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REVIEW OF: "THE CAUSES OF TROPICAL DEFORESTATION," KATRINA BROWN
AND DAVID W. PEARCE (EDS.).

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THE CAUSES OF TROPICAL DEFORESTATION

Edited by Katrina Brown and David W. Pearce
University College London Press, London, 1994. xiv + 338 pp.,
diags., index, and biblio., \$ ____ .00 (cloth)

The Causes of Tropical Deforestation, edited by Katrina Brown and David W. Pearce, brings together an impressive array of deforestation studies. In 19 chapters, treatments range from an update of Norman Myers' pan-tropical survey of deforestation to country-specific studies fitting various statistical models to predict deforestation from population, cattle, agricultural output, logging, roads and other variables. National studies include Brazil (Eustáquio Reis and Rolando Guzmán), the Philippines (David Kummer and Chi Ho Sham), Thailand (papers by Theodore Panayotou and Somthawin Sungsuwan and by Chiara Lombardini), Indonesia (Dianne Osgood) and India (Manab Chakraborty).

Other chapters approach deforestation from the perspective of a single variable, and seek to assess the importance of the chosen variable over a range of countries. These include population (papers by Matti Palo, by Thomas Rudel and by Richard Bilsborow and Martha Geores), international debt (James Kahn and Judith McDonald), macroeconomic changes (papers by Ana Doris Capistrano and by Nemat Shafik), agriculture (Douglas Southgate), government incentives (Dennis Mahar and Robert Schneider), and the tropical timber trade (papers by Edward Barbier, Nancy Bockstael, Joanne Burgess, Josh Bishop and Bruce Aylward, and by Jeffrey Vincent).

The quantitative analysis of deforestation included in the volume represents a significant advance over most of the treatment this area has received so far. The information on deforestation and causal factors that serves as input to the analyses reflects the state-of-knowledge as of mid 1993, usually with information on the situation in the mid 1980s. The analyses of deforestation are probably the best that have been published in almost all cases. Some of the papers also include interpretation of deforestation impacts in terms of greenhouse gas emissions, but this field has advanced considerably beyond what is reflected in the present volume, both in terms of data and in terms of interpretation methodology.

It is remarkable that the various analyses presented arrive at strikingly different conclusions as to what is important in causing deforestation. The three papers dealing with the role of population conclude that this is a key determinant across the sample of countries examined. The study of international debt, however, concludes that debt is important while population has an insignificant role. In individual country studies population also has a varied role: in the Philippines it had minimal

importance, whereas in other countries it was either shown or assumed to be of primary importance. Disagreements extend to the methods used in the analyses. Kummer and Chi Ho Sham attack the present and past work of several of the other chapter authors for using percent forest cover as the measure of deforestation. Percent forest cover is inappropriate as an indicator of the contemporary deforestation activity because forest cover depends on the area of the country, the portion originally forested, and the time that deforestation has been taking place. In addition, deforestation done in remote historical periods often stemmed from factors unrelated to those currently driving the process.

Macroeconomic factors, such as per-capita income and currency devaluations, have effects that change from decade to decade over a 19-year period examined by Capistrano. The most important factors shifted from tropical timber prices in the 1967-1971 period, to currency devaluations in the latter half of the 1970s, and availability of arable land in the 1980s. Shafik, in contrast, finds that macroeconomic factors explain only a minimal part of the variance in deforestation, and considers it "barking up the wrong tree."

The role of logging in deforestation is one of the most difficult to assess--and also one of great importance in international relations given the role that consumers in developed countries play in providing impetus for this factor--as contrasted, for example, with demographic changes and land tenure in tropical countries. Capistrano found a "high degree of [positive] correlation between industrial logging and deforestation of closed broadleaf forests" in a sample of 45 countries. In Brazil, Reis and Guzmán found a weak negative relationship between logging and deforestation across 153 municípios (counties); they attribute this to simultaneous equation bias due to the dual role of log production as a cause and a consequence of deforestation.

Most of the analyses in the volume are econometric in nature. Regressions of deforestation measures are fit to a list of variables (usually the deforestation data are cross-sectional, but sometimes they are combined with a limited amount of more-difficult-to-obtain time series data). The traditional use of econometrics is for forecasting inflation, unemployment and other economic indices given changes in 'policy instruments' such as interest rates and taxes. However, one cannot help but be impressed by the frequency with which governments are embarrassed when econometric studies lead their finance ministries to make grossly incorrect predictions. A certain amount of caution is therefore indicated in judging results, even when the methods are used in their original context of predicting short-term responses to change.

The greatest strength of traditional econometrics is for

short-term projections, while correctly predicting a long-term trend in a system that includes nonlinear relationships and feedbacks is rare. For a broad description of "behavior modes," such as the overshoot and collapse pattern that unfolds in the aftermath of many exponential trends, a model that roughly approximates the various feedbacks involved (for example in a systems dynamics model) is often better than the most precisely specified econometric model, even if the latter can claim proper statistical significance for its regressions. The syndrome of being "precisely wrong" rather than "approximately right" applies strongly to long-term forecasts using econometric models.

One general problem that worries this reviewer is the inability of cross-national studies using econometric techniques to avoid bias toward what is happening in small countries. Bias is unavoidable when regressions are made using data from 50 or more countries, each country representing a data point of equal weight. Bilsborrow and Geores come closest to confronting this problem when they throw out some of the outliers in their regression. Syria, Cuba and Brazil fall well off the regression line. The authors eliminate Syria without qualms due to its minor importance. Indeed, I would say that the vegetation of Syria is not what one normally thinks of as "tropical forest," and the inclusion of this and other similar countries dilutes the sample of countries about which the book seeks to generalize. Bilsborrow and Geores rationalize elimination of Cuba because of its highly atypical social system. But Brazil represents such a large portion of tropical forests and deforestation activity that the authors opt to leave it in the regression. The problem I see is that, although the one data point representing Brazil may reduce the R^2 by a modest amount by lying off the regression line, the result would be very different if the data point for Brazil were weighted by its true importance: any regression without Brazil falling right on the line indicates that one simply doesn't have a generalization about deforestation.

Several of the national studies are frankly inconclusive, including Thailand and Indonesia. Osgood concludes from her analysis of deforestation in Indonesia that "The results of the econometric analysis appear only to add ambiguity to the efforts of finding global causes of deforestation...nor do they offer positive insight on the role of macroeconomic policies....". This summarizes well the frustration one feels from the volume as a whole. In spite of this, the volume is valuable for laying out the data "such as they are" (as one author put it), and will be required reading for anyone working on causes of tropical deforestation. Given the importance of deforestation to global environmental change, efforts need to be redoubled both for understanding the dynamic processes that underlie deforestation and for estimating the probable short-term results of policy options open to governments.