Determinants of Forest Preservation

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Abstract

Between 1992 and 2003, the global area under preservation has increased 52.8%, such that the terrestrial proportion of the globe now protected is 11.5% (Chape \textit{et al.} 2003). Since some countries protect more forest than others, we wish to explain this variation using a reduced-form model capable of suggesting whether the amount of forest a country preserves is related to economic and ecological factors. More specifically, this paper will investigate whether there appears to be a relationship between forest preservation and forest intensification, since this would suggest that some countries are using intensive zones to offset timber losses from forest preservation. There is a robust literature exploring systematic approaches for efficiently selecting forest reserves (e.g., Ando \textit{et al.} 1998, Polasky \textit{et al.} 2005, \textit{etc.}), but we could find no multi-country empirical studies that estimate whether plantation forestry appears to be a technique by which countries are increasing forest preservation. If such a relationship between plantations and preservation were found, then policy alternatives for promoting plantation forestry, as will be suggested in this paper, could be used to promote preservation.

Although reduced-form models, as will be used in this paper, are not always supported by theoretical underpinnings, they can still quantify direct and indirect aggregate effects of variables on forest preservation (Grafton \textit{et al.} 2004). This methodology is supported by the reduced-form modeling used in: \textit{(i)} multi-country analyses that correlate explanatory factors with deforestation, \textit{(ii)} empirical work done on detailing the environmental Kuznets curve (EKC), and \textit{(iii)} analyses of the impact of trade on the environment. In general, these three branches of the literature test whether environmental degradation is related to factors such as income, time, trade, and sometimes other variables, such as population density and polity.

The literature on deforestation, the EKC, and trade-environment linkages also provide insights into the economics of forest preservation. The deforestation literature suggests that forest conversion is an important factor in fueling the economic growth of developing countries (Naidoo 2004). This result agrees with the “classic” finding of the EKC literature, that environmental quality \textit{initially} decreases with rising per-capita income. But the EKC literature has more to add: suggesting that, in some cases, as income rises, environmental degradation eventually reaches a turning point, after which environmental quality begins to rise (Grafton \textit{et al.} 2004). This second EKC finding—that economic growth might eventually benefit the environment—is also found in the trade and environment literature for some forms of environmental quality and for some regions. This relationship can arise when there are income, technique or composition effects that result in improved environmental quality and increased income (Copeland and Taylor 2004). Therefore it is possible that trade, which promotes economic growth, may have a beneficial effect on some measures of environmental quality.

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(Frankel and Rose 2005). Finally, applying these general results to our forestry question, we examine the hypothesis that the increased productivity from plantation forestry could not only increase income and trade, but could also increase environmental quality by encouraging forest preservation—i.e., a positive technique effect.

Empirically testing this hypothesis (of a positive technique effect) will be the main objective of this paper. Since this technique effect could arise via an EKC with respect to forest preservation, we will also test for the presence of such an EKC. The econometrics will incorporate the following multi-country data for the year 2000: (i) hectares of preserved forest, (ii) ratio of forestry value-added to GDP, (iii) total hectares of land, (iv) per capita income, (v) polity, (vi) forestry imports, (vii) ratio of forestry exports and imports to total forestry value-added, (viii) proportion of forest that is publicly owned, and (ix) hectares managed as forest plantations.

**Literature Cited**


