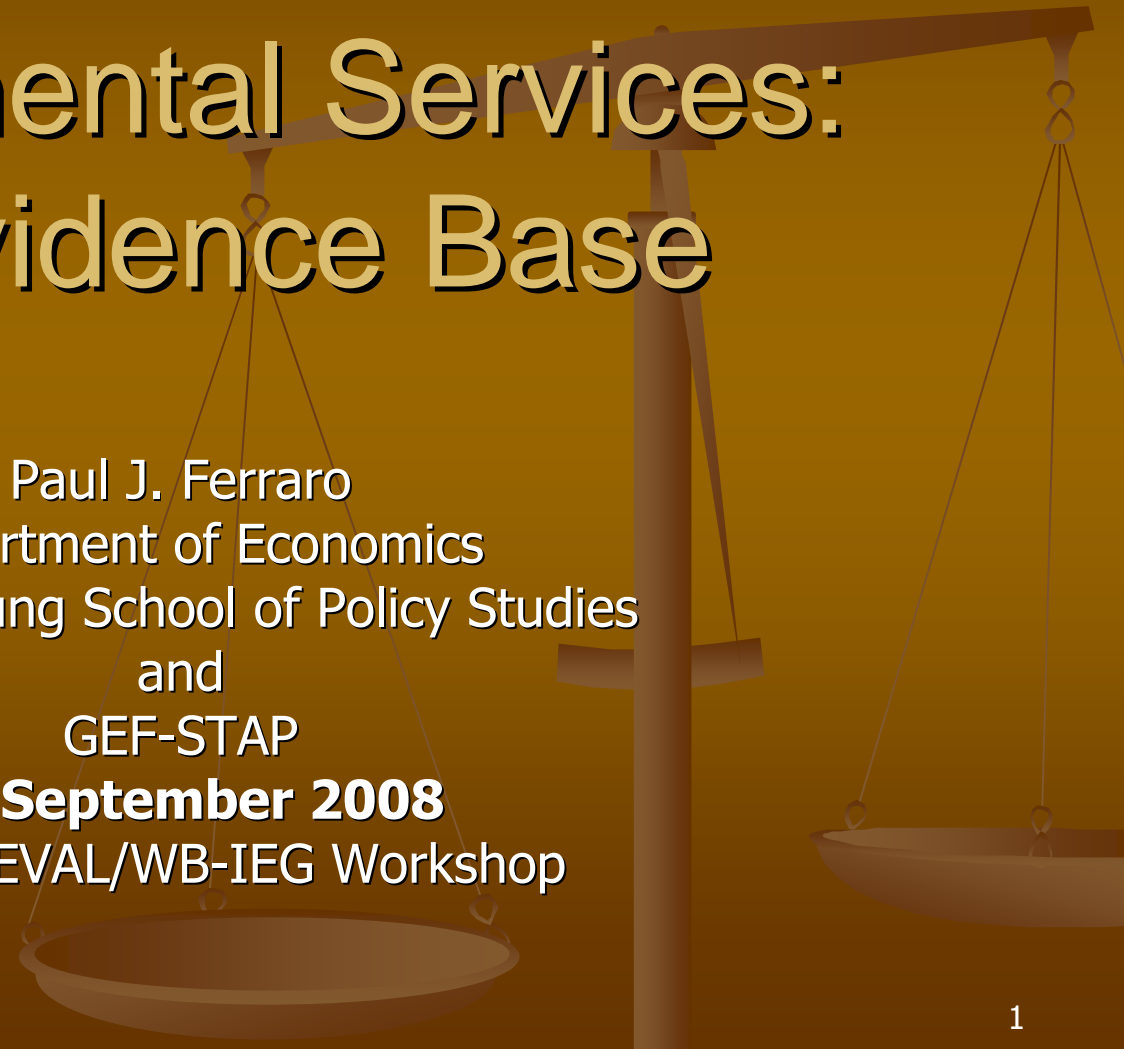# Protected Areas and Payments for Environmental Services:
The Evidence Base

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REDD Tools for the Field

1. **Performance payments**

2. **Regulation: e.g., protected areas, tradable development rights, land use taxes.**
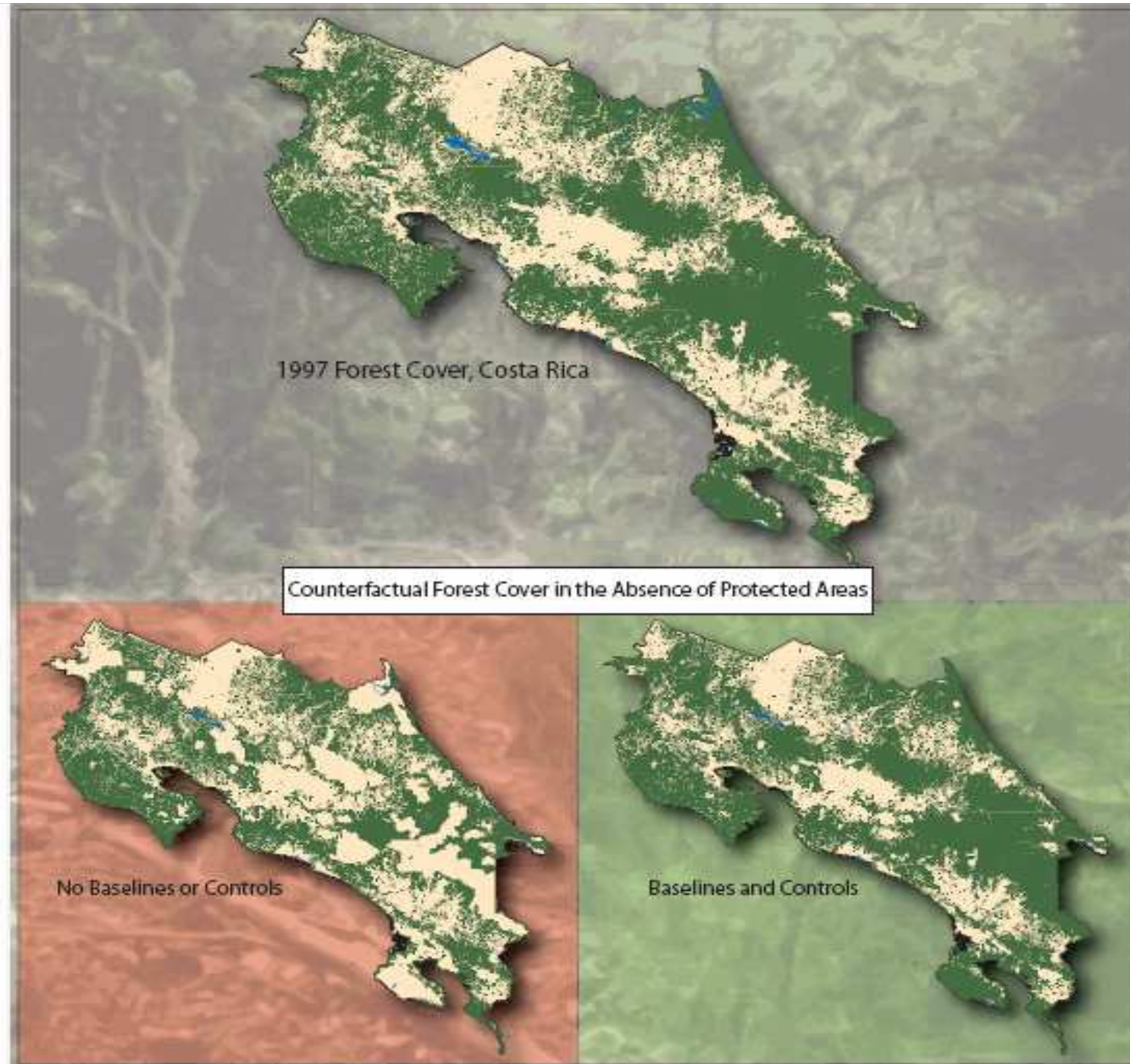
3. **Decentralization/Devolution of Management Authority**

4. **Economic Policy: e.g., eliminate perverse subsidies, alter infrastructure plans**

Evidence in Conservation Policy

Millennium Ecosystem Assessment (2005)

"Few well-designed empirical analyses assess even the most common... conservation measures."

3

1997 Forest Cover, Costa Rica

Counterfactual Forest Cover in the Absence of Protected Areas

No Baselines or Controls

Baselines and Controls

4

Protected Areas

Effectiveness = **How much deforestation (carbon release) would have taken place in the absence of protected areas?**

A counterfactual outcome that cannot be observed directly.

Protected Areas and Deforestation

Evidence base. Most studies use one of three approaches:

1. **Monitor deforestation trends inside protected areas (e.g., 80% of forest still present); -> Only tells us status**

2. **Extrapolate historical trends and compare actual deforestation to predicted deforestation; → Past predicts the future?**

3. **Compare protected forests to unprotected forests (no controls for other factors).**

Protected Areas and Deforestation

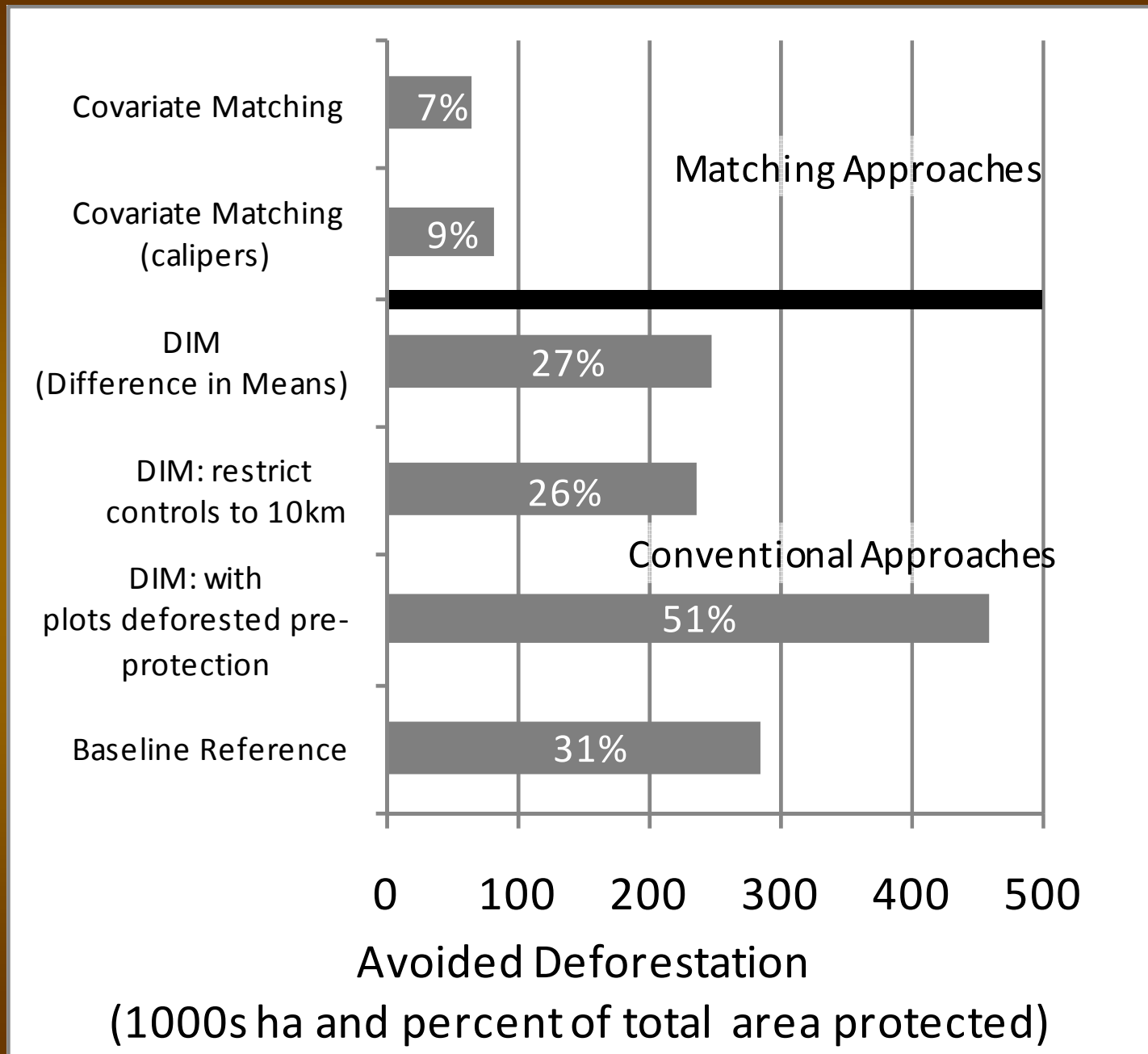**No control for confounding factors that can mask or mimic protection's effects on deforestation.**

1.Administrative selection: protected and unprotected forests differ in ways that also affect deforestation.

* Andam et al. (*PNAS*) Costa Rica**:** more than 90% of <u>unprotected</u> forests are on high or medium productivity lands; only 10% of <u>protected</u> forests comprise such lands. Similar evidence from many nations.

2. Time

3. Spillovers: protection can positively or negatively affect deforestation in unprotected forests.

* Based on theory, simulations and analyses that do not control confounders.

Costa Rica, 1960 – 1997 (Andam et al., In Press)   8

Performance Payments

Effectiveness: How much deforestation (carbon release) would have taken place in the absence of performance payments?

A counterfactual outcome that cannot be observed directly.

Payments and Deforestation

Evidence base. Few studies, and most use one of two approaches

1. **Calculate contracted area under forest.**

2. **Compare forest cover on plots under contract and plots not under contract, without controlling for confounding factors.**

Payments and Deforestation

No control for confounding factors that can mask or mimic protection's effects on deforestation.

1. Administrative selection

2. Spillovers from contracted to uncontracted lands:
* Example: Deforestation is "costly to reverse" and thus a payment program creates option value on uncontracted forests.

3. Self-selection: Forest that is least likely to be cut is most likely to be volunteered to be protected.

Costa Rica PSA Program

51% of PSA contracted forests on land designated for lowest-value uses; another 20% on lands with "strong limitation" for agriculture (Sills et al.)

Payment competitive with only "marginal lands with zero opportunity cost of conservation." (Ortiz et al.).

Recipients less likely to have grown crops in 1996 (Arriagada et al.)

Recipients less likely to live on farm, and more likely to have off-farm income, more education, and larger farms with steeper slopes.

Payments and Deforestation

Costa Rica PSA: 4 studies that estimate counterfactual forest cover using controls. 2 at landscape scale and 2 at farm scale. Only 3 control for observable differences

***Bottomline*: three detect zero impact on forest cover and one detects a small impact (<5% of pre-project cover). One study suggests that PSA promotes exit from agriculture (no control for confounders)**

***Reason*: Self-selection (+ low deforestation rates overall)**

Mexico (self-selection similar to Costa Rica) and high-income nation agri-environmental schemes (some evidence of effect after improvements in administrative targeting and, in US, competitive bidding).

Costa Rica as a Guide?

New Scientist article on REDD (Pearce, F. 2008. Save the Climate by Saving the Forests):

"[Costa Rica] has achieved a dramatic turnaround with a mix of conventional measures - such as creating national parks, banning deforestation and planting trees - and cash incentives akin to those envisaged by REDD....Can REDD repeat the Costa Rican success on a global scale?"

Implications for Designing Pilot REDD Activities

- Weak evidence base means that guideposts are few.

- Evidence from sparse credible analyses suggest that nations interested in reducing deforestation may not achieve as much as they hope, and,

- Strategic incentives to claim more counterfactual avoided deforestation than was achieved. How to mitigate?

Pilot REDD Activities

Use pilot REDD activities to build the evidence base about what works to reduce deforestation and degradation. Don't tell nations what interventions they can do, but do tell them that the interventions have to be designed in a way that can be credibly evaluated.

Evaluating Pilot REDD Activities

Create programs with some random variation in the way in which the program is implemented; i.e., variation that is not correlated with the outcomes we care about (deforestation/ degradation/social welfare)

This will make the identification and quantification of impacts easier and more credible.

Evaluating Pilot REDD Activities

Uganda (UNEP-GEF): randomized controlled experiment testing the ability of performance payments to reduce deforestation. Randomized at community-level.

Other approaches: Randomly <u>encourage</u> some communities/residents to participate; Random phase-in; Regional REDD pilot with "arbitrary" boundaries.

Protected Areas: local socioeconomic impacts

Very Controversial. Most studies are single protected area studies using:

1. **Attitudinal surveys**

2. **Case study narratives**

3. **Ex ante predictions based on historical use patterns and author assumptions**

4. **Ex post analyses that often prove little more than rural people near protected areas are poor.**

Costa Rica (1973-2000)

Conventional Methods (including regression) imply PAs have negative impact on poverty indices and other socioeconomic outcome methods.

Controlling for confounding factors: No evidence that PAs had harmful impacts on the livelihoods of local communities

On the contrary, protection has had *positive effects on* socioeconomic outcomes: lower poverty index, and better housing conditions and access to water

Thailand analysis tells the same story, and data also indicate that PAs also reduced inequality in neighboring communities.

- <u>Monitoring Indicators/Status</u>: tells us only where we are in relation to our goals.

- <u>Impact Evaluation</u>: tells us whether our actions are moving us in the direction of our goals.

Estimating counterfactual outcomes requires collecting data so that an actual program effect would be visibly different from the most plausible rival explanations (hidden biases).

Protected Areas: local socioeconomic impacts

Credible study:

1. Objectively measurable indicators of human welfare at appropriate scale;
2. Observations of these indicators before and after PA establishment, or if not available, some other control for the initial state and trend of the indicators;
3. Observations of these indicators from both treated units (i.e., areas known to be potentially affected by protected areas) and control units (i.e., areas similar to treated units in economic potential but known to be not affected, or less affected, by protected areas); and
4. Observations of baseline characteristics that affect both where protected areas are located and how the selected indicators of human welfare change over time (e.g., land productivity).