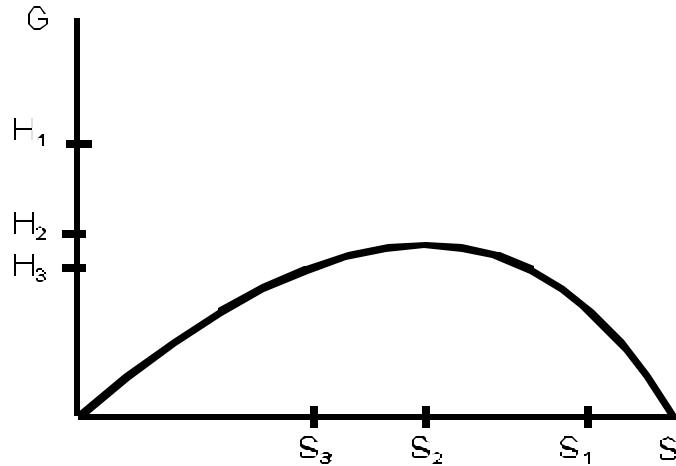


Economics Study Questions for Week 7

The diagram below depicts the relationship between the quantity of timber biomass (S) in a forest plot and the annual addition (G) to that biomass (growth). In the following analysis, assume (1) there are no benefits to the forest other than cutting and selling the timber, (2) there are no costs to cutting the timber and bringing it to market, and (3) the price of timber is expected to remain constant indefinitely.



1. Can S_1 be the “natural equilibrium” biomass stock, according to the definition given by Tietenberg? Explain.
2. Is S_2 the stock size corresponding to maximum sustainable yield? Explain.
3. Suppose the initial stock size is S_2 but the cut is increased to H_1 (above the sustainable yield). Why will next year’s growth in biomass be equal to H_3 ? (Note: both harvest H and growth G are measured on the vertical axis. They can both be expressed as kg/year, for instance.)
4. Beginning at S_2 , it is possible to harvest H_2 forever. By harvesting H_1 instead, the largest future sustainable harvest will be H_3 . Suppose H_3 is 5% less than H_2 . Is it possible that harvesting H_1 today and H_3 forever after is nevertheless more profitable in the long run (again assuming no change in prices)? Explain. (Hint: the key concept is opportunity cost.)

“Extra credit” (difficult): Under what condition would harvesting H_2 forever be the most profitable option?

Even more extra credit: Under what condition would it be profitable to cut the whole forest down, even if it cannot grow back? (Assume there is no other productive use for this land.)