

FROM THE PRESIDENT...

The second half of this year has been considerably quieter than the first half. In the last issue of the newsletter I reported on all of the negotiations over the *Journal of Environmental Economics and Management (JEEM)*.

- **JEEM continues as the flagship journal of our field** (meaning no disrespect to the other fine field journals). Academic Press continues to publish the journal under the editorial leadership of Joseph A. Herriges of Iowa State University in Ames. *JEEM* now operates with a set of co-editors, similar to the associate editors of the past, though with more autonomy. They are Anna Alberini, Brian Copeland, Larry Karp, Charles Mason, Stephen Polasky, and Anastasios Xepapadeas. Although all submissions should be sent to Iowa State, the co-editors will handle the manuscripts they are assigned from beginning to end, making the decision about acceptability and communicating directly with authors. This is the standard practice in many economics journals and should work well for *JEEM*.

Another innovation is that *JEEM* is now free to AERE members. Of course we had to raise the membership dues to make it free. The majority of AERE members have purchased subscriptions to *JEEM* in the past; this arrangement will result in a substantial net reduction in costs for those members.

- **AERE Committee Membership has been updated.** Jim Wilen of UC Davis has agreed to serve on the Program Committee, replacing outgoing member Jo Albers. Thanks to Jo for her service and to the outgoing Chair of the Committee, Larry Goulder. The new committee membership is George Parsons (Chair), Larry Goulder, Carlo Carraro, and Jim Wilen. The Committee to name the Publication of Enduring Quality has also been reconstituted. Bob Deacon has agreed to replace retiring Chuck Howe. Our thanks to Chuck for his service. The committee is now chaired by Tim Haab and consists of Tim, Bob and Gardner Brown.

- **A very successful AERE Workshop was held in Bar Harbor, Maine this past June.** Our thanks to Laura Taylor for organizing this workshop, entitled "Assessing and Managing Environmental and Public Health Risks." No workshop will be held this coming year, due to the Second World Congress being scheduled for late June.

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- **Meetings which took place over the summer** include the European Association of Environmental and Resource Economists (EAERE) annual meeting, held in Southampton, UK at the end of June. I remind AERE members that they may become EAERE members as well with the payment of a very nominal additional fee (with no charge for those under the age of 30). AERE also sponsored sessions at the American Agricultural Economics Association (AAEA) meetings held in August in Chicago. We had exceptionally good turnout for the AERE reception at the meeting.

- **Upcoming meetings** include the Allied Social Science Associations (ASSA) meetings in Atlanta, Georgia in January 2002. Information on AERE sessions can be found on page 8 in this newsletter. A reservation form is enclosed for our annual meeting and luncheon to be held at the City Grill. Please note the deadline date of December 21st for making a reservation. We hope to see many of you there.

- **Please mark your calendar for the big event of 2002: the Second Annual World Congress of Environmental and Resource Economists.** The Congress will be held in beautiful Monterey, California, June 24th – 27th (commencing with an opening reception and registration in the late afternoon on Sunday, June 23rd). Michael Hanemann is putting in a great deal of work to make this Congress a success. Please see the enclosed flyer for details about the World Congress including the Call for Papers and Registration.

We are extremely grateful to all the AERE members who have generously given of their time to our association to make these events happen. I invite any of you who are interested in serving in some capacity to contact me or one of the other officers or board members.

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AERE Newsletter

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AERE HOME PAGE

AERE can be found on the world wide web at:

<http://www.aere.org>

The AERE Home Page is a valuable resource. It provides information about membership, the *Journal of Environmental Economics and Management (JEEM)*, a list of AERE members with web pages, the on-line edition of excerpts from the *AERE Newsletter*, graduate programs in environmental and resource economics, meetings and workshops, job opportunities, on-line discussion lists, and WWW links of interest. Members may access the AERE Handbook and Directory using the membership code. (All members were sent a letter containing the code--please contact Marilyn M. Voigt at voigt@rff.org if you have misplaced it.) Send any and all comments regarding the web page to:

John Whitehead
Department of Economics and Finance
University of North Carolina at Wilmington
whiteheadj@uncwil.edu

AERE ANNOUNCEMENTS

BOARD OF DIRECTORS' MEETING

The annual meeting of the AERE Board of Directors will be held on Friday, January 4th from 5:30 to 7:30 p.m. at the Hilton Atlanta Hotel in the Board Room. Anyone with matters to be brought before the Board should contact the president:

Charles D. Kolstad
**Donald Bren School of Environmental Science
and Management and Department of
Economics**
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Santa Barbara, CA 93106-9210
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AERE WORKSHOP 2001

The workshop on "Assessing and Managing Environmental and Public Health Risks" was held at the Bar Harbor Inn in Bar Harbor, Maine, June 13-15, 2001. Sixteen papers were presented on a variety of topics, including risk assessment under uncertainty, valuation of adult and child morbidity and mortality, and assessment of long-term risks such as those arising from global warming. The papers are available at the AERE website, <http://www.aere.org>.

The organizers were the AERE Workshop committee, Laura Taylor (Chair), Joseph Charbonneau, Don Fullerton, Carol Adaire Jones, Norman Meade, and Richard Ready. Kevin Boyle and the University of Maine provided local transportation and helped with the local arrangements. AERE gratefully acknowledges the funding provided by the National Oceanic and Atmospheric Administration; the Economic Research Service, U.S. Department of Agriculture; and the Fish and Wildlife Service, U.S. Department of the Interior.

Laura Taylor
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WORLD CONGRESS OF ENVIRONMENTAL AND RESOURCE ECONOMISTS

The Second World Congress of Environmental and Resource Economists will be held at the Marriott Hotel in Monterey, California. The Congress will commence with an opening reception and registration at the Marriott in the late afternoon on Sunday, June 23, 2002. The Congress sessions will begin on Monday, June 24th and run through Thursday, June 27th.

The Congress is sponsored by the Association of Environmental and Resource Economists (AERE) and the European Association of Environmental and Resource Economists (EAERE).

The four-day program will consist of plenary sessions with keynote speakers, parallel sessions with contributed papers, and some sessions with invited papers and panels on special topics in environmental and resource economics. The keynote speakers are: Kenneth Arrow, Partha Dasgupta, Daniel McFadden, and Martin Weitzman.

On the evening of June 24th, there will be a Gala Dinner at the world famous Monterey Aquarium, overlooking Monterey Bay.

Please see the enclosed flyer for additional information about the Call for Papers and Registration or see the Congress web site which can be reached through the AERE and the EAERE web sites at:

www.aere.org and www.eaere.org

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and Goldman School of Public Policy
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Berkeley, CA 94720
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CALLS FOR PAPERS AND PROPOSALS

AERE NEWSLETTER

The AERE Newsletter is soliciting essays about natural resource and environmental economics issues of general interest to the membership. These essays can be relatively short (6-10 double spaced pages) and address a topic that does not fit into the traditional journal outlet. There is currently no backlog, so your essay would likely be published in the following *AERE Newsletter*. Marilyn Voigt and I need your essay in February for the May issue and August for the November issue. If you wish to float an idea by me, feel free to contact me.

John Loomis
AERE Newsletter Co-Editor
jloomis@agsci.colostate.edu
Telephone: 970-491-2485.

AMERICAN AGRICULTURAL ECONOMICS ASSOCIATION (AAEA)

The 2002 Summer meeting of the AAEA will be held in Long Beach, California on July 28-31, 2002. Authors wishing to have a paper considered for the AERE sessions at the meeting should send six copies of a two-page abstract to **George Parsons** at the address below. Submissions must be postmarked **by January 15, 2002**.

Proposals for complete sessions are also invited. Organizers of proposed sessions should submit abstracts of papers following the above instructions. Papers may be accepted or rejected on an individual basis unless the organizer specifically requests the session be considered only in its entirety.

George R. Parsons
Robinson Hall
University of Delaware
Newark, DE 19716
gparsons@udel.edu

ALLIED SOCIAL SCIENCE ASSOCIATIONS (ASSA)

The 2003 Winter meeting of the ASSA will be held in Washington, D.C. on January 3-5, 2003. Authors wishing to have a paper considered for the *AERE* sessions at the meeting should send six copies of a two-page abstract to George Parsons at the address below. Submissions must be postmarked **by May 15, 2002**.

Proposals for complete sessions are also invited. Organizers of proposed sessions should submit abstracts of papers following the above instructions. Papers may be accepted or rejected on an individual basis unless the organizer specifically requests the session be considered only in its entirety.

George R. Parsons
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APMOD 2002

Announcing a "Symposium on Applied Mathematical Programming and Modelling" in Varenna, Italy, on Lake Como, June 17-19, 2002. Individuals interested in presenting a paper on the application of mathematical modelling to environmental management should send a 300 word abstract **by February 1, 2002** to:

Jon M. Conrad
JMC16@cornell.edu

with a copy to

APMOD2002@disco.unimib.it

Further details on the symposium may be found at:
www.disco.unimib.it/apmod2002

**ANDEAN DEVELOPMENT
CORPORATION (CAF)**

The Corporación Andina de Fomento (CAF) invites applications for its First Research Papers Program. The Program invites proposals for research papers on topics of interest to CAF. CAF will provide economic support to the proposals selected, finished papers will be presented in a local seminar and distributed.

Eligibility:

The program is intended primarily, but not exclusively, for researchers associated with Latin American universities, research institutes and other private or public institutions in Latin America. The invitation is also extended to assistant professors, researchers or post graduates from CAF¹ member countries working in U.S. or European institutions with focus on topics related to Latin America.

Topics:

Proposals pertaining to the following research topics will be considered:

- Impact of the HIPC initiative
- Agricultural trade and integration
- Effects of the FTAA on the Andean Community
- Mechanisms and priorities for the development of social capital
- Value of environmental services and strategic ecosystems
- Dealing with problem banks in crisis and non-crisis situations
- Biodiversity and intellectual property rights

Preference will be given to work directly relevant to Latin America or specifically to the Andean region.

Program conditions:

CAF will pay U.S.\$6,000 to selected proposals. Additionally, it will pay travel (economy class) and lodging expenses for a seminar to be held in Caracas where final papers will be presented. CAF reserves the right to publish and distribute resulting works. Authors however are free to submit papers to specialized journals

or publications or to use them to fulfill academic requirements, provided that CAF sponsorship is acknowledged.

How to apply:

Proposals should not exceed eight pages and must include the following

- Title
- Abstract
- Objectives and relevance for the region
- Research methodology
- Outline of research and timetable
- Bibliography

Additionally, proposals must be accompanied by a Curriculum Vitae and a letter of support from the researcher's institution or, in the case of graduate students, from their academic advisor.

All material should be sent via e-mail to:

CAF Research Papers Program
desarrollo@caf.com
Corporación Andina Fomento
Caracas, Venezuela

Applications must be submitted **by January 10, 2002**. Early applications are encouraged. Final papers must be submitted by July 31, 2002. Seminars will take place in September 2002. A proposal for each topic will be selected and results will be announced by February 15, 2002.

For further information, please contact:

Osmel Manzano	Stefania Scandizzo
Email: omanzano@caf.com	Email: sscandiz@caf.com
Tel: 0058-212-2092234	Tel: 0058-212-2092240

Program representatives will attend LACEA meetings in Montevideo, Oct. 18-20, 2001 (Osmel Manzano) and AEA meetings in Atlanta, Jan. 4-6, 2002 (Stefania Scandizzo). Further information about CAF and the program can be found at www.caf.com

¹ CAF member countries are: Bolivia, Colombia, Ecuador, Peru, Venezuela, Brazil, Chile, Jamaica, Mexico, Panama, Paraguay and Trinidad & Tobago. Applications from researchers from countries in the process of becoming members (Argentina, Costa Rica, Uruguay and Spain) will also be given preference.

CITY OF KEY WEST, FLORIDA

NOTICE is hereby given to prospective proposers that the City of Key West, Florida is seeking University Consultants: Quality of Life Study—RFP #01-016. The Clerk of the City of Key West, Florida at 525 Angela Street, Key West, Florida 33040 will receive Request for Proposals until 3:00 P.M. local time on **November 21, 2001**. Late proposals will not be considered. Request for Proposal Documents may be obtained from DemandStar by Onvia at www.demandstar.com/supplier or call toll-free 1-800-711-1712.

One original and twelve copies of the letter of interest and statements of proposal are to be enclosed in two sealed envelopes, one within the other clearly marked on the outside: REQUEST FOR PROPOSALS for UNIVERSITY CONSULTANT: QUALITY OF LIFE STUDY - RFP # 01-016, addressed and delivered to:

**City Clerk
City of Key West, Florida
City Hall, 525 Angela Street
Key West, Florida 33040**

At the time of the award, the successful Proposer must show satisfactory documentation of such State, County, and City licenses as would be required. Any permit and/or license requirement and subsequent costs are located within the documents. The successful Proposer must also be able to satisfy the City Attorney at to such insurance coverage and legal requirements as may be demanded by the proposal in question. The City of Key West reserves the right to reject any and/or all proposals because of irregularities, waive irregularities or informalities in any or all proposals, and to accept any proposal that the City Commission deems to be in the best interest of the City.

Sue Snider, Purchasing Agent

ENVIRONMENTAL SCIENCE AND POLICY

The editors invite contributions to *Environmental Science and Policy*, a journal advancing interdisciplinary research of policy relevance on environmental issues such as climate change, biodiversity, environmental pollution and wastes, renewable and nonrenewable natural resources, and the interactions between these issues. The journal emphasizes the linkages between these environmental issues and social and economic issues such as production, transport, consumption, growth, demo-

graphic changes, well-being, and health. Submissions should address environmental issues of international significance, aim at informing policy debates and making, and be of international relevance. All submissions will be independently reviewed.

Proposals for ordinary and guest-edited special issues are also welcomed. Please send three paper copies and an electronic copy of your manuscript to *Environmental Science and Policy* at the address below. Contact us via email if you have any further inquiries.

For detailed submission guidelines, see <http://www.elsevier.nl/locate/envsci>

**Environmental Science and Policy
Environmental Change Institute
University of Oxford
5 South Parks Road
Oxford OX1 3UB
United Kingdom
Email: esp@eci.ox.ac.uk**

EUROPEAN ASSOCIATION OF AGRICULTURAL ECONOMISTS (EAAE)

**X Congress
"Exploring Diversity in the European
Agri-food System"
August 28-31, 2002 Zaragoza, Spain**

Under the broad title of "Exploring Diversity in the European Agri-food System", sessions on various topics will be organized. Papers on agricultural economics, agricultural and rural development policies, resource and environmental economics, agribusiness, farm management, trade, analytical methods and policy analysis are welcome. The Congress will try to emphasize the European experiences but is also open to analyses related to other territories.

The Program Committee invites submission of manuscripts for both contributed papers and posters. The committee considers that posters and papers are alternative ways to present information and its policy is not to establish a hierarchy between the two formats. Manuscript with best reviews by referees will be selected either for a formal session (paper) or for an interactive session (poster) on the basis of the topic. However, authors who do not wish that their manuscript be considered for a poster may indicate so.

The deadline for submission of contributed papers is **January 30, 2002**. The deadline for poster submission is **April 30, 2002**. Guidelines for authors: 3 paper copies of the full contributed paper or an extensive description of the work presented as a poster must be sent to:

J.C. Bureau
Program Committee EAAE Congress
INRA-ESR, BP1
78850 Thiverval-Grignon, France.

An electronic version must also be sent to: eaae.papers@grignon.inra.fr. For information on the Congress location and registration, contact the local committee and see:

<http://www.lei.dlo.nl/EAAE/activities/indexa.htm>

**NORTHEAST AGRICULTURAL AND
RESOURCE ECONOMICS ASSOCIATION
(NAREA)**

Land Use Policy Workshop
June 11-12, 2002
Harrisburg, Pennsylvania

Matching the growing societal interest in land-use issues is an explosion of exciting and innovative economics research on the forces driving land use change, the impacts of land use change on communities and environmental resources, and land use policy. Land use change affects ecosystems, biodiversity, production from farms and forests, rural landscapes, air, water and environmental quality, and even global climate change and international food security.

The objective of this special "Land Use Policy Workshop," following the Annual Meeting of the Northeast Agricultural and Resource Economics Association (NAREA) on June 9-11, 2002, is to collect results and lessons from this research that will be useful for land use planning and decisionmaking. The workshop will consist of invited and selected presentations that display advances in economic research addressing contemporary land use issues. Authors of selected papers will receive an honorarium of up to \$1000. Papers will be submitted for refereed publication in the Association's journal, *Agricultural and Resource Economics Review* (ARER) and workshop sponsors will cover costs of publication (page charges). Topics of interest include, but are not limited to:

- Causes and consequences of urban sprawl;
- Agricultural and private forest land conservation;
- Advances in spatially explicit landscape modeling;
- Land-use policy innovations;
- The implications of decision-making scale for land-use planning;
- Linkages between land use and ecosystem integrity or environmental quality;
- Potential gains from joint local land-use planning efforts;
- Socio-economic drivers, rural land-use patterns, and demographic change;
- Influence of landscape ecology on land-use change and land values;
- Land use regulation and property rights in the courts;
- The role of institutions in driving or directing land-use change;
- Market-based approaches to growth control and land-use change;
- Land conservation priorities;
- Inter-regional differences in the influences on land use change through farm policy and agricultural or ecological productivity.

An intent of the NAREA Workshop Committee is to produce an academically rigorous, policy-relevant volume that will extend research results to the policy community. The workshop is intended to foster improvements in future research and policy decisions directed toward rural land use changes, including the integration of economics with natural or ecological science.

Authors should check the NAREA web site (<http://www.NAREA.org/>) for additional details and plan to submit extended abstracts (5 pages) or draft papers to:

Robert J. Johnston
NAREA Workshop
Dept. of Environmental and Natural Resource
Economics
University of Rhode Island
1 Greenhouse Road, Suite 205
Kingston, RI 02881

Submissions due **January 18, 2002**. Drafts of full papers will be requested April 30th. Complete drafts for refereed review by *ARER* will be due August 1. Sponsored by Northeast Regional Center for Rural Development.

MEETINGS

ALLIED SOCIAL SCIENCE ASSOCIATIONS (ASSA)

January 4-6, 2002
Atlanta, Georgia

AERE PAPERS SESSIONS

Issues in Land and Forest Management (Q2)

Presiding: James Sanchirico
Resources for the Future (RFF)
Date/Time: Friday, January 4th, 8:00 a.m.
Place: Hilton, Ballroom B

Papers:

"Land Management with Ecological and Economic Objectives: Developing a Production Possibility Set of Wildlife Species Persistence and Timber Harvest Value," Jeffrey Arthur, Claire Montgomery, Darek Nalle, (Oregon State University), Stephen Polasky (University of Minnesota) and Nathan Schumaker (U.S. Environmental Protection Agency-EPA).

"Joint Production of Timber and Amenities by Private Landowners," Subhrendu K. Pattanayak (Research Triangle Institute-RTI), Karen L. Abt, and Thomas Holmes (U.S. Forest Service).

"Cost-Effective Management for Biodiversity and Timber Production in the Coast Range of Oregon," Mark Lichtenstein (Oregon State University).

"Shades of Green: Relative Values of Private, Neighborhood, and Public Forests," Carol Mansfield, Subhrendu Pattanayak, RTI; William McDow, Patrick Halpin, and Dean Urban, Duke University.

Discussants:

Jo Albers, Resources for the Future
Edward Barbier, University of Wyoming
Roger Sedjo, Resources for the Future
George Parsons, University of Delaware

Issues in Climate-Change Policy (Q2, D6)

Presiding: Lawrence H. Goulder
Stanford University
Date/Time: Friday, January 4th, 2:30 p.m.
Place: Hilton, Ballroom B

Papers:

"Global Warming, Endogenous Risk, and Irreversibility," Anthony C. Fisher (University of California-Berkeley) and Urvashi Narain (RFF).

"The Carbon-Sequestration Debate: Much Ado About Nothing?" Klaas Van't Veld (University of Michigan) and Urvashi Narain (RFF).

"The Effect of Allowance Allocation on the Cost of Carbon Emission Trading," Dallas Burtraw, Karen Palmer, Ranjit Bharvirkar, and Anthony Paul (RFF).

Discussants:

Geoffrey Heal, Columbia University
Brian Murray, Research Triangle Institute
Suzi Kerr, Massachusetts Institute of Technology

Urban Sprawl, Travel Demand, and Open Space (R4, Q2)

Presiding: Kenneth Small
University of California, Irvine
Date/Time: Saturday, January 5th, 8:00 a.m.
Place: Hilton, Ballroom B

Papers:

"The Impact of Urban Spatial Structure on Travel Demand in the United States," Antonio Bento, (University of California-Santa Barbara); Maureen L. Cropper, Mushtiz Mobarak, and Katja Vinha (University of Maryland, College Park).

"The Efficiency and Distributional Effects of Alternative Policies to Control Urban Sprawl," Antonio Bento, Sovia Franco, and Trenton Smith (UC-Santa Barbara).

"Comparing and Combining Revealed and Stated Preference Methods to Value Open Space and Its Duration at Residential Locations," Dietrich Earnhart (University of Kansas).

Discussants:

Richard Arnott, Boston College
 Kenneth Small, UC-Irvine
 Elena Irwin, The Ohio State University

"Pricing and Firm Conduct in California's Deregulated Electricity Market," Steven Puller (Texas A&M University).

Discussants:

Scott Harvey, Law and Economics Consulting Group
 Howard Gruenspecht, Resources for the Future
 Gregory Crawford, Duke University

Behavioral Responses to Environmental Regulations (H3, O3)

Presiding: Gilbert Metcalf
 Tufts University
Date/Time: Saturday, January 5th, 10:15 a.m.
Place: Hilton, Ballroom B

Papers:

"Environmental Regulations and Traditional Measures of Productivity: A Joint Production Perspective," Rolf Fare, Shawna Grosskopf (Oregon State University) and Carl A. Pasurka, Jr., (EPA).

"Empirical Estimates for Environmental Policy Making in a Second-Best Setting," Sarah West (Macalester College) and Robertson C. Williams III, (University of Texas-Austin).

"Endogenous Technological Change in the DICE Model of Global Warming," David Popp (Syracuse University).

"Pollution Abatement under Learning by Doing with Heterogeneous Costs," Yann Bramoulle and Lars J. Olson (University of Maryland, College Park).

Discussants:

Karen Fisher-Vanden, Dartmouth College
 Michael Greenstone, University of Chicago
 Charles Kolstad, University of California-Santa Barbara
 Lawrence Goulder, Stanford University

Water Resource Management (Q2)

Presiding: Bonnie Colby
 University of Arizona
Date/Time: Sunday, January 6th, 8:00 a.m.
Place: Hilton, Salon E

Papers:

"Consumer Response: Experimental, Survey, and Real World Results for Water Pricing," David Brookshire, Janie M. Chermak, and Kate Krause (University of New Mexico).

"Price and Non-Price Demand Management in U.S. Urban Water Markets," Sheila Cavanagh (Harvard), Michael Hanemann (University of California-Berkeley) and Robert Stavins (Harvard).

"Cadillac Desert Revisited: Property Rights, Public Policy, and Water-Resource Depletion," Stephen P. Holland (U.S. Federal Trade Commission) and Michael R. Moore (University of Michigan).

"Pollution Trading or Firm Specific Taxes in Water Quality Limited Areas: Use of Benefits Assessment and Efficient Trading Ratios," Scott Farrow, Martin Schultz (Carnegie Mellon University) and George Van Houtven (Research Triangle Institute).

Discussants:

Diane Dupont, Brock University
 Frank Wolak, Stanford University
 Julie Hewitt, U.S. Environmental Protection Agency
 Tom Tietenberg, Colby College

Empirical Analysis of Electricity Markets (Q4, L9)

Presiding: Robert Stavins
 Harvard University
Date/Time: Saturday, January 5th, 2:30 p.m.
Place: Hilton, Ballroom B

Papers:

"A Quantitative Analysis of Pricing Behavior in California's Wholesale Electricity Market During Summer 2000," Paul Joskow (Massachusetts Institute of Technology) and Edward Kahn (Analysis Group/Economics).

"An Empirical Analysis of Market Power in New England's Electricity Market," James Bushnell and Celeste Seravia (University of California-Berkeley).

Valuing Children's Health and Safety (I1, D6)

Presiding: Nicole N. Owens
 U.S. Environmental Protection Agency (EPA)
Date/Time: Sunday, January 6th, 10:15 a.m.
Place: Hilton, Salon E

Papers:

"Methodological Issues in the Application of Quality-Adjusted Life-Years to Interventions Regarding

Children," Mathew M. Davis (University of Michigan) and David O. Meltzer (University of Chicago).

"Revealed Demand for Children Risk Reduction: The Case of Bicycle Safety Helmets," Robin R. Jenkins, Nicole N. Owens, and Lanelle Bembenek Wiggins (EPA).

"Valuing the Damages to Children in the Tobacco Litigation," Glenn W. Harrison (University of South Carolina).

"What Do Organic Baby Food Purchases Tell Us About Parental Values for Reductions in Risks to Children's Health?" Kelly M. Maguire, Nicole N. Owens, and Nathalie B. Simon (EPA).

Discussants:

James Hammitt, Harvard University
V. Kerry Smith, North Carolina State University
Chris Dockins, EPA
Mark Dickie, University of Central Florida

The Valuation and Provision of Environmental Amenities (H4,D6)

Presiding: Anna Alberini
University of Maryland, College Park

Date/Time: Sunday, January 6th, 1:00 p.m.

Place: Hilton, Salon E

Papers:

"Green" Markets and the Private Provision of Environmental Public Goods," Matthew J. Kotchen (University of Michigan).

"Environmental Valuation with a Dynamic Theory of Welfare Measurement and Consumer Behavior," Jinhua Zhao and Catherine L. Kling (Iowa State University).

"Environmental Catastrophes and Non-Expected Utility Maximization: An Experimental Evaluation," Charles F. Mason, Jason F. Shogren (University of Wyoming), Chad Settle (University of Tulsa) and John A. List (University of Central Florida).

"Kuhn-Tucker Recreation Demand Models with Large Choice Sets: An Application to Beach Recreation," Dan Phaneuf (North Carolina State University) Roger Von Haefen (Duke University) and George Parsons (University of Delaware).

Discussants:

James Andreoni, University of Wisconsin
Ray Palmquist, North Carolina State University
William Schultze, Cornell University
Frank Lupi, Michigan State University

JOINT SESSION WITH THE AMERICAN ECONOMIC ASSOCIATION (AEA)

Exploring New Designs for Climate-Change Policy (Q4, Q2, O3)

Presiding: Charles D. Kolstad
University of California-Santa Barbara

Date/Time: Friday, January 4th, 10:15 a.m.

Place: Hilton, Ballroom B

Papers:

"Addressing Industry Distributional Concerns in U.S. Climate-Change Policy," A. Lans Bovenberg (Tilburg University) and Lawrence H. Goulder (Stanford).

"Economic Issues in the Design of International Climate Policy," Alan S. Manne (Stanford) and Richard G. Richels (Electric Power Research Institute).

"Alternative Approaches to the Design of Mechanisms for Global Public Goods," William Nordhaus (Yale University).

"Alternative Designs for Developing Country Participation in a Global Climate Agreement," William Pizer (Resources for the Future).

Discussants:

Anne Smith, Charles River Associates
Henry Jacoby, MIT
Robert Stavins, Harvard University
Jeffrey Frankel, Harvard University

University of Helsinki and European Forest Institute (EFI)

**Protecting Nature on Private Land —
From Conflicts to Agreements
June 12-15, 2002
Lahti, Finland**

An interdisciplinary workshop intended for conservation biologists, environmental economists, as well as environmental policy researchers. More information and a registration form can be found at the following website: http://www.efi.fi/events/2002/Protecting_Nature

ESSAY

Double Dividend Reconsidered

William K. Jaeger*

Introduction

Over the past eight years, a sizable body of literature on “green tax reform” and the “double dividend hypothesis” has appeared, accompanied by a considerable degree of confusion surrounding these results and their interpretation. Much of the confusion stems from the apparent incongruities between the findings in this literature and the intuitive propositions that preceded them. Despite efforts by the authors of this literature to clarify the reasoning behind their findings and interpretations (for example, Goulder and Parry 2000), doubts and confusion persist in many quarters.

To be sure, the theoretical questions being raised are inherently complicated, and it is remarkable just how complex this particular issue has become due to the myriad of assumptions, definitions, and distinctions on which a particular interpretation may depend. Adding to the confusion are disagreements about what question is being asked, and which results are pertinent to what question. Such ambiguities can create a moving target, leading us in circles, and making it difficult to reduce the confusion or resolve the debate.

At a general level, the debate is about tax policy in a world with two tax problems: where revenue-motivated (distortionary) taxes are needed to raise revenues, and where externalities create an opportunity for environmental (corrective) taxation. In general, the questions being asked pertain to whether these two tax problems are complementary, or whether they are competing government objectives. This general question can be broken down into: 1) questions about price (Will the optimal environmental tax generally be higher or lower than the marginal social damage from pollution in the presence of

revenue-motivated taxes?); 2) questions about quantity (Can environmental policy do more, or less, to improve the environment in the presence of revenue-motivated taxes?); and 3) questions about welfare effects (Does the presence of revenue motivated taxes raise or lower the welfare gains from “green tax reform” (the revenue-neutral introduction of environmental taxes)?).

Obviously, these questions are interconnected, and answers to one may lead intuitively to inferences about the others. Indeed, while much of the recent literature has been based on the price question, their conclusions have emphasized the inferences to be drawn about the welfare effects of “green tax reform”. Some analysts have evaluated whether setting the environmental tax equal to the marginal social damage from pollution is welfare maximizing (e.g., Bovenberg and de Mooij 1994, Parry 1995), others have judged whether the optimal environmental tax should be higher or lower than marginal social damages (e.g., Bovenberg and van der Ploeg 1994, Bovenberg and Goulder 1996, Fullerton 1997).

The connection between the optimal environmental tax and the welfare gains from green tax reform are closely tied with the “double dividend hypothesis,” which suggests that using the revenues from environmental taxes to lower preexisting revenue-motivated taxes will produce an added welfare gain. Since the Pigouvian principle calls for equating the environmental tax to the marginal social damage, the introduction of an additional welfare gain should lower the net cost of environmental taxation, and, intuitively, this should make it possible to raise the environmental tax above marginal social damage. The term “double dividend” became widely used following Pearce (1991), who suggested that this could make the effective environmental tax (in terms of its distortionary cost) 20 to 50 percent lower than its nominal value.¹

Nevertheless, while the authors of the recent literature agree that using pollution tax revenues to finance reductions in preexisting taxes is welfare improving, they have found—surprisingly—that the optimal environmental tax generally lies below the marginal social

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¹ Other literature frequently cited as supportive of the double dividend hypothesis includes Tullock (1967), Terkla (1984), Lee and Misioczek (1986), and Oates (1995).

damage from pollution. Herein lies the apparent incongruity and source of confusion of their findings.

The current essay attempts to clarify these issues by drawing attention to two key distinctions that, in my view, are central to the analysis but have been overlooked in the recent literature. One of these involves distinguishing between social and private valuation. The other involves distinguishing between the two main types of environmental externalities, those that affect productivity and those that affect utility directly.

On the distinction between social and private values, first-principles in welfare economics and social benefit-cost analysis tell us that in a distorted economy, social valuations will differ from private valuations and that to interpret optimality conditions it is the social, or shadow, value of resources that should get our attention. This is true in an economy distorted by taxes or externalities. Thus, I take the position that the present analysis should focus on the social rather than the private value of resources and income. In particular, this means identifying the social marginal utility of income, rather than the private marginal utility of income, as the relevant and appropriate numeraire unit of value for social welfare considerations (more on this below).

On the second point, there exist two distinct types of environmental externalities: production externalities that affect factor productivity, including labor, land, and capital of various types; and amenity externalities that affect utility directly, such as visual and aural amenities and existence values. Since many examples of both types of externalities can be cited (indeed many environmental problems involve both kinds of externalities), I take the position that both types should be given equal consideration in the present analysis—since the results and interpretations may differ by externality type.

Before addressing the specific questions noted above, several caveats are in order. Unless indicated otherwise, all the analyses discussed below pertain to the kinds of models which have been used in the recent literature, ones where certain restrictive assumptions have been introduced to make the analysis tractable. The discussion will therefore pertain to models with homogeneous consumers where all goods are assumed to have identical demands (being equal substitutes for leisure), where labor is the only productive factor and source of income, and where, in the case of an amenity externality, environmental quality is weakly separable in utility. These restrictions ensure that the optimal revenue-motivated tax (in the absence of externalities) will be equal for all goods.

Additionally, government is assumed to rely on distortionary taxes to raise a fixed amount of revenue. The revenue can be assumed to be returned lump sum to con-

sumers or used to provide a public good that is separable in utility. Thus, the starting point for discussions of green tax reform is a situation with preexisting revenue motivated taxes. These may take the form of either a tax on labor income (denoted as an “income tax normalization”) or—equivalently—uniform taxes on all commodities (denoted as an “expenditure tax normalization”). The choice of normalization for the preexisting tax program does not affect the analysis in any real way, as pointed out by Fullerton (1997) and Schöb (1997). It is, however, important to recognize that for the income tax normalization approach, household income has been converted as a consequence to “net income units.” For the expenditure tax normalization, it is the differential between the optimal taxes on polluting and non-polluting goods that defines the “environmental tax.”

The Optimal Environmental Tax

The question of whether the second-best optimal environmental tax will be higher or lower than the marginal social damage from pollution has been the cornerstone of the recent literature. There is little ambiguity about what the optimal environmental tax should be. For a given theoretical or numerical model, the optimal environmental tax can be identified precisely.² But without a point of reference for comparison, there is no way to interpret this result, or to answer the questions being asked in the current literature. Interpretation involves comparing the optimal environmental tax to marginal social damage, and this requires defining marginal social damage explicitly.

From society’s perspective, marginal social damage (MSD) is based on the marginal rate of substitution between income and environmental quality. In other words, it is the social marginal disutility of environmental damage divided by the social marginal utility of income (in absolute value). Differences between private and social values occur in the current context for two reasons. First, the non-rival character of the environment means that the social marginal utility of environmental quality (or other public goods) exceeds its private marginal utility. Second, with preexisting revenue-raising taxes, the social marginal utility of income will exceed the private marginal utility of income because it includes the value of the incremental tax receipts. The

² This assumes we are able to distinguish between the revenue component and the environmental component of the optimal tax. This has been accomplished by using an income tax as the revenue-motivated tax (e.g., Bovenberg and de Mooij 1994), or by defining the environmental tax as the difference between the optimal taxes on polluting and non-polluting goods (Fullerton 1997; Jaeger 2001a).

definition of the social marginal utility of income was identified and formalized by Diamond (1985), and defined as “the sum of gains from individual consumption and from the marginal propensity to pay taxes out of income.”

As in social benefit-cost analysis, the distinction between private and social value is crucial, so we need to be absolutely clear on this point. To illustrate, consider a first-best world where a one-unit increase in an individual’s income will be spent on consumer goods from which they derive 10 “utils” of utility. In this case the private marginal utility of income is 10 utils, and the social marginal utility of income is 10 utils as well. There is no difference between the two values in the first-best case.

Now assume that revenue-motivated taxes are introduced on all consumer goods in order to finance the provision of a public good. In the presence of these taxes, a one-unit increase in an individual’s income will be spent on goods whose prices now include these taxes. This will generate some tax revenue, but it will also lower the purchasing power of the incremental unit of income compared to the first-best case. Given the loss of purchasing power, let’s assume that the private marginal utility of income is now only 6 utils. Assume also that the incremental tax receipts are used to provide an additional increment of the public good, which has a social value of 4 utils. Thus, the social marginal utility of income could still equal 10 utils in this example due to the contribution of additional revenues, but the private marginal utility of income will be less than that, in this case only 6 utils.

In an economy with preexisting taxes, if environmental damage reduces labor productivity and thus lowers income, which of these definitions of the value of a unit of income should be used, 10 utils or 6 utils? Since a one-unit loss of income will reduce social welfare by 10 utils, society should recognize 10 utils as the social marginal utility of income. If we were to look only at the private marginal utility of income, we would understate the social cost of environmental damage in this hypothetical example.

This definition of value differs from the one used in the recent literature, where changes in income are valued from the private, or household, perspective rather than from society’s perspective.³ This means that, according to the recent literature, only that portion of an incre-

mental unit of income spent directly on consumption is reflected in the numeraire unit of value. If a production externality lowers income, the definition involving private valuation only includes the reduction in private consumption, not the reduction in public revenues. Valuing an incremental change in income in this way does not reflect a Pareto efficient allocation: it does not correspond to the difference between *ex ante* and *ex post* Pareto states for a unit change in income.

If we define marginal environmental damages based on this private measure of value—call it “marginal private damages” or MPD—complications arise. For example, MPD will be less than MSD in the case of a production externality, but it will be higher than MSD in the case of an amenity externality. To be clear on this point, let’s look at each type separately.

For a production externality where labor productivity is an increasing function of environmental quality, a decline in environmental quality will impose a cost on individuals and society. The cost to society will exceed the cost to an individual for two reasons. First, given the non-rival character of the environment, all individuals will see their labor productivity decline and the social cost will reflect the aggregate loss of income across all individuals. Second, in the presence of revenue raising taxes, the loss to society will include the social value of lost tax receipts due to the decline in income. If workers are sickened and cannot work, or if crop yields decline due to pollution, the social cost includes not only the lower consumption experienced by individuals, but also the reductions in public goods or transfers resulting from the lost tax receipts. Thus, MPD will be lower than MSD.

In the case of an amenity externality, the reverse occurs. Environmental damage is first measured in utility units, aggregated across households, and then converted to dollars dividing by the value of a numeraire unit of income. MPD in this case is defined as the marginal (dis)utility of environmental damage divided by the private marginal utility of income. Using the private marginal utility of income as the numeraire rather than the social marginal utility of income, however, places a relatively smaller measure of value in the denominator of MPD, which means the dollar value of MPD will exceed that of MSD.⁴

³ Throughout the recent literature the Lagrange multiplier on the household budget constraint, λ , is used to define marginal social damage (see for example, Bovenberg and de Mooij 1994; Bovenberg and Goulder 1997).

⁴ In the amenity case, changes in environmental quality may also affect revenues if environmental quality is a substitute (complement) for leisure, which would raise (lower) marginal social damage. This possibility has generally been abstracted from in the recent literature by assuming that environmental quality is weakly separable in utility, so that these effects will not arise.

In a first-best setting with no revenue-motivated taxes, MSD and MPD are equivalent because the social marginal utility of income equals the private marginal utility of income. When revenue-motivated taxes are present however, the social marginal utility of income will exceed the private marginal utility of income, and the divergence between the two will grow with increasing revenue requirements. Thus, an increase in revenue requirements has the effect of exacerbating the divergence between MSD and MPD, but in opposite directions for the two types of externalities.

Indeed, as Figure 1 illustrates, the relationship between the optimal environmental tax and MSD is a function only of the parameters in the model (those that determine the marginal excess burden of taxation), and not dependent on which type of externality is under consideration. We can also see in Figure 1 that for revenue levels that cannot be satisfied by a Pigouvian tax alone (greater than R^0), the optimal environmental tax exceeds MSD and rises relative to MSD with rising revenue requirements (see also Jaeger 2001b).

By contrast, the relationship between the optimal environmental tax and MPD will depend on which type of externality is being considered. In the case of a production externality, the optimal environmental tax will exceed MPD^P and the ratio between the two will be greater than the ratio between the optimal environmental tax and MSD, as illustrated in Figure 1. In the case of an amenity externality, however, increases in revenue requirements above R^0 result in MPD^A rising faster than the optimal environmental tax. This is also illustrated in Figure 1, indicating how the ratio of the optimal environmental tax to MPD^A would actually decline even though the optimal environmental tax is rising. The rise in MPD^A results from the decline in the private marginal utility of income as a greater proportion of incremental income is being taxed and allocated to public consumption.

These same observations can be made with explicit theoretical expressions derived using an approach similar to Sandmo (1975). For the classes of models used in the recent literature, the optimal environmental tax, t^* , can be expressed as a function of MSD and the revenue-motivated tax rate (Jaeger 2001b). The expression can be written as

$$(1) \quad t^* = \left(\frac{\alpha'}{\mu'(1-t_L)} \right) MSD' = \left(\frac{\alpha(1+t_C)}{\mu} \right) MSD$$

where α denotes the social marginal utility of income, μ denotes the social marginal utility of public revenues, and t_L is the income tax rate. The first and second expressions in (1) pertain to the income tax normaliza-

tion (involving t_L) and the expenditure tax normalization (involving t_C), respectively.⁵

The term in brackets may be greater or less than one since we understand that $\alpha < \mu$ and that $(1-t_L) < 1$. However, for parameter values consistent with the models and assumptions in the recent literature, the expression in brackets will be in the range of 1.4 to 1.6, indicating that the optimal environmental tax should be 40 to 60 percent above MSD (Jaeger 2001a, b).

If we want to use MPD as our benchmark, no analytical expression exists for the production externality case. For an amenity case in which environmental quality is assumed to be weakly separable in utility, the relationship can be expressed in terms of MPD and the private marginal utility of income, λ , as

$$(2) \quad t^* = \left(\frac{\lambda'}{\mu'(1-t_L)} \right) MPD' = \left(\frac{\lambda(1+t_C)}{\mu} \right) MPD$$

This relation is equivalent to the one derived by Bovenberg and Goulder (1996), although the identity $\lambda' = \lambda/(1-t_L)$ has been substituted into their expression so that λ and μ are expressed in the same “net income” units. This substitution has no effect on the value of the expression. Based on parameter values for the kinds of models and assumptions found in the recent literature, the expression in (2) suggests that t^* may be 5 to 20 percent below MPD for the amenity case.

For the case of a production externality, the optimal environmental tax has been estimated to exceed MPD by more than 70 percent, based on a numerical model of the U.S. economy (Jaeger 2001a).

With MPD as the chosen benchmark, and with a focus on amenity externalities, the recent literature observed that t^* would generally lie below MPD whenever revenue requirements exceeded R^0 . As revenue requirements increase, t^* will lie even farther below MPD—but this is because MPD is increasing faster than t^* due to the decline in the private marginal utility of income in the denominator. The authors of the recent literature, however, appear to have assumed that MPD is unaffected by increases in revenue requirements, and they conclude that the optimal environmental tax declines with rising revenue requirements.

⁵ Parameters in each expression are normalized in consistent and appropriate units (a prime (') indicates parameters are expressed in net income units consistent with the income tax normalization. The difference, $\mu - \alpha$, defines the marginal excess burden of taxation. The two normalizations are equivalent given that $1+t_C = 1/(1-t_L)$ and $x' = x/(1-t_L)$ for all x .

This interpretation has led to the rejection of the double dividend hypothesis. For example, Fullerton (1997) characterizes the “strong view” of the double dividend hypothesis as suggesting that any additional revenue requirements should be met by raising the tax on the dirty good by more than the taxes on the clean goods. He concludes that “the important and correct result of Bovenberg and de Mooij is that this strong view is flawed.” (p. 225). As illustrated in Figure 1, however, the rising optimal environmental tax implies that, for the expenditure tax normalization Fullerton has in mind, the tax on the dirty good should, indeed, be raised by more than the tax on the clean good. Fullerton’s interpretation overlooks the fact that both the environmental tax and MPD are rising, and that MPD is rising faster than the optimal environmental tax.

Had the recent literature modeled a production externality rather than an amenity, the use of MPD as their benchmark would have led them to the opposite conclusion. They would have observed that the optimal environmental tax rises steeply relative to MPD—even more quickly than it does relative to MSD.⁶ Had this situation occurred, presumably the authors of the recent literature would have concluded that the double dividend hypothesis was valid. Indeed, two papers involving production externalities have recently obtained precisely this kind of result, one that runs counter to the early amenity models (Williams 2000; Parry and Bento 1999). In these cases, however, the authors introduce a new “benefit-side tax interaction” effect to explain their findings.

In sum, given the well-established rationale for using shadow values in benefit-cost analysis, it should not be surprising that comparisons between private valuations and the marginal relationships expected from a social optimization problem will give rise to results that are inconsistent with our intuition.⁷

⁶ MPD declines relative to MSD because the revenue losses associated with environmental damage are larger than those associated with a simple unit reduction in income in this model. When environmental damage reduces labor productivity, there are both income and substitution effects which reduce tax receipts.

⁷ As a practical matter, in some cases it may be easier to measure private values empirically. This may be the case for contingent valuation techniques or hedonic studies, although even these methods may reflect values based on tax-deductible expenditures, pre-tax income or gross rather than net wage differentials. In such cases the conversion to equivalent shadow values will be important simply to maintain comparability among these different methods. Indeed, for cases where

Environmental Quality

Armed with the general-equilibrium result summarized above that the optimal environmental tax will generally lie above MSD, we can infer that the quantity of the environmental good (“environmental quality”) will also be higher in the second-best setting than in the first-best. This result has been shown analytically by Gaube (1998), independent of any comparison between the optimal environmental tax and marginal damages. Like Fullerton (1997) and Schöb (1997), Gaube (1998) points out that, intuitively, a revenue-raising income tax is equivalent to a uniform tax on all expenditures, including both polluting and non-polluting goods. For the type of models being considered, the higher the revenue-requirement the higher will be the direct or indirect tax on polluting and non-polluting goods. It follows that this will mean lower consumption and, consequently, less pollution. Thus, revenue-motivated taxes by themselves will discourage pollution in this context.

Framed differently, however, we may want to ask whether the ability of government to improve the environment—from a given second-best starting point—is strengthened or weakened in the presence of distortionary taxes. One way to respond is to appeal to the optimal environmental tax results above: As the revenue-requirements of government rise, the optimal environmental tax rate that can be justified rises as well. Thus, the ability of government to discourage pollution, as represented by the tax that can be imposed, increases with revenue motivated taxes.⁸

environmental damage reduces the productivity of labor or other assets, these measures are frequently estimated as gross income costs including the foregone tax payments that would otherwise not be reflected in marginal private damages.

⁸ An alternative approach to this question has been an attempt to compare environmental control costs in a second-best setting directly with environmental control costs in a first-best setting. Parry, Williams and Goulder (1999) present numerical simulation results showing that the marginal abatement cost curve is higher in second-best than in first-best for a U.S. carbon tax model. Interpretation of their result is problematic, however, since they compare marginal costs across a given *percentage reduction* in emissions rather than at a given *level* of emissions. Because the initial emissions level is higher in the first-best case than the second-best case, a one-percentage change in their first-best model corresponds to a larger quantity of emissions than in the second-best model. Converting their results so that the comparisons are made at equal emissions levels, reveals

This result runs counter to inferences in the recent literature which invoke Pigou's reasoning and the Samuelson Condition which both point out how the optimal provision of public goods will fall as distortionary taxes rise. This reasoning is certainly correct for public goods that must be paid for out of public expenditures. Environmental quality, however, is an endowed public good, the consumption of which is not directly taxable (by assumption of non-exclusivity). By contrast, pollution, or "environmental waste disposal", is a competing environmental service which can be taxed to raise revenue (and to achieve allocative efficiency). A side effect of this is the improvement of environmental quality.

Welfare Effects of Green Tax Reform

Competing assessments of the welfare changes accompanying green tax reform have been difficult to reconcile. Moreover, clarifying this issue has been complicated by an evolving definition of the "double dividend hypothesis" and by the introduction of new concepts and phenomena (i.e., "tax interaction effect", "benefit side tax interaction effect", "gross cost"). To help clarify these issues, green tax reform can be decomposed into three components or stages and examined in terms of distinct welfare and environmental changes for each stage, as illustrated in Figure 2.

Stage 1: Correcting the market failure. In this stage, assume that allocative efficiency is simply restored. One might imagine that this is achieved by correcting a property rights failure or with Coasian bargaining, or by the introduction of an auctioned tradable permit scheme in which the revenues are returned lump sum to the economy. Polluting is costly, and after stage 1 polluters will pay the full social cost of polluting. Prior to stage 1 polluters were, in effect, being subsidized.

Thus, the changes in stage 1 can be thought of as "subsidy removal effects," and will include a reduction in pollution, an increase in the cost of consumption, and changes in labor supply that affect the tax base. For a production externality, the reduction in pollution will increase labor productivity and labor supply, which will enlarge the tax base and lower the excess burden. In the case of an amenity externality, the "subsidy removal effect" will lower the real wage and discourage labor supply, raising the excess burden.

Figure 2 indicates environmental improvement and a welfare gain in stage 1 (moving from A to B). There is, however, the possibility with an amenity externality that the net welfare change may be negative in stage 1 if the

environmental gain is less than the increase in excess burden. This may arise if environmental quality is separable in utility or where environmental damages are linear (see Bovenberg and Goulder 1996 for an example). This possibility reaffirms the theory of the second-best.

Stage 2: Appropriating environmental resource rents. In this stage we assume that government appropriates the environmental resource rents, or those payments being made by polluters after stage 1. Compared to stage 1, payments by polluters are now being retained by government to finance reductions in preexisting revenue-motivated taxes. These reductions in revenue motivated taxes will lower the excess burden of taxation, increase the real wage and encourage labor supply. As indicated in Figure 2 (moving from B to C), welfare increases due to the improved efficiency of the tax program, a change representing the "double dividend." Environmental quality declines somewhat, however, because the more efficient tax program and higher real wage encourages consumption of both polluting and non-polluting goods.

Stage 3: Achieving optimal taxation. In this stage, government takes advantage of the remaining opportunity to increase welfare by adjusting tax rates to achieve optimality. With an expenditure tax normalization in mind, we recognize that after stage 2 consumers face prices that exceed social cost for all goods—except in the case of the environmental good. For a tax program to be truly optimal, each price must include a Ramsey tax premium. At point C in Figure 2, however, consumers are paying *only* the social cost of pollution: there is no Ramsey premium on this environmental service. In order to minimize the excess burden, Ramsey taxes must be introduced for all goods—including environmental "waste disposal services."

Thus, stage 3 involves introducing the optimal revenue-raising tax on pollution. This will increase welfare, improve environmental quality, and push the environmental tax above marginal social damages. After this stage, we arrive at an optimal tax program consistent with the result that the optimal environmental tax lies above MSD. This result is intuitive, analytically validated, and wholly consistent with Pearce's initial argument and inference about the double dividend. Indeed, Pearce's quantitative assessment that the effective carbon tax would be 20 to 50 percent below the nominal tax is remarkably close to the present estimations showing that MSD will lie 30 to 40 percent below the optimal environmental tax (Jaeger 2001a,b).⁹

⁹ Note that an increase in revenue requirements shifts points A through D in Figure 2 to the right, raising environmental quality relative to the first-best level. This result further contradicts the suggestion that increased revenue requirements and a "high cost of public funds

that the second-best marginal abatement cost curve is everywhere lower than in first-best.

Bringing clarity to the debate surrounding the welfare changes from green tax reform has become complicated by an evolving definition of the double dividend hypothesis. Based on Pearce (1991), Goulder initially summarized the double dividend argument as implying that swaps of environmental taxes for distortionary tax may produce a double dividend by not only (1) discouraging environmentally damaging activities but also (2) reducing the distortionary cost of the tax program (1995, p. 158). Subsequently, however, Goulder revised this second component of the definition to read “(2) reduce the *overall* cost of the tax system, apart from consideration of the benefits from environmental improvement” (Goulder and Parry 2000)(emphasis added). According to this revised definition, a negative “gross cost” is a requirement for the second dividend. This new version is not only more stringent, but it also fails to reflect Pearce’s recognition that carbon taxes “themselves will impose a deadweight loss which has to be set against the gain from the reduced externality from global warming”(pp. 943).

There is no apparent theoretical basis for using “gross cost” as the criterion for the double dividend, and this appears to have created yet another source of confusion. I understand the logic of separating the welfare gains due to increased allocative efficiency from those associated with increased tax efficiency—which appears to be the intended rationale for using “gross cost.” However, it is not correct to assume that all welfare gains from environmental improvement are attributable to improved allocative efficiency, and that all other gains are attributable to changes in tax efficiency. For example, in stage 3 above, there is a welfare gain from optimizing the tax program by raising the environmental tax above MSD. A portion of the welfare gain from doing this comes from improving environmental quality above the level that could be justified on allocative efficiency grounds alone, making it a part of improved tax efficiency. Yet, according to Goulder’s test involving “gross cost,” this gain would be labeled an “environmental improvement” rather than a gain associated with optimizing the tax program. Moreover, in many other examples such as production externalities or when environmental quality is non-separable in utility, it is not obvious how one would go about separating or evaluating “gross cost.” In short, it is not clear that Goulder’s notion of “gross cost” is helpful in testing the validity of the double dividend hypothesis, or that Pearce’s definition is inconsistent with the evidence summarized above.

crowd out not only ordinary public consumption, but also the collective good of the environment” (Bovenberg and de Mooij 1994).

The “Tax Interaction Effect”

To explain the apparent incongruity between a) a positive welfare gain from “revenue recycling” and b) an optimal environmental tax that is below marginal damage, the authors of the recent literature focus on changes in labor supply. They claim that when environmental taxes lower the real wage and labor supply, this narrows the tax base, producing a negative “tax interaction effect,” and that this cost overshadows the “revenue recycling” or double dividend effect. According to this explanation, these effects cause the optimal environmental tax to be below MPD in the amenity case (Bovenberg and de Mooij 1994; Parry 1995; Bovenberg and Goulder 1997), and above MPD in the production externality case (Parry and Bento 1999, Williams 2000). This effect on labor supply is the same one that is described in stage 1, an effect that will be positive in the case of a production externality and negative in the case of an amenity externality.

One way to assess the importance of these “tax interaction effects” would be to compare results for two nearly-identical models, one with a production externality and one with an amenity externality. To do this, a pair of numerical models was calibrated to have identical labor supply elasticities (0.15), identical revenue requirements, and identical marginal social damages (0.216) affecting utility directly in one case and affecting labor productivity in the other)(Jaeger 2001b). Revenue requirements were set to generate marginal tax rates similar to those in the U.S. economy.¹⁰ Based on the recent literature, we should expect a substantial divergence in the optimal environmental taxes for these two models due to the presence of a tax interaction cost in one case, and a tax interaction benefit in the other case.

Starting from this base case with uniform taxes, both models are allowed to select the optimal tax program. Labor supply rises in the case of the production externality and declines in the case of the amenity externality, as expected. How did these changes in labor supply affect the optimal environmental tax? The optimal environmental taxes for these two models differ only slightly: 0.322 in the production externality model, 0.317 in the amenity model. Moreover, in both models the environmental tax is above MSD: 49 percent above MSD in the production externality case, 46 percent above MSD in the amenity case. These slight differences are attributable to the changes in labor supply which affect the tax base and alter the parameters in (1). From this experiment, we conclude that these adjustments in labor supply have only a slight effect on the

¹⁰ The GAMS code for each of these models is available from the author.

relationship between the optimal environmental tax and MSD—whether labor supply is increasing or decreasing.

If we compare the same optima and environmental taxes with the corresponding measures of MPD, a different picture emerges. In the production externality case, the environmental tax is 56 percent above MPD. In the amenity externality case, the optimal tax is 4 percent below MPD. As explained above, the large differences in this ratio are due to the divergence between MPD and MSD in the presence of revenue-motivated taxes, and the fact that MPD diverges in opposite directions for the two kinds of externalities. Nevertheless, if these differences are not recognized, comparisons of the optimal environmental tax with MPD would appear to indicate large swings in the optimal environmental tax, rather than large swings in MPD. Given that these changes in the ratio of t^*/MPD are correlated with changes in labor supply, it is understandable how speculation about a causal story involving labor supply and excess burden might emerge in the face of these otherwise unexplained and incongruous changes in t^*/MPD .

Conclusions

Early proponents of green tax reform believed that it held the promise of large, additional welfare increases when pollution tax revenues were used to finance reductions in preexisting taxes. The notion that we could tax “bads” instead of taxing “goods” certainly has some instinctive appeal. But the reality that pollution taxes must be paid out of the same income as preexisting taxes was not fully accounted for in some early analyses.¹¹ In one estimate, this oversight led to the conclusion that revenue recycling could raise the optimal carbon tax more than tenfold (Nordhaus 1993).

In contrast, opponents of the double dividend idea have relied on comparing the optimal environmental tax to a measure of marginal damages that does not reflect the social value of income. Basing their conclusions on the amenity externality case, they observed that the optimal environmental tax was lower than their measure of marginal damages even when environmental tax revenues were used to reduce revenue-motivated taxes. Efforts to explain this seemingly incongruous result led to speculation that a previously unrecognized “tax interaction effect” must be at work, and this theory was linked to changes in labor supply and the consequent narrowing of the tax base.

From the perspective presented here, a middle ground emerges. Very large additional benefits from green tax reform may not occur as a general rule. However, the optimal environmental tax *does* exceed marginal social damage, and it does so by 40 to 60 percent, a proportion that is remarkably consistent with the inference made initially by Pearce (1991).

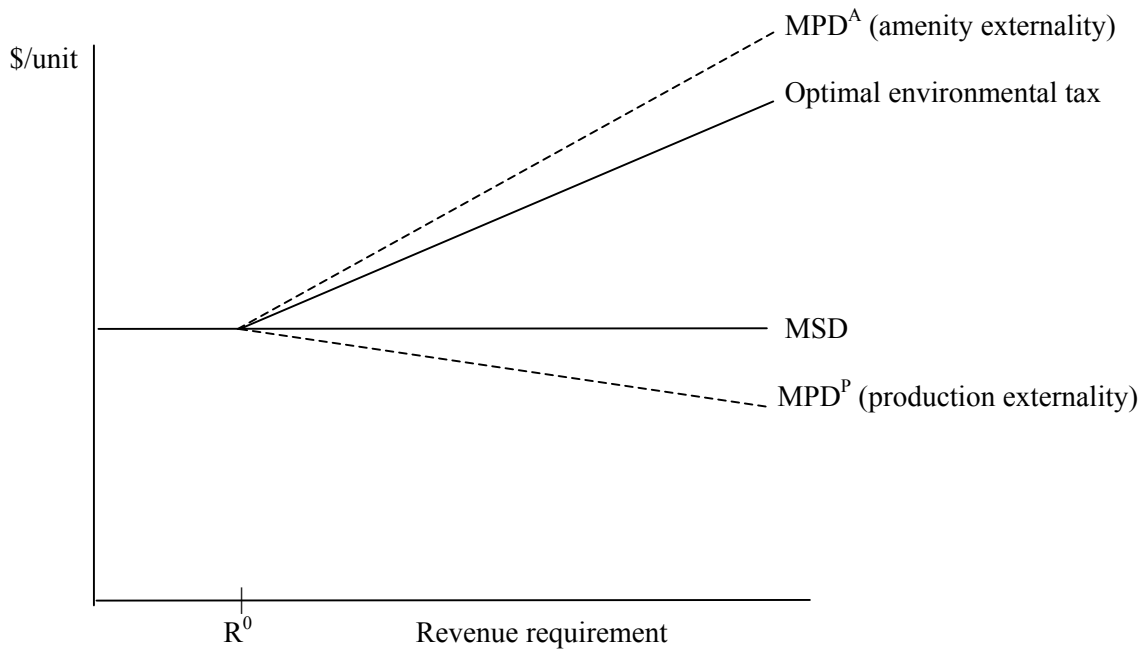
Is there an ‘extra’ benefit from green tax reform? Yes. Since the optimal environmental tax exceeds the social measure of marginal damages, and the optimal level of environmental quality rises with an increase in revenue requirements, we can infer that there is an additional welfare gain from green tax reform—indeed there is general agreement on this point.

Is there an extra cost to environmental policy? On balance, no. In the case of a production externality where the tax base is likely to broaden slightly, this will lower the excess burden of taxation. In the case of an amenity externality where the tax base is likely to narrow slightly, this will raise the excess burden of taxation. These effects are small and we have no *a priori* basis for expecting a positive or negative effect overall.

Do environmental goals compete with the provision of other public goods? No. The presence of revenue-raising taxes lowers the cost of environmental taxation and increases the level of environmental quality that can be achieved efficiently. Symmetrically, the existence of opportunities to tax pollution will lower the cost of raising revenues and, consistent with the Samuelson Condition, increase the optimal level of public goods provision.

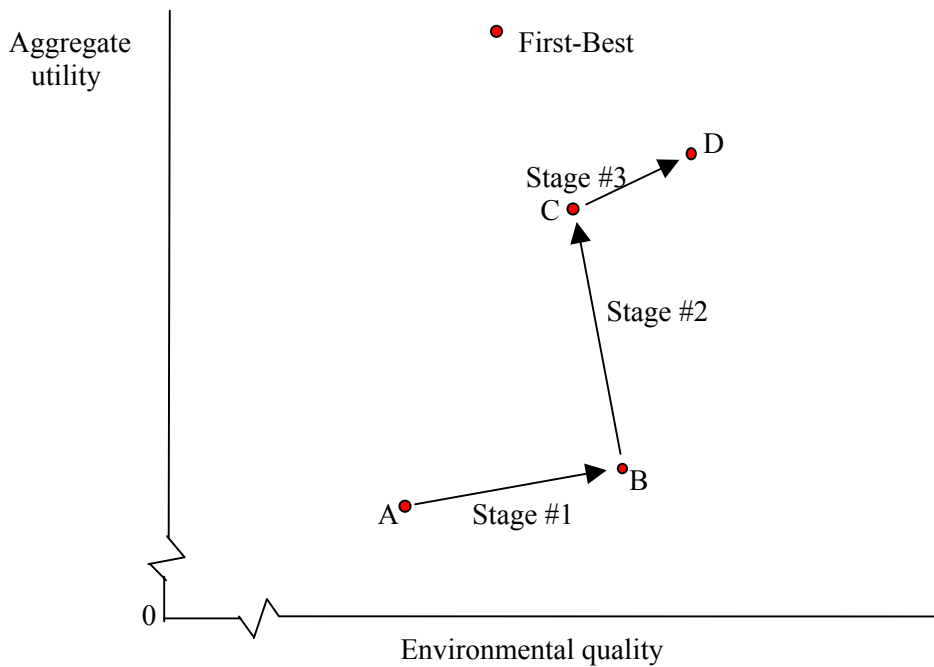
¹¹ See Fullerton and Metcalf (1997) for a critical survey of literature promoting the double dividend hypothesis.

Figure 1. The relationship between the optimal environmental tax and government's revenue requirement



Note: R^0 is the revenue requirement that could be satisfied by a Pigouvian tax.

Figure 2. Decomposition of the welfare and environmental effects of green tax reform.



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BULLETIN BOARD

CORPORACIÓN ANDINA DE FOMENTO (CAF)

VISITING SCHOLARS PROGRAM

The Andean Development Corporation (CAF) invites applications for its First Visiting Scholars Program, which will take place in the Corporation's headquarters in Caracas, Venezuela in 2002. The invitation is extended to all researchers active in areas of interest of the CAF. Visiting scholars will stay at CAF approximately three months, working on their research projects either individually or together with CAF economists.

Eligibility: The program is intended primarily, but not exclusively, for upper year graduate students writing their doctoral dissertation, assistant professors, researchers or post graduates from CAF member countries working or studying in U.S. or European institutions with focus on topics related to Latin America.¹ The invitation is also extended to researchers associated with Latin American universities, research institutes and other private or public institutions.

Research Topics: Proposals pertaining to the following research topics will be considered. Preference will be given to work directly relevant to Latin America or specifically to the Andean region.

- Labor market reform, labor mobility and integration
- International financial markets and their impact in the region
- Equality and access to education
- Biotech and biotechnology
- Development of pension funds and their effect on local capital markets
- Education and information technology

Available dates:

Term I: March 2002 – May 2002

Term II: June 2002 – August 2002

Term III: September 2002 – November 2002

Program conditions: CAF will cover visiting scholars' travel expenses (economy class), lodging in Caracas and a monthly salary of U.S.\$2,500. CAF reserves the right to publish and distribute resulting works. Authors however are free to submit papers to specialized journals or publications or to use them to fulfill academic requirements, provided that CAF sponsorship is acknowledged.

How to apply: Proposals should not exceed five pages and should contain the following

- Title
- Abstract
- Objectives and relevance for the region
- Research methodology
- Outline of research and timetable
- Bibliography
- Preferred time period to come to CAF

Additionally, proposals must be accompanied by a Curriculum Vitae and a letter of support from the researchers' institution or, in the case of graduate students, from their academic advisor. Applications should be sent via e-mail to:

CAF Visiting Scholars Program
desarrollo@caf.com
Corporación Andina Fomento
Caracas, Venezuela

Applications must be submitted by **January 10, 2002**. Early applications are encouraged. Proposals will be evaluated by a jury appointed by CAF and decisions will be made on the basis of the quality of the proposal and of its relevance to Latin America and the Andean region. A proposal for each topic will be selected and results will be announced by February 15, 2002.

For further information, please contact:

Osmel Manzano

Email: omanzano@caf.com

Tel: 0058-212-2092234

Stefania Scandizzo

Email: sscandiz@caf.com

Tel: 0058-212-2092240

Program representatives will attend LACEA meetings in Montevideo, Oct. 18-20, 2001 (Osmel Manzano) and AEA meetings in Atlanta, Jan. 4-6, 2002 (Stefania Scandizzo). Further information about CAF and the program can be found at www.caf.com

¹ CAF member countries are: Bolivia, Colombia, Ecuador, Peru, Venezuela, Brasil, Chile, Jamaica, Mexico, Panama, Paraguay and Trinidad & Tobago. Applications from researchers from countries in the process of becoming members (Argentina, Costa Rica, Uruguay and Spain) will also be given preference.

HARVARD UNIVERSITY
NEW ENVIRONMENTAL ECONOMICS
PROGRAM

The Environmental Economics Program at Harvard University (EEPHU) was launched in 2001. It is a University-wide program that brings together seventeen faculty Fellows and twelve Pre-Doctoral Fellows (Ph.D. students) engaged in research, teaching, and outreach efforts in environmental and natural resource economics and related public policy. Prospective students apply to one of four Ph.D. programs at Harvard: Economics, Health Policy, Political Economy and Government, or Public Policy. The Program is directed by Professor Robert Stavins; other Faculty Fellows are David Bloom, Richard Cooper, Jeffrey Frankel, Jerry Green, James Hammitt, William Hogan, Dale Jorgenson, Joseph Kalt, Robert Lawrence, Theodore Panayotou, Richard Peiser, Forest Reinhardt, Jeffrey Sachs, Kip Viscusi, Martin Weitzman, and Richard Zeckhauser. To learn more about the program, please visit the website at:

www.ksg.harvard.edu/cbg/eephuhome.htm.

NATIONAL SECURITY EDUCATION
PROGRAM (NSEP)
2002 DAVID L BOREN GRADUATE
FELLOWSHIPS

The Academy for Educational Development (AED) invites applications for the year 2002 National Security Education Program's (NSEP) David L. Boren Graduate Fellowships competition. These fellowships enable U.S. graduate students to pursue specialization in area and language study or to add an important international dimension to their education. Created by the U.S. Congress to address the need to increase the ability of U.S. citizens to communicate and compete globally, NSEP embodies a recognition that the scope of national security has expanded to include not only the traditional concerns of protecting and promoting American well-being, but the new challenges of a global society, including: sustainable development, environmental degradation, global disease and hunger, population growth and migration, and economic competitiveness.

Boren Fellowships are intended to provide support through overseas study and limited domestic tuition to students who will pursue the study of languages, cultures, and world regions deemed critical to U.S. national security. Excluded explicitly is study of Western Europe,

Canada, Australia, and New Zealand. Fellowships are awarded in a broad range of academic and professional disciplines including business, economics, history, international affairs, law, applied sciences and engineering, health and biomedical sciences, political science, and other social sciences. Award recipients incur a requirement to work for an agency or office of the federal government involved in national security affairs or in the field of U.S. higher education in an area of study for which the fellowship was awarded, in that order of preference.

Eligibility Requirements: Applicants must be U.S. citizens, enrolled in or applying to graduate programs in accredited U.S. colleges or universities located within the U.S. All applications must include study of a modern language other than English.

To Apply: Guidelines and application forms may be obtained on the Web at: <http://www.aed.org/nsep> or by calling AED at 800-498-9360 or 202-884-8285 or by e-mail at nsep@aed.org.

Deadlines: Applications must be postmarked by **February 1, 2002**. No faxed submissions accepted; late applications will not be reviewed.

RESOURCES FOR THE FUTURE
FELLOWSHIPS IN ENVIRONMENTAL
REGULATORY IMPLEMENTATION

Resources for the Future (RFF) will award two fellowships for 2002-2003 for the pursuit of scholarly research that documents the implementation and outcomes of environmental regulations. The objective of the fellowships is to develop a base of scholarship that systematically examines environmental regulations in practice and that can be used to inform regulators, industry, and others on assumptions of environmental laws and policies. Consideration will only be given to proposals for research that is documentary in nature – that is, research that attempts to describe objectively how a regulation and/or regulations were promulgated and implemented, the reactions to the regulation(s), and the actual outcomes (for example, were new air or water quality standards met?)—without arguing in favor of any particular policy or result. The fellowship is not intended to fund studies balancing costs and benefits or conducting other policy analyses of regulations. Case studies of any environmental regulation implemented within the past fifty years in the United States will be considered. There are no restrictions on the disciplinary approach. The research is expected to result in substantial publishable output – for example, a monograph or book.

Eligibility: Scholars from universities and research organizations and who have a doctorate or equivalent degree, or equivalent professional research experience, are eligible to apply.

Duration: Fellowships are for one to two years. Starting dates are flexible. Fellows can be in residence at RFF or remain at their current institution.

Financial Support: Fellows will receive an annual stipend commensurate with experience; research support; office facilities and limited support for relocation, if the recipient chooses to conduct the project at RFF; and funding for travel and conferences. Preference will be given to researchers who have sabbatical or other sources of support from their home institutions. Fellowships do not provide medical insurance or other RFF fringe benefits. Neither Social Security nor tax payments are deducted from the stipend.

Application Materials: No application form is required. The application process proceeds in two stages. In the first stage, individuals interested in applying should submit a pre-proposal that includes the following: (1) full name, title, and professional address (including telephone number and email address) of the applicant; (2) a descriptive name or title of the project; (3) a brief, concise description of the research to be addressed by the project, the importance of the problem to be addressed, and the product (for example, book or monograph) expected to result from the project; (4) a list of the major tasks involved in conducting the project; (5) a schedule for start and completion of the project; (6) a brief statement of prior experience of the applicant; and (7) an estimated budget. The pre-proposal should be limited to two-pages, single-spaced with no smaller than 11-point font and one-inch margins. Applicants whose pre-proposals are selected for further review will then be invited to submit final proposals. Final proposals are limited to ten pages and are to follow a similar format. They must include all of the information contained in the pre-proposal but should offer further detailed description of the proposed research, anticipated contribution of the project, and the importance of the results, and include a curriculum vitae with the applicant's educational background, professional experience, list of most relevant publications, and honors and awards received. In addition, final proposals must include three letters of recommendation from fellow faculty members or colleagues (these letters are not included in the ten-page limit).

Outreach and Dissemination: RFF will encourage fellowship recipients in efforts to publish peer-reviewed scholarship. Recipients will also be encouraged to give an RFF Wednesday Seminar and submit publications to

Resources (RFF's quarterly newsletter), the RFF website, and the RFF Press.

Application Deadlines: The pre-proposal for the 2002 fellowships must be received by **January 4, 2002**. Applicants will be notified by January 25, 2002 if they are invited to submit a final proposal. Final proposals must be received by February 28, 2002. The pre-proposal and final proposal materials should be addressed to: Coordinator for Academic Programs, Resources for the Future, 1616 P Street, NW, Washington, DC 20036-1400. Phone: 202-328-5060. **PRE-PROPOSALS AND APPLICATIONS SENT VIA FAX OR EMAIL WILL NOT BE ACCEPTED.** Awards will be announced in April.

RFF is an equal opportunity employer. Women and minority candidates are strongly encouraged to apply. These Fellowships are made possible through a generous grant from the Andrew W. Mellon Foundation.

**UNIVERSITY OF CALIFORNIA
AT SANTA BARBARA
NEW NATIONAL SCIENCE FOUNDATION
PROGRAM IN ECONOMICS AND
ENVIRONMENTAL SCIENCE**

In September, the University of California at Santa Barbara (UCSB) received a five-year National Science Foundation (NSF) IGERT award for a program in Economics and Environmental Science (EES). The bulk of the nearly \$3 million received for the program is dedicated to fellowship support for students. The program is a rigorous environmental and resource economics Ph.D. program in which students also do a field in one of the natural sciences. NSF support allows UCSB to provide all accepted US citizens and residents with up to five years of fellowship support, including an \$18,000 annual stipend plus most tuition and fees. Students may take their Ph.D. degree in either the Department of Economics or the Bren School of Environmental Science and Management. For information, see:

www.bren.ucsb.edu/programs/EnvEcon/

Call toll-free 1-866-4-UC-BREN or email:
info@bren.ucsb.edu.

POSITION ANNOUNCEMENTS

DUE TO LIMITED SPACE, FULL POSITION ANNOUNCEMENTS ARE NOT INCLUDED IN THIS NEWSLETTER. PLEASE REFER TO THE AERE WEB PAGE (www.aere.org) FOR COMPLETE INFORMATION, INCLUDING QUALIFICATIONS AND APPLICATION INSTRUCTIONS, FOR THESE AND OTHER POSITIONS.

Hamilton College, Clinton, New York:

Q0 Environmental and Resource Economics. Tenure track position at the assistant professor level beginning July 1, 2002. **Closing Date: Nov. 26, 2001.**

Contact:

Chair
Environmental Search Committee
Economics Department
Hamilton College
198 College Hill Road, Clinton, NY, 13323.

For more information:

<http://www.hamilton.edu/academics/departments.html>

University of California, Berkeley:

Assistant Cooperative Extension Specialist in Agricultural and Resource Economics and Policy. An exceptional candidate may be appointed at the Associate level. Full-time (100% CE), 11-month position effective July 1, 2002. **Closing date: December 21, 2001** See our web site for a complete, up-to-date listing of positions.

Contact:

David Sunding
Dept. of Agricultural & Resource Economics
University of California, Berkeley
207 Giannini Hall
Berkeley, CA 94720-3310

University of California-Riverside:

The Department of Environmental Sciences invites applicants (11 month, tenure-track position beginning July 1, 2002) for an Assistant Professor/Cooperative Extension Specialist in Water Resource Management. **Closing Date: December 15, 2001.** Additional information may be obtained at: <http://envisci.ucr.edu>.

Contact:

Dr. Walter J. Farmer, Chair
Department of Environmental Sciences
University of California-Riverside
Riverside, CA 92521

The University of Colorado:

The University of Colorado, Institute of Behavioral Science, in collaboration with both the Department of Economics and the Environmental Studies Program, invites applications from economists for the position of Director of the Research Program on Environment and Behavior in the Institute of Behavioral Science (IBS). More information can be found in the IBS' brochure, available on-line, at www.colorado.edu/IBS/brochure/

Consideration of applications will begin October 15, 2001 and continue until the position is filled. **Contact:** Dr. J. Terrence McCabe, Search Chair, Research Program on Environment and Behavior, Institute of Behavioral Science, 468 UCB, University of Colorado at Boulder, Boulder, CO 80309-0468. E-mail: tmccabe@spot.Colorado.edu

Resources for the Future, Washington, DC:

One or more openings for career-track research fellows. Submit application materials **by November 27, 2001** to ensure consideration. For more information, see our website: www.rff.org. **Contact:** Kay Murphy, Recruiting Assistant, Resources for the Future, Box ENR, 1616 P Street, NW, Washington, DC 20036; fax 202-939-3460. Application packages sent electronically should be addressed to hire2001@rff.org.

PUBLICATIONS

Inter-American Development Bank:

Investing in Water Quality: Measuring Costs, Benefits and Risks by Clifford S. Russell, William J. Vaughan, Christopher D. Clark, Diego J. Rodriguez and Arthur H. Darling / 2001 / 333 pages / Paper, ISBN 193100305X / \$29.95.

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