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Front Matter

 **First page**



EDITORIAL



Editor's Introduction

Spencer Banzhaf

pp. 193–194

 First page



ARTICLES

OPEN ACCESS

Structural Transformation, Agriculture, Climate, and the Environment

Christopher B. Barrett, Ariel Ortiz-Bobea, and Trinh Pham

pp. 195–216

Abstract ▼



This paper reviews the feedback between structural transformation and agriculture, on the one hand, and climate and the natural environment, on the other. The long-standing, dominant economic development narrative largely ignores nature's influence on factor productivity and stocks, even as it increasingly illustrates how agricultural technological change and economic growth affect nature. We articulate some of the missing linkages and pose key policy research questions concerning structural transformation and the complex feedback among agriculture, nature, and economic growth processes, especially in low-income agrarian economies.



What Drives and Stops Deforestation, Reforestation, and Forest Degradation? An Updated Meta-analysis

Jonah Busch and Kalifi Ferretti-Gallon

pp. 217–250

Abstract ▼



This article updates our previous comprehensive meta-analysis of what drives and stops deforestation (Busch and Ferretti-Gallon 2017). By including six additional years of research, this article more than doubles the evidence base to 320 spatially explicit econometric studies published in peer-reviewed academic journals from 1996 to 2019. We find that deforestation is consistently associated with greater accessibility (as influenced by natural features such as slope and elevation and built infrastructure such as roads, cities, and cleared areas) and with higher economic returns (from agriculture, livestock, and timber). Some demographic variables are consistently associated with less deforestation (e.g., Indigenous people, poverty, and age) or more deforestation (e.g., population), and others are not associated with the level of deforestation (e.g., education and gender). Policies that directly influence allowable land-use activities are associated with less deforestation (e.g., protected areas, enforcement of forest laws, payments for ecosystem services, community forest management, and certification of sustainable commodities). But policies and institutions that primarily seek other ends are not consistently associated with more or less deforestation (e.g., democracy, general governance, conflict abatement, and land-tenure security). We introduce reforestation and forest degradation as new dependent variables alongside deforestation. Greater population is

consistently associated with more forest degradation, whereas steeper slope, greater distance from cities, and lower population are consistently associated with more reforestation.



The Economics of Natural Gas Flaring and Methane Emissions in US Shale: An Agenda for Research and Policy

Mark Agerton, Ben Gilbert, and Gregory B. Upton Jr.

pp. 251–273

Abstract ▼



Natural gas flaring and methane emissions (F&M) are linked environmental issues for US shale oil and gas operations. Flaring refers to burning natural gas when regulatory, infrastructure, and market constraints make it infeasible to capture it when drilling for oil. In this paper, we lay out an agenda for researchers and policy makers. We describe why F&M are linked, both physically and in terms of policy. Following an interdisciplinary literature review on measurement of F&M, we marshal detailed industry data to identify constraints in the natural gas system that are correlated with upstream F&M. We then discuss the economic and physical causes of F&M. Moving on to the external costs imposed by F&M, we calculate that the climate costs of estimated methane emissions are an order of magnitude larger than the climate costs of reported flaring after accounting for hydrocarbon content and flare efficiency. Finally, we discuss both existing policies and economic insights relevant to future policies.



The Economics of Electric Vehicles

David S. Rapson and Erich Muehlegger

pp. 274–294

Abstract ▼



We examine the private and public economics of electric vehicles (EVs) and discuss when market forces can be expected to produce the optimal path of EV adoption. Privately, consumer cost savings from EVs vary. Some experience net benefits from choosing gasoline cars, even after accounting for EV subsidies. Publicly, we survey the literature documenting the external costs and benefits of EVs and highlight several themes for optimal policy design. These include (1) promoting regional variation in EV policies that align private incentives with social benefits, (2) pursuing a time-path of policies that reflects changing marginal benefits, and (3) rationalizing electricity and gasoline prices to reflect their social marginal cost. On the one hand, research suggests optimal policy be front-loaded and then ramp down over time as industries gain experience in EV production and as charging infrastructure is put in place. On the other hand, as electricity generation becomes cleaner over time, environmental considerations may favor increasing subsidies as the environmental benefits of driving EVs rise relative to conventional vehicles.



The Fiscal Implications of the US Transition Away from Fossil Fuels

Daniel Raimi, Emily Grubert, Jake Higdon, Gilbert Metcalf, Sophie Pesek, and Devyani Singh

pp. 295–315



The need to reduce greenhouse gas emissions requires curtailing coal, oil, and natural gas production and consumption. However, these fuels are major revenue sources for governments. Here, we develop a novel estimate of the revenues generated by fossil fuels for all governments in the United States. Then we estimate how those revenues change under three stylized scenarios through 2050. The first is business as usual (BAU), without further controlling emissions. The second is to limit the increase in global average temperature to 2°C. The third and most ambitious climate goal is to limit the increase to 1.5°C. We estimate that fossil fuels generate \$138 billion annually for US governments. Although revenues decline under all three scenarios, they fall more quickly under the ambitious climate policy. Taxes on refined petroleum products are the largest source of revenue and decline under all scenarios. Oil and gas production is the second largest and is relatively stable under the BAU and 2°C scenarios but declines rapidly under the 1.5°C scenario. Under all scenarios, coal revenues decline rapidly, approaching zero by 2040 under the 1.5°C and 2°C scenarios. These revenue shortfalls will be concentrated in certain regions. At the same time, recent estimates of climate damages easily exceed the revenue losses described in this analysis. This highlights the need for policy makers to adopt emissions-reduction strategies and also address revenue shortfalls. The policy tools to accomplish both goals are relatively straightforward. However, implementing them will require overcoming considerable political challenges.



Invention and Global Diffusion of Technologies for Climate Change Adaptation: A Patent Analysis

Simon Touboul, Matthieu Glachant, Antoine Dechezleprêtre, Sam Fankhauser, and Jana Stoecker

pp. 316–335



In addition to greenhouse gas mitigation efforts, the global economy will need adaptation technology to function in a changing climate. In this article, we use patent data to describe the global pace of innovation in climate adaptation technology. We identify the leading countries, track technology diffusion across borders, and relate innovation trends to adaptation needs. We find that innovation in adaptation technology has developed less rapidly than innovation in low-carbon technologies since 2005. This seems mainly due to the fact that adaptation is more important in sectors where the overall pace of innovation is slower than average, such as agriculture. Moreover, innovation is highly concentrated, with China, Germany, Japan, South Korea, and the United States accounting for nearly two-thirds of global patented inventions that are relevant to climate adaptation. Other economies could benefit through international technology transfer, but we find only limited technology diffusion through the patent system. International diffusion is particularly low in agriculture and flood protection, and there is virtually no transfer of the relevant patented knowledge to low-income countries. As a result, we find a striking mismatch between countries' adaptation needs and technological availability.



Climate Change, Epidemics, and Inequality

Belinda Archibong and Francis Annan

pp. 336–345



What are the links among climate change, epidemics, and socioeconomic inequality? Although the recent pandemic has focused attention on the effects of epidemics on economic outcomes, and a separate literature in climate science and environmental health has linked global environmental change to an increase in infectious disease epidemics, there is relatively little work connecting these two strands of literature. We explore the links among climate change, epidemics, and group-based inequality by first reviewing the scientific literature modeling the effects of global warming on infectious disease epidemics. We highlight the ways in which climate variables (such as temperature, precipitation, and wind speeds) and adaptive human behavior (such as migration) in response to climate events may facilitate the spread of infectious disease. We then examine the effects of climate-induced epidemics on gender inequality using evidence from the African meningitis belt. The results show that epidemics can worsen outcomes for groups in already economically precarious circumstances, thereby widening group-based socioeconomic inequality. Effective policies to combat the negative effects of epidemics must be mindful not to increase existing group-based inequalities and should aim to reduce these inequalities by minimizing damage for members of the most marginalized groups in societies.

FEATURES



Environmental Justice Analysis for EPA Rulemakings: Opportunities and Challenges

Ann Wolverton

pp. 346–353

Abstract ▾



This article discusses the nature and current approach to environmental justice analysis for US Environmental Protection Agency regulations and highlights key data and analytic challenges where economists could play a role in filling these gaps.

FREE

Announcements

pp. 354–358



MOST READ MOST CITED

Of all published articles, the following were the most read within the past 12 months.

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The Economic Impacts of Natural Disasters: A Review of Models and Empirical Studies

W. J. Wouter Botzen, Olivier Deschenes, and Mark Sanders

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The Impacts of Environmental Regulations on Competitiveness

Antoine Dechezleprêtre and Misato Sato

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Marine Plastic Pollution: Sources, Impacts, and Policy Issues

Bethanie Carney Almroth and Håkan Eggert

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Toward Optimal Meat Pricing: Is It Time to Tax Meat Consumption?

Franziska Funke, Linus Mattauch, Inge van den Bijgaart, H. Charles J. Godfray, Cameron Hepburn, David Klenert, Marco Springmann, and Nicolas Treich

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