

effectiveness, a "technical" parameter. The value ratio depends strongly on the political preferences, objectives, and interests of the particular state. Inspection effectiveness, on the other hand, is a technical parameter because it is determined by the IAEA's allocation of inspection effort, plus the inspection efficiency, which reflects inspection equipment, procedures, etc. Thus, the success of safeguards does not depend exclusively on the IAEA's technical capability and effort, nor on the state's temptation to violate, but on the interplay of these two factors.

In general, therefore, the level of enforcement effort sufficient to deter a state from violating is determined by the state's value ratio as well as the technical relationship between inspection effort and inspection effectiveness. What determines the value ratio, and how can the threshold effectiveness be decreased? The detection loss component (numerator) of the value ratio reflects the penalties the state would face were it detected in a violation. These might include negative publicity, trade and other economic sanctions, embargoes, and the possibility of military action. But these discouragements to violation are themselves reduced by the actual gain achieved by the illegal behaviour. In the extreme case, when the state is better off even after its violation has been detected (i.e. when the net detection loss, b , is negative), the value ratio falls below zero, and no safeguards program, no matter how effective, can deter the state from illegal behaviour.

The determinants of the violation gain component (denominator) of the value ratio are even more difficult to specify. This quantity reflects the state's own view of how much its position would be improved by successful completion of illegal actions. This might depend on the perceived threat from other states, the history of disputes involving the state, the size of its military establishment, its political objectives and intentions, and geographical factors. The perceived threat from other states depends on the size and power of their military establishments, their objectives and intentions, etc. In short, estimating the denominator of the value ratio is difficult, although the problem is somewhat eased by the need to estimate only the relative sizes of the numerator and denominator.

The minimum necessary level of inspection effectiveness depends on the value ratio, but the actual or attained level of inspection effectiveness depends on factors relating to the IAEA's operations. The primary consideration is the level of resources available for inspection and related activities, such as data analysis. But there are other relevant variables as well — those determining inspection efficiency. For instance, different types of violation may be easier