

## Addendum: How will protected areas and timber certification affect market behavior?

This note is to illustrate the likely effects of two conservation instruments - protected areas (PA) and Certification of Timber (CT) - on market behavior, in order to place these instruments in an analytical framework. To

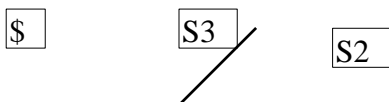
**Law of Supply:** to supply more, costs get higher.

**Law of demand:** to buy more, willingness to pay gets lower.

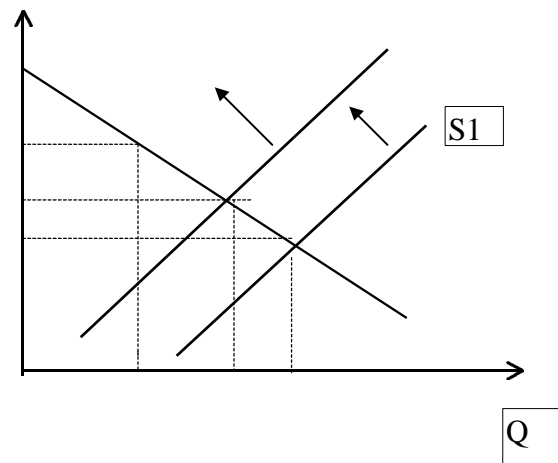
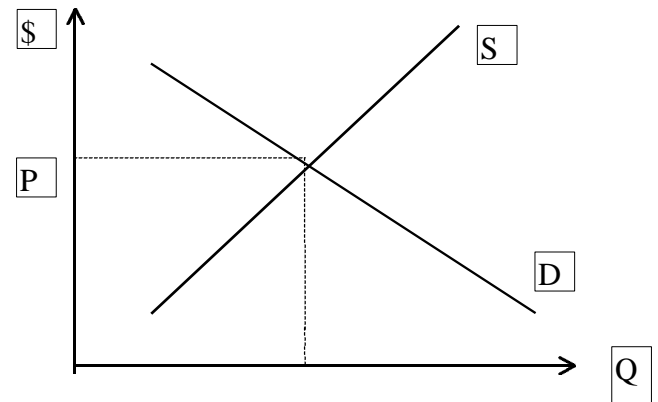
We can now use this model to examine the likely effects of PA and CT. In the following graph, there are three supply curves. S1 is what can be observed in the market. But this S1 may conceal government subsidies given to the supplier. These are explicit subsidies such as below market concession fees, preferential interest rates applied to borrowing by logging companies, subsidies for transportation, etc.

If these explicit subsidies were removed, the supplier's cost would be represented by S2 - the real market supply curve that is free from distortions introduced by government intervention. To reduce deforestation, therefore, it could be argued that removal of government subsidies should be considered as one of the first steps. This can also help reduce government fiscal burden.

Let us now assume that all subsidies were removed, so the supply curve in effect would be S2. This curve reflects the private production cost to the supplier of making a given quantity available. But this curve does not reflect the fact that in making the quantity available, there are costs to the society as a



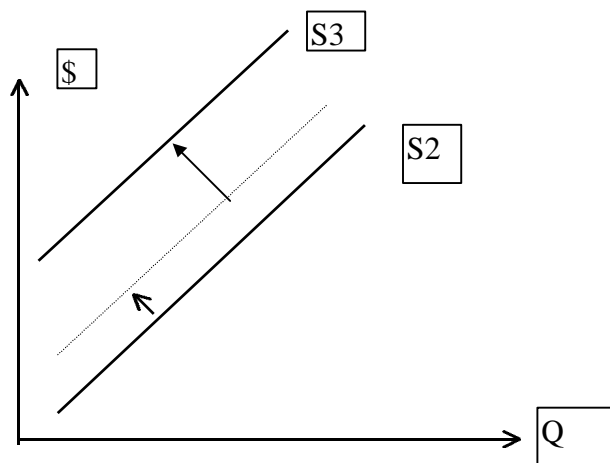
start, we need to construct a simple supply and demand model. In the following diagram, we have quantity (Q) of timber on the horizontal axis and price (P) on the vertical axis. The two curves, supply (S) and demand (D) crosses each other. This graph illustrates the Law of Supply and Law of Demand. Market price (P) is determined by the interaction of these two forces.



whole (biodiversity loss, damage to the ecosystem, etc.) in addition to private costs of hiring labor and renting trucks. These costs are usually known as “externalities” (or implicit subsidies), for which the supplier is not required by market forces to pay. But if these externalities were fully identified and internalized (that is, taken into the private cost calculation of the supplier), then the correct supply curve should move to S3.

How does PA fit into all this, assuming we start from S2 without explicit subsidies (in reality, however, subsidies must not be easily assumed away)? The establishment of PA

(whether in practice we can succeed in this or not is another question) increases the scarcity of conventionally logged timber and shifts the supply curve to the left side (see the dotted line in the following graph). One explanation for the shift in the supply curve may be that as the PA is established, forests available for conventional logging would decrease. Logging companies would compete for a reduced number of concessions and bid up the price of concessions, which will in turn be reflected in the increased cost for a given unit of supply.



We don't know the extent of this shift (a positive one as far as the objective of halting deforestation is concerned), but we know it would not likely eliminate all the externalities in the forest sector represented by the distance between S2 and S3. We can depict the supply curve (after the establishment of PA) to lie somewhere between S2 and S3, represented by the dotted line. To move beyond the dotted line and to reach S3, we need more PA and other measures.

We can highlight three points here:

First, PA would in fact be a useful step toward internalization of externalities, provided its establishment is effective and enforceable.

Second, PA by itself would probably not be adequate to halt the deforestation trend; explicit subsidies (the distance between S1 and S2) must be removed and other externalities

(the distance between the dotted line and S3) must also be internalized.

Third, to move the supply curve from S2 to the dotted line, to eliminate the distance between S1 and S2, and to go beyond the dotted line to S3, we would have to address the political, social, institutional, economic, cultural and other forces that may oppose the shifts. The last point is the key point.

What about the CT? It effectively creates a substitute for uncertified timber. Economic logic dictates that if the price of a substitute (e.g. coke cola) becomes lower, the demand for the product in question (e.g. sprite) is likely to decline. But in the case of certified timber, we expect to see a high cost margin over the uncertified timber unless the CT is subsidized. Other things being equal, the demand for uncertified timber is not likely to decline. Any decline observed in the demand for uncertified timber (or increase in the demand for certified timber) could be explained either by moral persuasion (to change consumer preferences and shift demand curve to the left) or by subsidy for CT to make its price lower than the conventionally logged timber. The following diagram depicts the shift in demand curve. The key factors here are: a) the strength of moral persuasion relative to the strength of market forces; b) the financial sustainability of subsidizing CT.

