

# The Role of Economics in Interdisciplinary Environmental Policy Debates: Opportunities and Challenges

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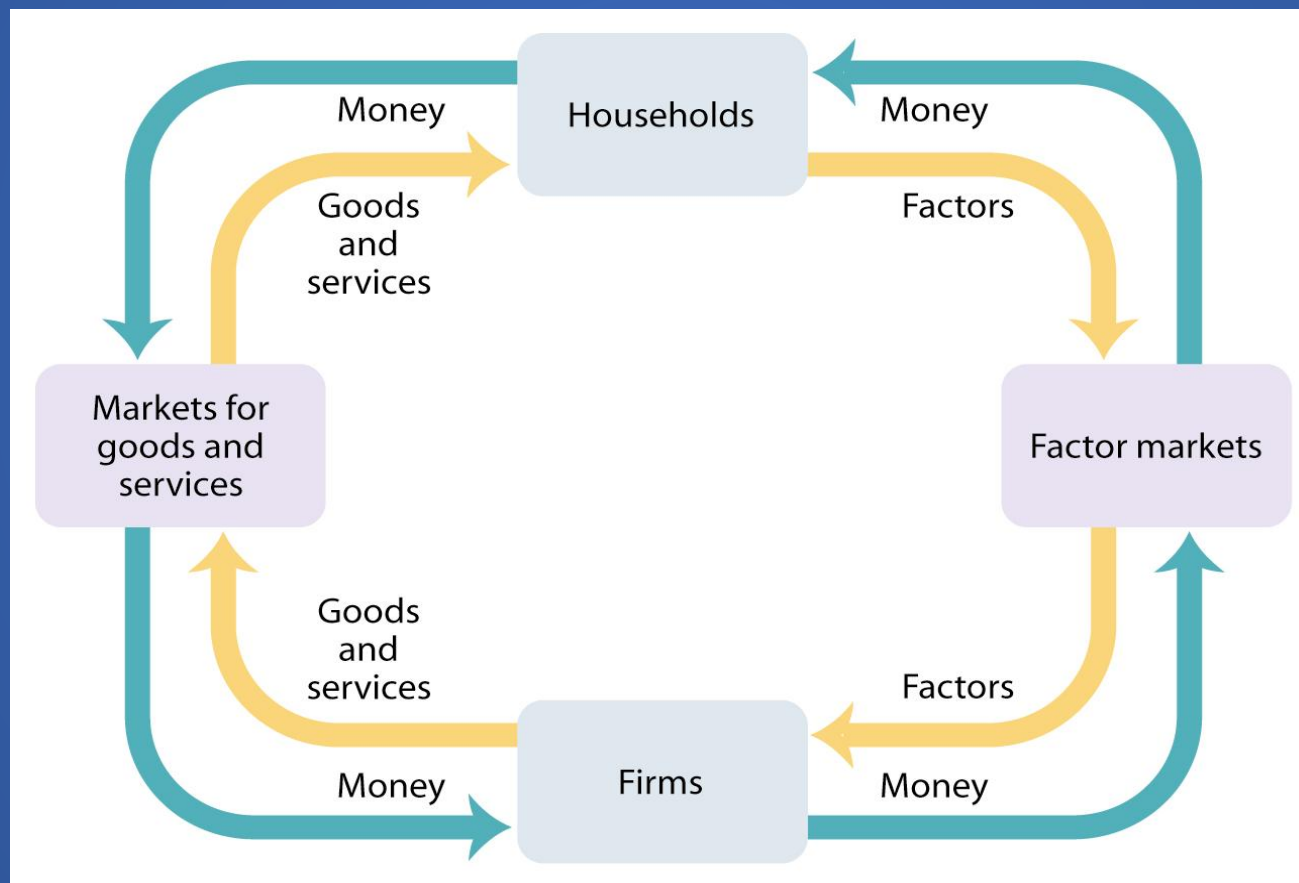
# Introduction

In contrast to policy discussions in other fields within economics (e.g., macro, labor), environmental policy discussions:

- Are inherently interdisciplinary
- Typically do not focus on advice from economists (economists are **not the “go to” people for advice**)
- Economists are under-represented at table

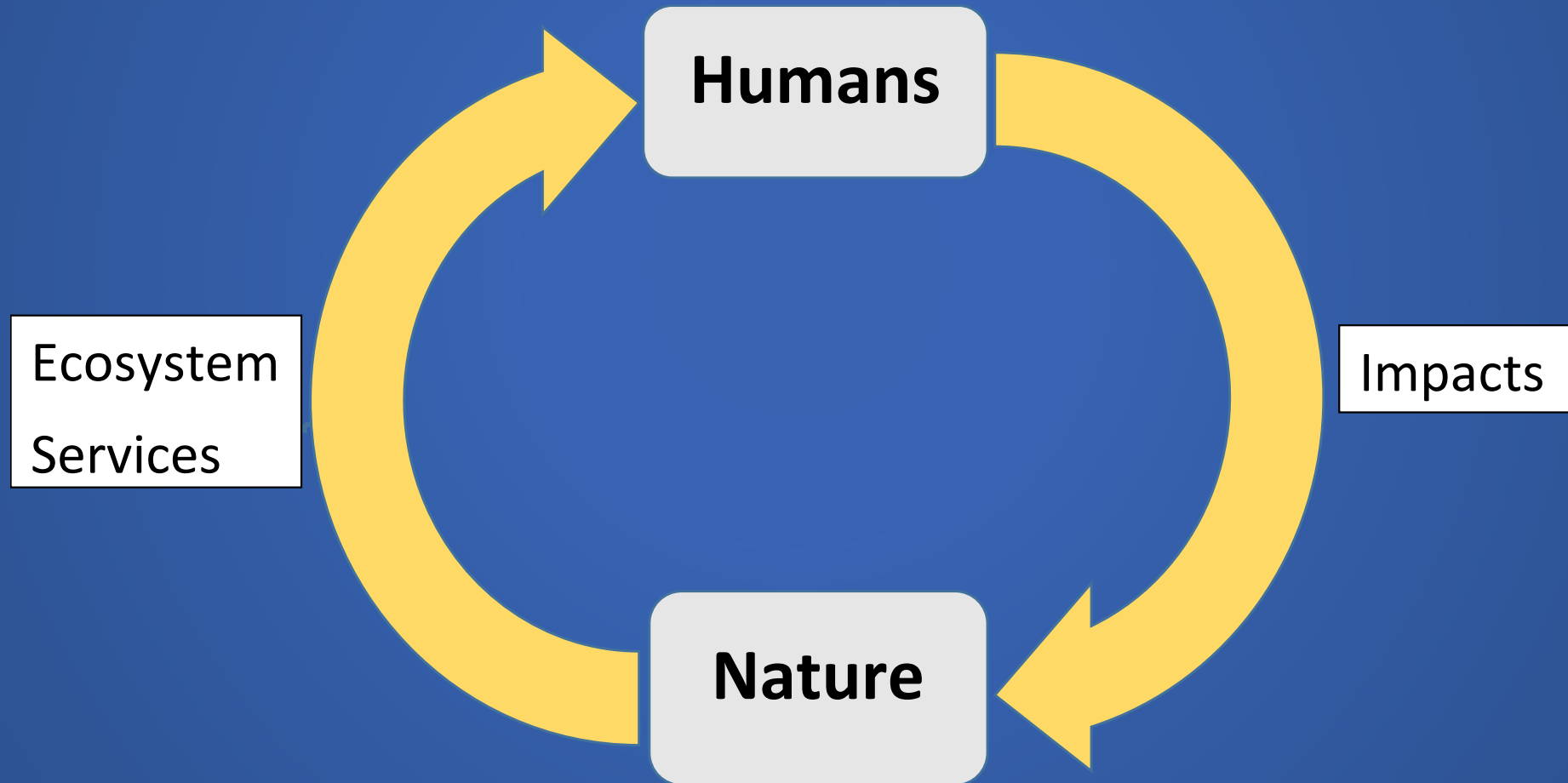
Creates both great **opportunities** and great **challenges** for injecting economic principles/reasoning into policy debates.

# Traditional View of Economics “The Circular Flow Diagram”



Source: Krugman and Wells

# An Alternative Circular Flow Diagram: A “Coupled Natural-Human System” Perspective



# CNH or “Socio-ecological” System Perspective

- More than just recognizing
  - (1) Environmental externalities
  - (2) Demand for environmental quality
- **Systems approach** with feedback loops
- Builds on concept of “**ecosystem services**” = benefits that ecosystems provide to humans
  - Directly (e.g., clear air, clean water)
  - Indirectly (e.g., “**natural assets/capital**” provide critical inputs into production of goods and services, such as agriculture)
- Inherently **long run, dynamic** perspective (relevant for sustainability)

# Role for Economics in Environmental Policymaking

General: Inject **economic perspective** into policy discussions:

1. Understanding of basic economic concepts/principles
2. Relating those concepts/principles to environmental policy issues

Two **Key Contexts**:

1. Estimating **benefits and costs**
2. Designing **effective policies**

# Benefits and Costs in Environmental Policymaking

## Environmental Statutes:

- Some **explicitly prohibit** use of economic criteria for making decisions
  - Ex: Clean Air Act, ESA
- Some **explicitly allow** it
  - Ex: FIFRA, Toxic Substance Control Act

## Executive Orders:

- require use of benefit-cost analysis by federal agencies (including EPA) for major regulations
  - EO 12291 in 1981 (Reagan)
  - EO 12866 in 1993 (Clinton)
  - **EO 13563 in 2011 (Obama)**



# EO 13563 (reaffirming EO 12866)

Our regulatory system must ... *take into account benefits and costs*, both quantitative and qualitative.

[T]o the extent permitted by law, each agency must:

1. Propose or adopt a regulation only upon a reasoned determination that its benefits *justify* its costs (recognizing that some benefits and costs are difficult to quantify);
2. Tailor its regulations to impose the *least burden* on society, consistent with obtaining regulatory objectives;
3. Select ... approaches that *maximize net benefits* (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity);
4. To the extent feasible, specify *performance objectives* ...
5. Identify and assess available alternatives to direct regulation, including providing *economic incentives* to encourage desired behavior, such as user *fees or marketable permits*, or providing *information*.....



# Impact of BCA Requirement

## Hahn and Dudley (REEP, 2007)

- Sample of EPA Regulatory Impact Analyses, 1982-1999
- Scorecard method based on inclusion of basic economic information

## Findings/Conclusions:

- All RIAs monetized at least some costs
- About 50% monetized at least some benefits
- About 30% presented some measure of net benefits
- **Quality** (based on what was included) **was generally quite low**, with no clear trend toward improvement
- **Evidence of non-compliance** with EOs
- Guardedly optimistic about future use of BCA in RIAs

# Recent Example: EPA's GHG Standards for Light-Duty Vehicles

- Set fleet-wide average carbon dioxide emission standards for cars and light trucks (**grams/mile**)
- Issued in conjunction with changes in fuel economy standards (**CAFE**) by Department of Transportation
- Standards correspond to projected average fuel efficiency (combined cars and light trucks) of **54.5 mpg for MY2025**, if all reductions come from improved fuel economy

**Table 1 EPA's Estimated 2017-2025 Model Year Lifetime Discounted Costs, Benefits, and Net Benefits assuming the 3% discount rate SCC Value<sup>a,b,c,d</sup>**  
**(Billions of 2010 dollars)**

Lifetime Present Value <sup>c</sup> - 3% Discount Rate	
Program Costs	\$150
Fuel Savings	\$475
Benefits	\$126
Net Benefits <sup>d</sup>	\$451
Annualized Value <sup>e</sup> - 3% Discount Rate	
Annualized costs	\$6.49
Annualized fuel savings	\$20.5
Annualized benefits	\$5.46
Net benefits	\$19.5
Lifetime Present Value <sup>c</sup> - 7% Discount Rate	
Program Costs	\$144
Fuel Savings	\$364
Benefits	\$106
Net Benefits <sup>d</sup>	\$326
Annualized Value <sup>e</sup> - 7% Discount Rate	
Annualized costs	\$10.8
Annualized fuel savings	\$27.3
Annualized benefits	\$7.96
Net benefits	\$24.4

## Estimates considered:

- Climate change
- Energy security
- Particulate matter
- Rebound effect
  - benefits of additional driving
  - cost of additional congestion, accidents, noise
- Value of reduced refueling time

# Success for Economics?

Executive Orders provide a prominent role for economics in the **evaluation** of **major** environmental **regulations**

*“Endorsed for more than three decades and by five presidents, **cost-benefit analysis is here to stay.**”*

*Cass Sunstein in “The Stunning Triumph for Cost-Benefit Analysis”, BloombergView, 2012*

# Opportunities/successes regarding policy design/choice?

- Greater use of **performance standards**?
- Greater use of **economic incentives** (e.g., tradable permits)?
  - Pollution
  - Fisheries (ITQs)
- Still heavy reliance on standards
  - **Energy efficiency standards vs. carbon tax**
    - Neoclassical models: tax is preferred
    - Behavioral models: mixed results
- Despite this progress (success?), economics/economists still play a **limited role** in environmental policy debates.

# Economics at EPA

## Economists at EPA:

- National Center for Environmental Economics (NCEE)
  - about 30 economists (out of approx. 18,000 EPA employees)
- Social scientists in Office of Research and Development (ORD)
  - 1.57% of science staff of over 1,200
- A few economists in program offices

EPA's Science Advisory Board (SAB) has repeatedly called for **increasing social sciences**, including economics, within the agency

- Example: 9/28/12 Letter to Administrator:

*“Investment in social and behavioral sciences is needed to complement ORD’s investments in ecological and human health research.”*

- Reflects recognition of importance of social sciences (economics) in meeting EPA’s mission to protect human health and the environment.



What are the  
**Key Challenges** in Integrating an  
Economic Perspective  
into Environmental Policy?

# Talking across Disciplines

- “Equilibrium”

**Economics:** “an economic balance at which no one would be better off doing something else”

**Ecology:** “biophysical steady state”

Market equilibrium does not imply long run biophysical steady state (e.g., overfishing)

- “Efficiency”

**Economics:** Pareto efficiency

**Other disciplines:** minimum input/output ratio

Maximizing fuel efficiency does not imply Pareto efficiency

# Three Fundamental Differences in Perspectives/Views

- (1) What does it mean to “value” something?
- (2) What criteria should be used for ranking policies?
- (3) How should distributional issues be handled?

# Concept of “Value”

What does it mean to “value” something?

**Economics:** what something is “worth”

- Defined in terms of CV or EV, typically monetized (**WTP/WTA**)
- Underlies definition and estimates of benefits in BCA

**NOT universally accepted** outside of economics

# Key areas of divergence regarding concept of value

- Should values be defined in **anthropocentric** terms?
  - Alternative: biocentric/ecocentric (not based on human preferences)
- Should values be defined in **utilitarian**?
  - Alternative: rights-based (deontological) view
- Who should determine values when **public lacks knowledge**?
  - Alternative: expert “judgment”
- Do people have well-defined and **stable preferences**?
  - Alternative: preferences are “constructed”
- Are values defined only for **changes**?
  - Alternative: valuing entire ecosystems, or values as principles governing behavior
- What is the relevant **baseline**?
  - Alternative: historical/pristine state

# Criteria for ranking alternatives

## Economics:

- Cost-effectiveness
- Economic efficiency (based on net benefits)
  - As a **decision rule** vs. an **input** into decision

**NOT universally accepted** outside of economics, especially efficiency as a decision rule.



# Alternative views on policy objectives

- Maximize environmental outcome (e.g., **biodiversity**)
  - No role for tradeoffs with other non-environmental concerns
  - Can still endorse cost-effectiveness
- (Ecological) **resilience**:
  - Stability of steady states, or ability of system to tolerate/absorb disturbances
- **Sustainability** (various definitions)
  - Sometimes viewed as economic efficiency subject to constraints, suggesting a tradeoff
  - Conditions exist under which efficient paths are sustainable (e.g., Heal 1998)
    - People value environmental assets directly (stocks enter utility function)
    - Society places a positive value on the very long run

# Distributional Issues

How to evaluate **tradeoffs across individuals**

- Intra-temporally (e.g., across income groups)
- Inter-temporally (across generations)

**Economics:**

- Aggregation of benefits and costs, sometimes with weights
- Intertemporal weights: **discounting**
  - Utility discounting vs. consumption discounting

**NOT universally accepted** outside of economics, especially discounting

# Moving forward

Despite “successes”, role for economics in environmental policy debates has been limited because of:

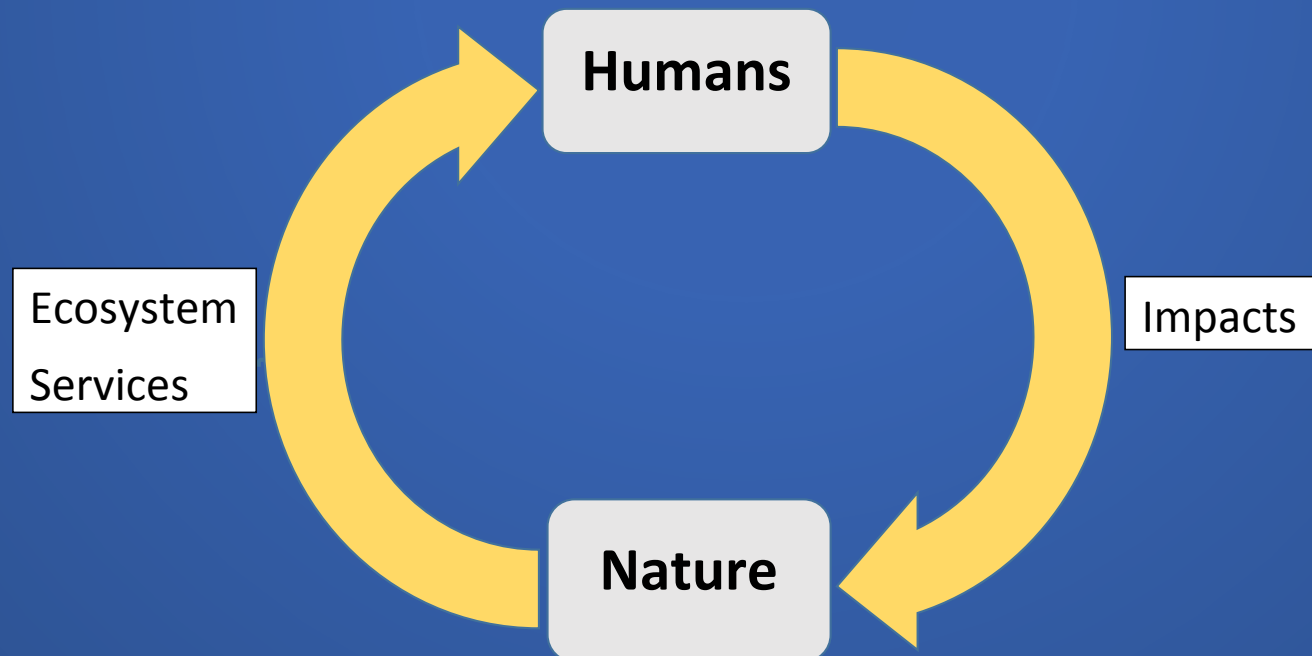
- **Misunderstanding** about economics (study of markets & money, reverence for unfettered markets)
- **Skepticism/controversy** about economics, particularly welfare economics (formal/monetized BCA as decision rule) .

How to move forward to increase role of economics?

# Moving forward

(1) Clear up the misunderstandings: **rebranding**

- Make clear that economics is not just about studying and promoting markets and money
  - start with **CNH perspective** & alternative circular flow diagram in Economics 101



# Moving forward

(2) Make clear that estimation of benefits and costs is to **inform and increase awareness** about tradeoffs, **not necessarily to evaluate** or dictate decisions about those tradeoffs

Purpose of BCA is not to reduce everything to “*the monochromatic dull gray of the monetary metric*”, as some believe (e.g., Sinden, 2011).

*“Cost-benefit analysis is not an effort to reduce all human goods to numbers, but to increase the likelihood that regulation will actually produce human goods.”*

*Hahn and Sunstein, UPennLR, 2002*

Many environmental economists have been trying to make this case for many years (e.g., Arrow et al.), but there is a clear need for more

# Moving forward

(3) Acknowledge and work within the realm of the **fundamental differences in perspectives** that give rise to controversies

- Different objective functions can lead to same or similar environmental protection goals
  - Share **similar goals** (e.g., increase conservation, reduce energy use), but for different reasons
  - Focusing on ideological differences (→ differences in motivation) makes collaboration and consensus more difficult
- Emphasize using economics to design policies to ensure those goals are met (**effectiveness**), and met at least cost (**cost-effectiveness**)
  - Incentives (intentional & unintentional, positive & negative) → behavioral responses
  - Spillover effects