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# ON RATIONAL CHOICE THEORY AND THE STUDY OF TERRORISM

Charles H. Anderton & John R. Carter

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# INTRODUCTION

The theme of this paper is that rational choice theory, when rigorously applied, can help clarify and discipline the study of terrorism. Much of what follows is a review, or perhaps better, a reminder of principles generated by the basic model of utility maximization subject to a budget constraint. We assume a modest degree of familiarity with the model. Textbook presentations of the model are legion; particularly useful for this paper are Henderson and Quandt ([1980](#)) and Silberberg ([1990](#)).

We take as our starting point the interesting article by Frey and Luechinger ([2003](#)), who contrast the potential benefits of ‘benevolence’ versus ‘deterrence’ strategies to dissuade terrorists from violent activities. A deterrence strategy raises the opportunity cost of terrorist activities by defending potential targets, hitting terrorist training centers, infiltrating terrorist groups, and so on. Deterrence strategy is fundamentally confrontational and thus zero-sum. A benevolence strategy also raises the opportunity cost of terrorist violence, but it does so by reducing the cost of non-violent activity, or what Frey and Luechinger call ‘ordinary activity’. Unlike a deterrence strategy, however, a benevolence strategy can improve the well-being of terrorists (if they have more ordinary goods) and the public (if less terrorism occurs). In this way, a benevolence strategy has the potential to achieve a positive-sum outcome.[1](#)

We begin by reviewing the basic model of rational choice theory and then apply it to the study of terrorism. The model is simple, but its implications are not fully appreciated. The model is not followed implicitly, and budget constraints are not fully utilized. The Slutsky effect is not fully appreciated.



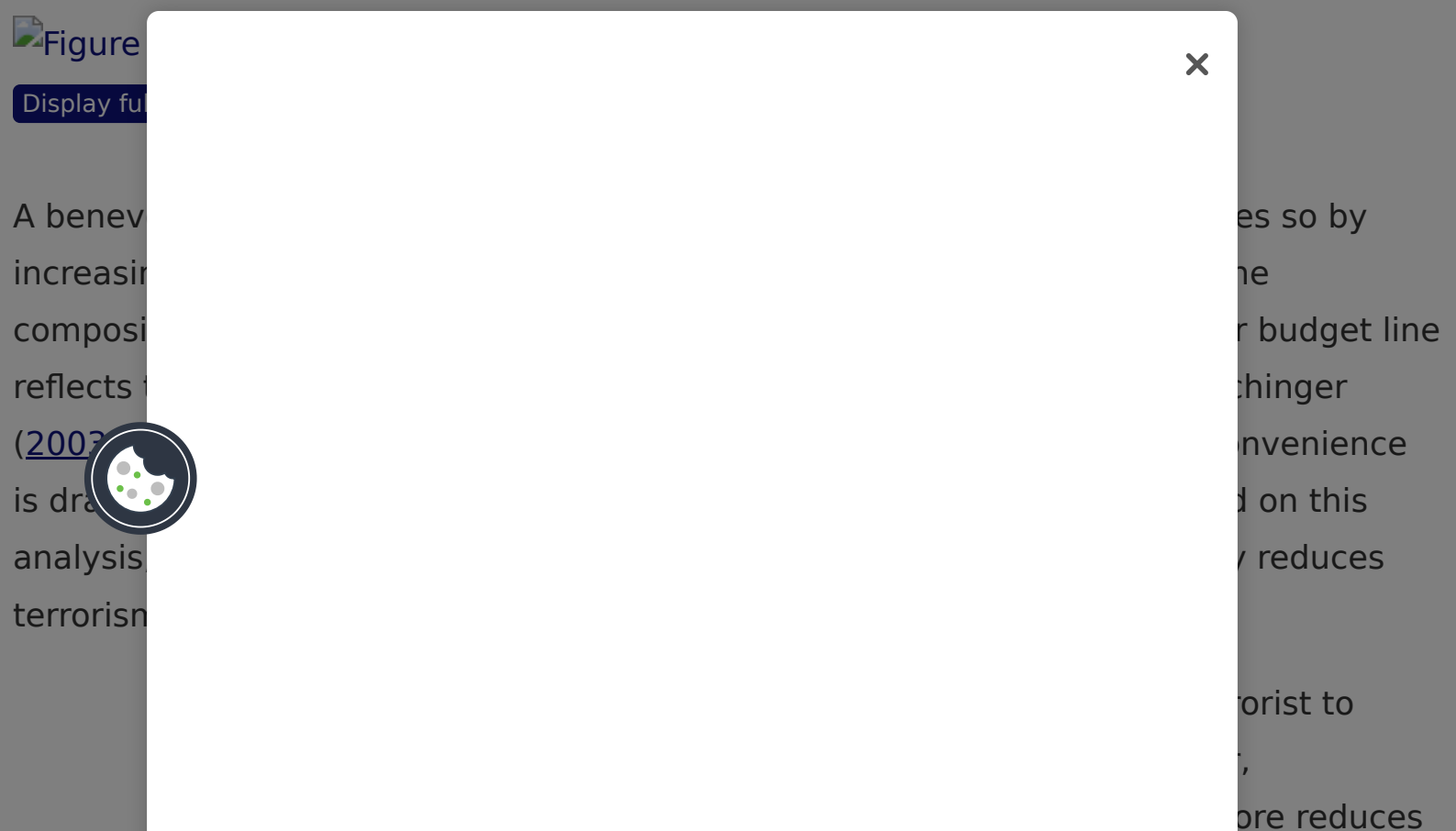
## DETERRENCE TERRORISM

In Frey and Luechinger (2003), the authors distinguish between two types of terrorism: ‘all-out’ terrorism and ‘all-out’ terrorism. ‘All-out’ terrorism refers to terrorism that is aimed at the destruction of the state, while ‘all-out’ terrorism refers to terrorism that is aimed at the destruction of the state.

initial prices of the  $n - 1$  ordinary activities  $X_2, \dots, X_n$ . According to the composite good theorem due to Hicks (1946), as long as the prices of the component goods change by the same factor of proportionality  $t$ , then comparative-static analysis can be completed as if choice is over two commodities  $T$  and  $Y$ . Define the price of the composite good to be  $P_Y = t$ , where at base prices  $= 1$ . Then  $Y$  and  $tY$  can be interpreted respectively as real and nominal expenditures on all other goods.

Following Frey and Luechinger (2003: 242), Figure 1 compares and contrasts deterrence and benevolence policies to reduce terrorism. Terrorist activity  $T$  is measured on the horizontal axis and the composite good  $Y$  on the vertical axis. Assume that the initial budget constraint available to the terrorists is  $aa$ . According to Figure 1, the terrorists consume  $T_1$  in terrorist activity and  $Y_1$  of the composite good. A deterrence policy raises expected costs of terrorist activity and hence increases the price of terrorism  $P_T$ . This causes the terrorist budget constraint to rotate along the  $T$  axis to budget line  $ab$ . The steeper budget line reflects the higher opportunity cost of terrorism. In accordance with the law of demand, terrorist activity is reduced to some lower level  $T_2$  along budget line  $ab$ . Hence, the deterrence policy reflected in Figure 1 can be expected to reduce terrorist activity for given preferences.

Figure 1 Deterrence and benevolence strategies to reduce terrorism.



## THEORETICAL CONSIDERATIONS

Careful consideration of the rational choice model used in Figure 1 shows that Frey and Luechinger's claim about the terrorism-thwarting effect of benevolence is not general. In Figure 1, the decrease in the price of other goods reduces terrorism from  $T_1$  to  $T_2$ . However, an alternative outcome is consistent with the rational choice framework. As illustrated in Figure 2, a decrease in  $P_Y$  can have the opposite effect, increasing terrorism from  $T_1$  to  $T_4$ , for example. Note that the comparative-statics in Figure 2 is neither illogical nor extraordinary. Hence, the rational choice model, without more specificity, is agnostic about the terrorism-reducing potential of a benevolence strategy. Further review of the model shows that the additional information required to distinguish between the two outcomes can be traced to certain underlying demand elasticities.<sup>2</sup>

Figure 2 Benevolence strategy with upward-sloping price-consumption curve.

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## The Price-Consumption Curve and the Elasticity of Other Goods



The relationship between the elasticity of terrorism and the elasticity of the test of site good is

To summarize, a reduction in the prices of other goods will decrease (increase) terrorism if and only if the composite good is price elastic (inelastic). Hence, we would like to know the elasticity of the composite good. It can be shown that the elasticity of the composite good is equal to a weighted average of the own and cross price elasticities of the component goods included in  $Y$ . More formally, given that the prices of all component goods change by the same proportion, then:

where  $s_i$  is the expenditure on component good  $X_i$  as a share of expenditures on all component goods, and  $\epsilon_{ij}$  is the elasticity of demand for component good  $X_i$  with



policy will indeed reduce terrorism; if the cross price elasticity is negative, then they are gross complements, and a benevolence policy will instead increase terrorism. As noted before, the rational choice model cannot by itself provide an unambiguous answer. It can, however, provide helpful guidance.

The help lies in the Slutsky equation, a central and well-known result in microeconomic theory. In terms of elasticities, the equation can be formally stated for the present case as:

$$(2)$$

where  $\sigma_{TY}$  is the compensated cross price elasticity of terrorism,  $\alpha_Y$  is the budget share of the composite good, and  $\eta_T$  is the income elasticity of terrorism.

The Slutsky equation thus decomposes the cross price elasticity into two parts called, respectively, the substitution and income effects. Speaking generally, the substitution effect is positive if and only if the compensated cross price elasticity is positive, in which case the respective goods are net substitutes; the substitution effect is negative if and only if the compensated cross price elasticity is negative, in which case the goods are net complements. In the present case, however, terrorism and the composite good must be net substitutes, meaning that the substitution effect is necessarily positive. This follows from the homogeneity of compensated demand, which can be shown to hold for any two goods.

Turning to the income effect, equation (2) indicates that the income effect is positive if the budget share of terrorism is large enough to outweigh the substitution effect. The larger the budget share, the more likely it is that the income effect will be positive. As a consequence, the income effect will be positive if the income elasticity of terrorism is greater than that of the composite good. If the income elasticity of terrorism is less than that of the composite good, the income effect will be negative. If the income elasticity of terrorism is equal to that of the composite good, the income effect is a normal good.

Because the income effect is positive, the cross price elasticity of terrorism is positive. The substitution effect is positive. This is not a good that



is in fact negative. Working back through equation (2) from right to left, the strong presumption is that terrorism is a normal good. Terrorism does not fit the usual characterization of an inferior good as being narrowly defined within a broader category of higher quality, more costly goods (e.g. bus travel within the larger category of transportation services). Moreover, implicit in anti-terrorism policy is the belief that terrorism is a normal good: reduced resources are expected to reduce terrorism. If, on the contrary, terrorism was an inferior good, then the obvious policy prescription would be to provide cash grants to terrorists. Turning next to the budget share of the composite good, presumably  $\alpha_Y$  is large, even for terrorists. Hence, the income effect is likely to be negative and substantial. Lastly, it is not unreasonable to believe that the positive substitution effect is comparatively small, reflecting the lack of ease in substituting terrorism for the composite good, which consists largely of ordinary goods like food, clothing, and housing. Putting these considerations together means there is a strong likelihood that the positive substitution effect is more than offset by a negative income effect, with the serious implication that a benevolence policy could actually increase terrorism.

## Extensions Using the Slutsky Equation

Although Frey and Luechinger (2003) frame their model in terms of terrorism and all other activities, the general conclusion is that lowering the price of a single specific activity,  $p_i$ , has ambiguous effects on the demand for terrorism. Here, too, the Slutsky equation can be used to decompose the effect of a policy change. Consider a policy decrease in the price of terrorism,  $p_T$ . Then the Slutsky equation can be written as

where  $\epsilon_T$  is the elasticity of terrorism with respect to its own price,  $\epsilon_i$  is the elasticity of activity  $i$  with respect to its own price, and  $\epsilon_{Ti}$  is the elasticity of terrorism with respect to the price of activity  $i$ . Discussing the effect of a policy change on the demand for terrorism requires a contrast between the substitution and income effects. First, in the case of a single activity,  $i$ , the substitution effect is positive. Second, the income effect is negative. These two changes



successful because the income effect will tend to be smaller. At the same time, however, whether the alternative activity is in fact a net substitute as supposed becomes an empirical question. The cautionary note here is that intuitions – for example, that democratic participation is a net substitute for terrorism – might be wrong.<sup>5</sup>

While we have focused on the issue of benevolence policy to this point, it should be clear that the Slutsky equation can be similarly applied to other terrorist choice problems. For example, Enders and Sandler ([1993](#), [1995](#)) have studied the effects of policies directed at inhibiting attacks on particular targets. Among their stronger empirical results, Enders and Sandler show that the installation of metal detectors at US airports in 1973 decreased skyjackings but also increased hostage taking and assassinations, consistent with their conjecture that these activities generate very similar political characteristics. In terms of the Slutsky equation, the empirical results indicate large positive substitution effects and at most only partially offsetting income effects associated with the increased price of skyjackings.

## CONCLUDING REMARKS

In the standard model, a terrorist attack can generate a decrease in the level of terrorism, called the substitution effect. However, the substitution effect is constrained by the utility maximization condition, which is in another. By the Slutsky equation, the substitution effect can be decomposed into a substitution effect and an income effect. The substitution effect is the effect of a change in the price of terrorism, holding the income effect constant. The income effect is the effect of a change in the income, holding the substitution effect constant. The Slutsky equation can be written as follows:

$$\Delta T = \Delta T_{sub} + \Delta T_{inc}$$

Rational choice models of terrorism, including, for example, the rational choice model, have been developed in the literature (see, e.g., [Enders and Sandler, 1998](#)).



## ACKNOWLEDGEMENT

## Notes

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groups such as food, clothing, housing, and transportation. These estimates would appear to provide the information required to estimate  $\epsilon_{YY}$  in equation (1) for Turkey. However, because Alpay and Koc's commodity categories include all goods, and terrorism is not separated out as a product category, the weighted sum of their matrix of elasticities necessarily sums to  $-1.0$ , except for a small rounding error. Furthermore, the spending patterns in Alpay and Koc's study presumably reflect the behavior of typical households in Turkey, not terrorists.

<sup>5</sup> Relevant to some extent on this issue are empirical studies of democracy and civil war. Examples include MacCulloch and Pezzini (2002), who find increased political freedom reduces revolutionary support; Hegre et al. (2001), who show an inverted U-shaped relationship between the level of democracy and the likelihood of civil war; and Collier and Hoeffler (2004), who find an insignificant relationship between democracy and civil war. Terrorism, however, is distinct from civil war and is believed by many scholars today to be primarily a phenomenon of religious extremism (Enders and Sandler, 2000; Hoffman, 1998; and Juergensmeyer, 2000). Lewis (1996: 54) maintains that the so-called neo-Islamic fundamentalists 'regard liberal democracy with contempt as a corrupt and corrupting form of government'. See also, for example, Sivan (1995).



Toward a Democratic Civil Peace? Democracy, Political Change, and Civil War, 1816–1992

Source: American Political Science Review

Terror in the Mind of God: The Global Rise of Religious Violence

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