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Abstract

This working paper employs an alternatives and consequences approach to evaluate some of the potential consequences of using computer simulation models to estimate indirect land use for the purposes of regulating production of biofuels.

Keywords

greenhouse gases, indirect land use, deforestation, corn, soybeans

Disciplines

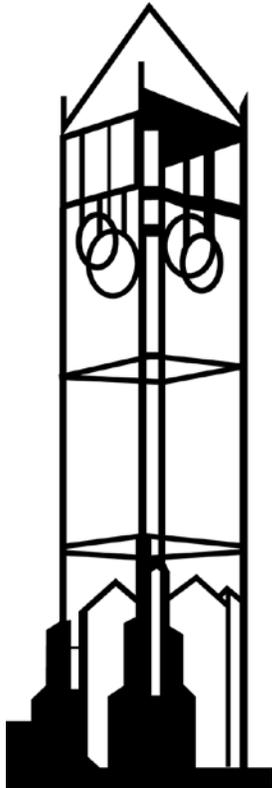
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Indirect Land Use: The Folly of Over-Indulgent Environmentalism?

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Indirect Land Use: The Folly of Over-Indulgent Environmentalism?

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In response to a recent Supreme Court decision on the Clean Air Act, the Environmental Protection Agency (EPA) identified carbon and other green house gas emissions as being harmful to the environment. Now the stage is set for major decisions on the approach to be used to address climate change.

There are three major approaches for reducing domestic emissions:

- **Regulatory** -- This approach defines a threshold of harmful emissions and sets up an effective monitoring and enforcement system with fines and penalties.
- **Tax & tax credit** -- This approach imposes a tax in relation to the harmful emissions and may provide tax credits for adjusting to lower emission technologies.
- **Cap & trade** – This approach sets an emissions ceiling over which the emitter must either reduce emissions or purchase emission rights from others who control and reduce emissions or deploy sequestration activities.

As part of the process for developing a regulatory framework, EPA recently announced a proposed rule and comment period on “Indirect Land Effects.” EPA officials indicate that the recently revised Renewable Fuel Standard Act asks for indirect land effects to be considered. So on one level EPA appears to be doing its job. However on another level, the proposed policy may create results that are different from initial intentions.

Indirect land use regulatory logic

Indirect land use theory goes something like this:

- the U.S. biofuels industry creates more demand for domestic corn,
- which causes less soybeans to be produced,
- which in turn creates more demand for Brazilian soybeans,
- which in turn causes more rainforests to be converted.

Since Brazilian rainforests sequester carbon and green house gases, therefore U.S. biofuels should be regulated for indirect land use impacts on rain forest conversion.

Does the logic make sense for regulatory purposes? Brazil has more land area than the continental United States. The development of Brazil’s natural resources has been a long standing national policy priority since 1960 when the national capital was moved to an undeveloped inland area. Prior to that era, Brazil operated pretty much as a closed economy. The creation of Brasilia as the national capital was an overt strategy to spark the development of the nation’s western natural resources and infrastructure. It has worked. Brazil is now among the 10 largest economies in the world. Economic growth was 5.4 percent in 2007 with agriculture growing at 5.3 percent. Brazil has a 24.7 billion trade surplus.

In 2008, the agribusiness sector accounted for 25 percent of Brazil's GDP. Agribusiness contributes to 36 percent of Brazil's exports and 35 percent of the labor force in Brazil. According to one report, Brazil has dramatically increased financial support for agriculture in recent years. The 2009 program spending increased by 11 percent over the previous year for agricultural production incentives in the face of rising food prices and domestic inflation. In conclusion, agricultural development plays a key role for Brazil's economic development and Brazilian rainforests may continue to be converted to other uses as long as it is within the sovereign rights and interests of the Brazilian people.

But wait, now comes the climate change initiatives and proposals. It may now be in the interests of all global citizens to curb the rain forest conversion. If the goal is to curb rain forest conversion, then it is appropriate to ask about the key factors affecting the loss of rain forests.

At the top of the list for Brazil, the factors might include:

1. The devaluation of the Brazilian currency in 1999 which made Brazilian exports less expensive for all international consumers,
2. The discontinuance of Brazilian export taxes,
3. The investments in agricultural research and infrastructure being made by the Brazilian government to further develop the agricultural resources and rural economy,
4. The increased spending by the Brazilian government to provide incentives for expanding Brazil's crops and livestock industries,
5. The economic growth of China and India and their respective growing demand for South American agricultural and energy exports,
6. The rise in global energy prices heavily influenced by OPEC which contributed to the Brazilian drive for energy independence and expansion of the Brazilian sugar and ethanol industries, and
7. Brazilians who see opportunities for earning income by converting rain forests into other land uses.

While the U.S. biofuels industry has expanded in the more recent years and may have some correlation with recent land use change events, correlation does not necessarily prove causality. Other domestic incentives within Brazil likely have more influence on Brazilians who make the rainforest conversion decisions and doesn't the ultimate causality rest with the growth in incomes and demand for food and energy?

Risks of regulating indirect land use

So, what are the risks of imposing an extra U.S. regulatory policy on indirect land use? Some of the risks are that the policy may:

- interfere with U.S. agricultural competitiveness,
- not achieve desired results in rain forest preservation,
- impede maximum potential in reducing domestic carbon and greenhouse gas emissions, and
- impede progress toward less dependence on imported oil.

EPA is appropriately cautious in looking at the “peer reviewed” literature and public comments for potential policy rationale. The infant body of literature on “Life Cycle Analysis” may not fully consider the context for international institutions, policy, and land use decisions. Computer models representing international trade for agriculture have been around for several decades and were principally developed for forecasting and analyses of policy outcomes. If the EPA and the California Air Resources Board are on the verge of using trade models to implement regulatory policy decisions, a second look at the literature in that area may be useful. Computer trade models presume a constant institutional structure, policy framework, and predefined set of market relationships leading to presumed behavioral responses. So by definition, the models can and will generate results that include a lot of empirical relationships. This does not necessarily mean that causality exists in all correlations that are generated.

In recent Congressional testimony, the focus was on the range of results and variability across the models available. While computer trade models often do a pretty good job of simulating international market responses, they are not perfect. One example presented in testimony highlighted a model forecast that was incorrect relative to the real world outcomes that actually occurred in 2006. Perhaps some relevant exogenous policy response variables were excluded from the models. The risk of ascribing causality and responsibility by computer simulation is that U.S. policy may generate benign results, or worse yet, vastly incorrect results regarding the actual impacts on rain forest preservation in Brazil. Without a change in Brazil’s current land use policy, rain forest conversion may actually accelerate as Brazil’s agricultural economy continues to grow in response to dominate domestic expansion incentives, as Brazil’s share of world agricultural trade continues to grow, and as China’s demand expands. In the meantime, U.S. carbon and green house gas regulations may incorrectly interfere with U.S. agricultural and biofuels markets and impede progress toward less dependence on imported oil.

Brazil only uses 19 percent of its 790 million cultivable acres, so an obvious question is whether there is room for agricultural expansion without harming the rain forests? So the Brazilian government might be able to legislate rain forest preservation and eliminate perceived market responses for indirect land use without much cost in terms of foregone economic activity.

Policies to contain rainforest conversion

It is important to note that for the U.S. indirect land use policy proposed there appears to be no direct institutional authority or policy linkages that effectively assure less rain forest conversion. If the relevant policy goal is to enhance carbon and greenhouse gas sequestration, there are three general approaches for developing more effective outcomes.

1. One approach would have the nations of the world to act so as to impose a cost on the nations with rain forest assets if they allowed continued conversion and loss of sequestration capability.
2. A second more peaceful approach would be to compensate the nations with rain forest assets and/or the owners of rain forest assets by purchasing development rights, creating limited-use preserves, and providing incentives for appropriate rain forest management.

In either case, the range of effective policy responses for assuring global rainforest protection appear to be confined to the realm of international negotiations among sovereign governments or private international philanthropy—neither of which are within

the normal span of decisions by agricultural producers and the biofuels industry who would face added U.S. regulatory deterrence by the proposed indirect land use rule.

3. The third approach would be to allow the Brazilians and other nations with rain forests to have flexibility in addressing their domestic emission and sequestration issues within the emerging global market or policy framework of the post-Kyoto global environmental policy. A strong and consistent general agreement on carbon and greenhouse gas emissions across nations in theory could potentially sustain a level playing field for international competition as externalities are internalized to create incentives for GHG reduction in each nation.

Here a critical element might be whether the body of international decision-makers wish to utilize GHG market mechanisms to manage the GHG emissions and transfers of wealth to less developed nations or whether policy institutions would be used to manage such emissions and transfers within a more defined set of goals and limits. The international quandary is increased if large players like China and India decide to opt out of market or policy mechanisms creating a free rider problem for both GHG emissions and wealth transfers to developing nations.

Double counting is an accounting problem that the international framework would need to address. Double counting occurs because the indirect land use effect of one country tends to be a direct land use effect for another. The U.S. proposed indirect land use policy could be placed in the double counting category. Many regulations are based on measures outcomes of actual behavior. However in this case it often appears that RPG style computer simulations are being deployed simply because they are there and because they provide a method of arbitrarily allocating some responsibility among parties in the absence of measurable outcomes, more definitive studies, or policy-developed solutions.

In a recent hearing on indirect land use, House Agriculture Committee leaders suggested the costs and emission effects for the U.S. to protect oil shipping lanes in the Middle East or environmental cost from oil spills should be added to calculations of indirect emission effects for petroleum based fuels. This could represent an example of an indirect emissions cost that might be left out of first generation RPG-style computer simulations in an international regulatory framework. Should these costs logically be included for nations that provide international security? Academicians might argue over whether such emissions are considered direct or indirect costs along with other proposals. On questions of prettiness—that cannot be scientifically measured—a more democratic policymaking process would use voting to determine the final answer.

Conclusions

In the final analysis, the approach of pursuing a unilateral indirect land use policy appears to run the risk of imposing extra costs on a domestic sector while having no apparent impact on rain forest preservation. RPG-style computer simulation approaches to regulation run the risk of incorrect attribution and may impede progress toward less dependence on imported oil. An argument for bilateral agreements to serve as a temporary policy until an international policy framework is established could be made if there is a felt need by the U.S. to take steps to demonstrate timeliness and resolve in preserving rain forests. Still, such action would likely raise issues over how widely the rainforest preservation costs should be spread and whether it should be confined to one industry. While U.S. farmers and biofuels producers may not mind being held

responsible for their own behavior, they are not likely to be willingly held responsible for decisions made others in sovereign nations over which they have little or no control.

The Obama Administration has an unprecedented opportunity to change the face of future opportunities across America and the globe by simultaneously moving from dependence on foreign oil imports toward creating new policies and income generating opportunities for producing clean renewable energy and reducing carbon and greenhouse gas emissions to address climate change. Agriculturalists, environmentalists, private sector leaders and community leaders have multitudes of reasons for working together on decisions for responding to the new incentives, new opportunities, and new ventures that will be created by the new energy, carbon and greenhouse gas policies. With no widely accepted and defensible “bright line” test for measuring and assigning emission impacts for indirect land use, the actual outcomes in terms of rainforest preservation in Brazil will remain dubious. It is known, however, that the indirect land use proposals do have the potential to create major divisions between agriculture and environmentalists as well as regional conflicts between the heartland and the coasts that may derail the progress for the overall initiatives. Without the indirect land use proposal, a much broader coalition of interests would have incentives to work together toward goals of change that can be more accurately and consistently measured for their direct impacts and effective outcomes.

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