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Are forests real options to mitigate climate change?

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Abstract

Emissions reductions through forests can be provided through measures of afforestation and reforestation (A/R) or by Reducing emissions from Deforestation and Forest Degradation (REDD) that would otherwise occur. These measures could provide emissions reduction at lower cost than energy-related projects (Stern, 2006). However, comparing to energy-related emissions reductions strategies, carbon removals resulting from forest activities are particularly subject to risks of being reversed, i.e. face the risk of non permanence (Dutschke and Angelsen, 2008).

There are several types of risk that jeopardize permanence: natural/ecological, climate-change related, failure of project partners and political risks (Wong and Dutschke, 2003). We focus on demand side risks. Demand side risk is the risk that an increase in commodity prices in the world market raises landowners opportunity costs of keeping land under forest above to the payment level settled in the contract. In this case, it would be profitable for landowners to convert land to agriculture and permanence would not be warranted. Understanding how these risks affect landowners decisions can provide valuable insights for the design of payments schemes and how to ensure permanence.

The application of the real options approach to landowners land use decisions provides valuable insights for the design of payments for afforestation and for Reducing Emissions from Deforestation and Forest Degradation (REDD). According to the real options theory, in the presence of sunk costs and uncertain returns, landowners might value the option of delaying land conversion. This affects considerably policy recommendations for the design of payments schemes. Our results show that: (i) REDD is potentially more cost-effective and afforestation programs more expensive than estimated in the current literature and (ii) contrary to current proposals to address the risk of non-permanence, indexing conservation payments to agricultural prices would induce further deforestation

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