

The general features of this inspection problem are as follows.

- * inspections are limited in number, usually fewer than the number of inspection opportunities (time periods);
- * there is a ceiling on the amount of cheating in each time period, but no additional overall restriction;
- * if cheating does occur
 - the amount of cheating during a time period is variable;
 - if inspected, the detection probability increases as the amount of cheating increases;
 - the value to the cheater of undetected cheating depends on the amount;
 - the penalty paid by the cheater for detected cheating does not depend significantly on the amount.
- * values to the cheater (inspectee) accumulate over time
- * values to the inspector are the same as to the inspectee, but opposite in sign.

All but the last of these properties can be understood in the context of a chemical plant, or perhaps a weapons storage facility, which falls under the terms of a hypothetical non-production treaty [see Avenhaus, Fichtner, and Vachon (1987)]. The last property listed above may be problematic because arms control treaties are obviously sometimes in the common interests of the signatories (otherwise they would not be signed). But if, within a treaty, one side for some reason decides to cheat, then the interests of both sides with respect to the amount, detection, and value of cheating are indeed opposite. Thus the last feature listed above can be thought of as characterizing the cheating game within the arms control game.

The additional assumptions which are incorporated into the model to simplify the analysis, but which could be altered if necessary, are as follows:

- * false alarms are unlikely, and/or of negligible cost;
- * once the treaty has been agreed to, additional costs per inspection (to either the inspector or the inspectee) are negligible;
- * all time periods are identical with respect to the detectability of cheating, the (per unit) value of undetected cheating, and the maximum amount of cheating.

These assumptions and linearity yield the treaty model described schematically in Figure 1.