top

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[305] *See* Verchick, *supra* note 112, at 1296 ("Environmental justice is a moral and theoretical commitment to correcting social imbalances in all aspects of environmental policy. For this reason, environmental justice advocates must seek out distributional injustice wherever it threatens the poor, the polluted, and the politically powerless."); Luke W. Cole & Caroline Farrell, *Structural Racism, Structural Pollution, and the Need for a New Paradigm*, 29 WASH. U. J.L. & POL'Y 265 (2006).

[306] Verchick, *supra* note 112, at 1298.

[307] *See supra* Part II.B.

[308] Hricko, *supra* note 48, at A78.

[309] NEJAC, *supra* note 48, at 6 ("Across the country, there are many

of preexisting social vulnerabilities, these population groups face the added impediments of poor health, reduced well-being, and fractured communities that mass movement of freight entails. In this way, free trade is dirtied by its tendency to increase social divides through uneven environmental degradation.

Scholars and activists of the environmental justice movement have developed a number of strategies for countering these conjoined environmental and social inequities. Within the environmental movement, some of these strategies have been criticized as counterproductive or obstructionist;[310] however, the general strategy that is central to goods movement policy—the localization of environmental regulation—is one that advances environmental progress rather than impedes it. Luke Cole, a prominent voice of the environmental justice paradigm, argued that solutions to environmental problems must incorporate three theoretical perspectives: "the idea of communities speaking for themselves, of pollution prevention, and of the precautionary principle."[311] Each of these principles supports policies to clean up and reorient the goods movement system.

First, environmental justice advocates press for procedural reforms "that open the process" of lawmaking "up to local voices and that often decentralize political power."[312] Dormant Commerce Clause evisceration of local and state regulations can add to the disempowerment of communities most affected by goods movement by further removing them from decision-making processes.

Second, environmental justice activists emphasize the need to revamp the production-consumption paradigm. Distributional equity in waste and pollution is important because it alleviates

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communities near goods movement infrastructure that consist of large populations of low-income and minority residents. These environmental justice communities tend to have greater exposure to poor air quality as a result of diesel emissions from transportation facilities with high traffic density"); *see supra* Part I.A.

[310] *See, e.g.*, Robert Stavins, *Why the Environmental Justice Lawsuit Against California's Climate Law is Misguided*, GRIST (May 23, 2011), http://grist.org/climate-policy/2011-05-23-environmental-justice-lawsuit-against-californias-climate-law/ (criticizing attempts by environmental justice advocates to use the judiciary to thwart implementation of California's cap and trade program under AB32 as misguided and counter-productive).

[311] Cole & Farrell, *supra* note 305, at 280.

[312] Verchick, *supra* note 112, at 1302.

disproportionate burdens and "can lead to better and more efficient environmentalism by internalizing the costs of consumption."[313] Ultimately, lifting these burdens requires not just shifting pollution around, but also a concerted effort to prevent its production in the first place. Environmental justice activists thus "seek to change production practices upstream so that pollution is eliminated."[314] Beyond making the arteries of freight movement cleaner and more efficient, goods movement policies can help transition society toward a more environmentally friendly economic paradigm by helping to close the distance between producer and consumer and forcing both parties to bear the otherwise externalized costs of production, consumption, and distribution. Food localization policies, for instance, have at their heart an effort to stop upstream pollution production by moving healthy food sources closer to communities. Lifecycle-based polices also force the public to see—and marketplaces to account for—embodied harms that would otherwise be invisible to consumers. They reflect an expansive notion of moral accountability, which suggests that accountability for externalized harms of production cannot be neatly compartmentalized and must be shared by all those implicated along the vast channels of modern trade.

Finally, the precautionary principle seeks to shift the burden of proof with regard to actions that could harm human health and the environment. The precautionary principle places the onus on producers who seek to introduce these processes or substances to "prov[e] that risks are acceptable or reasonable."[315] The precautionary principle also supports legislators and decision makers in enacting environmentally and socially protective policies in the face of scientific uncertainty.[316] In the

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313 *Id.* at 1293.

314 Cole & Farrell, *supra* note 305, at 280.

315 Noah M. Sachs, *Rescuing the Strong Precautionary Principle from its Critics*, 2011 U. ILL. L. REV. 1285, 1295 (2011). *See also* Cole & Farrell, supra note 305, at 281 ("Environmental justice activists have pushed to reframe this debate as well, shifting the presumption of harmful pollution from 'innocent until proven guilty' to 'guilty until proven innocent.'").

316 *See, e.g.*, Brian P. Rafferty, *The Door Opens Slightly: Recent European Union Regulations on Genetically Modified Products and the Ongoing United States-European Union GM Product Dispute*, 16 GEO. INT'L ENVTL. L. REV. 281, 293–94 (2004) (discussing affirmative precautionary policies and regulations undertaken by the U.S. government in areas such as food safety and nuclear power at great cost and before scientific evidence of risk was available); Nicholas Akkers, *New Tools for Environmental Justice: Articulating a Net*

environmental justice view, regulation should presumptively protect communities from the harms of goods movement and place the burden on goods movement industries to produce the cleanest possible mechanisms. Dormant Commerce Clause strictures should similarly give way to allowing states to enact precautionary goods movement policies.

In light of these critiques, it is the authors' hope that Dormant Commerce Clause jurisprudence will eventually fall by the historical wayside. The principles of cooperative federalism and environmental justice both suggest that the time has come for the courts to abandon Dormant Commerce Clause review entirely. The appropriate balance of local, state, and federal regulation is best left to the political process and tensions addressed directly through more well-grounded doctrines like preemption. Fears of protectionism that have motivated the expansion of Dormant Commerce Clause review have become anachronistic and even perverse in a world dominated by large-scale interstate trade. Alternatively, if they are unwilling to dispense with the Dormant Commerce Clause outright, courts should follow the lead of the Ninth Circuit in curtailing the reach of strict scrutiny. It makes little sense for geographic distinctions in regulation to trigger the application of strict scrutiny where these distinctions are based on material differences between products (differences, for instance, in pollution emissions along the course of their production) or motivated by needs such as the protection of local health and stewardship of scarce resources. Courts should then remain faithful to the original formulation of the *Pike* balancing test and invest goods movement regulation with a strong presumption of constitutionality. If, like the citizenry that enacts goods movement regulations, courts are willing to give sufficient weight to their public health and environmental benefits, the *Pike* test too would lose its bite.

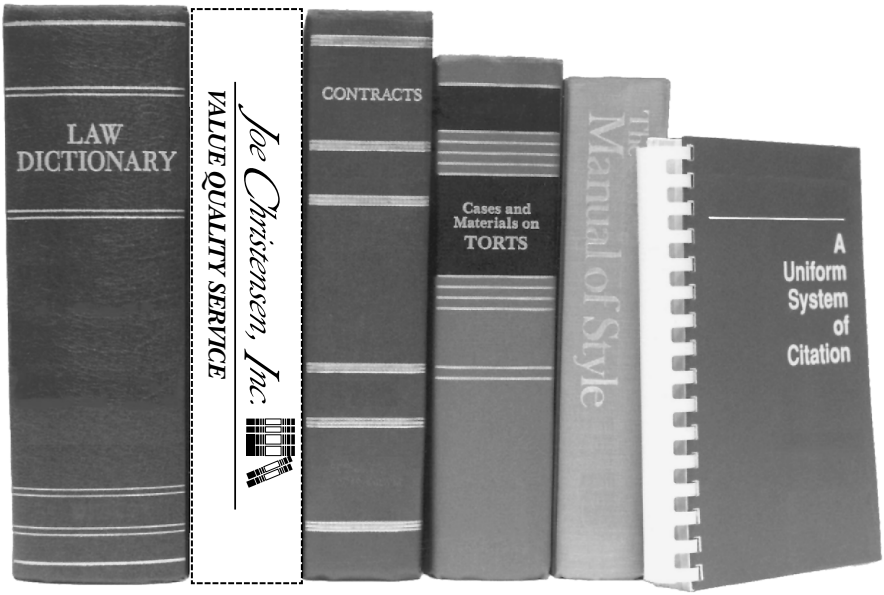
CONCLUSION

As the above analysis reveals, two of the fastest-growing theoretical camps in the environmental movement—cooperative federalism and environmental justice—bolster creative, sub-national goods movement policies that aim to reduce emissions to

Health Effects Challenge to Emissions Trading Markets, 7 HASTINGS W.-N.W. J. ENVTL. L. & POL'Y 203, 227 (2001).

combat global warming and improve public health. These theories of environmentalism and social justice call for a foundational re-examination of the Dormant Commerce Clause and the principles purportedly underlying it. Lower court precedent has already borne out the potential of this extra-constitutional doctrine to derail some of the few successes the environmental movement has enjoyed in this decade. Without reexamination of the doctrine's purposes and consequences, judicial evisceration of states' efforts to control the movement of goods within them, and thereby protect the health of their people and environment, may escalate.

However, if a reasoned jurist (or five) with a penchant for history and an understanding of modern environmentalist thinking were to critically examine the application of the Dormant Commerce Clause to goods movement policies, a much different path may be blazed. With the partisan gridlock of Congress stalling any attempt at impactful environmental policy change at the national level, it will no doubt be the states that decide whether creative policies to address climate change and other environmental harms ever come to fruition. These state statutes and regulations will most certainly be subject to Dormant Commerce Clause scrutiny before the federal courts. When those cases find their way up to the highest court in the land, a decision will have to be made about the Constitutional basis and the continued relevance of the Dormant Commerce Clause. It is the authors' hope that originalists and progressives alike will see the logic and import of abandoning, or at least significantly narrowing, Dormant Commerce Clause doctrine. If that course is not taken, and the Dormant Commerce Clause continues to impede the freedom of states to experiment with goods movement and other environmental policies, with the increasingly dire threat of climate change and the increasingly stubborn stasis of federal government, it very well may be that environmental policy, at least in the United States, will lie dormant for years to come.



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