# Abstract

Hundreds of billions of dollars have been spent in homeland security since September 11, 2001. Many mathematical models have been developed to study strategic interactions between governments (defenders) and terrorists (attackers). However, few studies have considered the tradeoff between equity and efficiency in homeland security resource allocation. In this article, we fill this gap by developing a novel model in which a government allocates defensive resources among multiple potential targets, while reserving a portion of defensive resources (represented by the equity coefficient) for equal distribution (according to geographical areas, population, density, etc.). Such a way to model equity is one of many alternatives, but was directly inspired by homeland security resource allocation practice. The government is faced with a strategic terrorist (adaptive adversary) whose attack probabilities are endogenously determined in the model. We study the effect of the equity coefficient on the optimal defensive resource allocations and the corresponding expected loss. We find that the cost of equity (in terms of increased expected loss) increases convexly in the equity coefficient. Furthermore, such cost is lower when: (a) government uses per-valuation equity; (b) the cost-effectiveness coefficient of defense increases; and (c) the total defense budget increases. Our model, results, and insights could be used to assist policy making.


## Citation


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