Risk Assessment of the FBI's Counterterrorism Efforts

by Mark G. Stewart and John Mueller*

A recent review of the Department of Homeland Security's (DHS) spending on counterterrorism found little evidence of risk analysis capabilities, no attempt to describe absolute risks, and a preference to describe only relative risks.[1] In general, it seems counterterrorism agencies simply identify a potential source of harm and try to do something about it, rather than systematically evaluating the likely magnitude of harm caused by a successful terrorist attack, the risk of that attack occurring, and the amount of risk reduction that can be expected from counterterrorism efforts. Without considering such factors, it is impossible to evaluate whether security measures reduce risk sufficiently to justify their costs, or whether the existing risk is already at an acceptably low level.

In this article we lay out a simple, back-of-the-envelope approach for evaluating the costs and benefits of counterterrorism spending that uses only four variables: the consequences of a successful attack; the likelihood of a successful attack; the degree to which the security measure reduces risk; and the cost of the security measure.

To illustrate this approach, we apply it to the Federal Bureau of Investigation (FBI) to assess if its counterterrorism effort reduces the terrorism risk enough to justify its cost.

A conventional approach to cost-effectiveness compares the costs of a security measure with its benefits as tallied in lives saved and damages averted. The benefit of a security measure is a multiplicative composite of three considerations: the probability of a successful attack absent the security measure; the losses sustained in a successful attack (these two, combined, constitute the risk); and the

benefit of a security measure =

probability of a successful attack absent the security measure

×

losses sustained in the successful attack

×

reduction in risk furnished by the security measure

reduction in risk furnished by the security measure.[2]

This is consistent with the risk analysis framework adopted by DHS for many applications.[3] A number of steps are basic to a quantitative risk assessment, and this process is shown on the final page in this article in Figure 1.

There may be co-benefits that could be added to the benefit side of the ledger. Thus, the FBI, in the process of going after terrorists, may obtain valuable information about other crimes unrelated to terrorism, and this information may contribute to their disruption. While the FBI may not always be able to prevent attacks, its enhanced ability to apprehend terrorists quickly is a definite benefit. On the other hand, there may be opportunity costs. Increases in resources for counterterrorism may come at the expense of other FBI efforts, such as combating corruption and organized crime. We exclude co-benefits and opportunity costs from our cost-benefit calculations.

These considerations can be taken into account using a procedure known as "break-even analysis." In this, we seek to determine what the probability of a successful

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[1] National Research Council, *Review of the Department of Homeland Security's Approach to Risk Analysis* (2010), available at http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0CDMQFjAC&url=http%3A%2F%2Fwww.fema.gov%2Fpdf%2Fgovernment%2Fgrant%2F2011%2Ffy11_hsgp_risk.pdf&ei=Ab4RVIeHBI2lyASk_oDgDA&usg=AFQjCNGd-dVvh2-W3jVtzntt6wAZV_qlIA&sig2=zfzmD7BeSeKTBE7AdpDMnw&bvm=bv.74894050,d.aWw.

[2] Since there is no particular reason to expend funds to deal with terrorist attempts that are unsuccessful (that is, cause no damage), the equation deals with successful attacks—ones that actually do damage.

[3] Mark G Stewart & Robert E Melchers, *Probabilistic Risk Assessment of Engineering Systems* (Springer, 1997).

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terrorist attack would have to be for a security measure to begin to justify its cost. Thus, we set the cost of the security measure equal to its benefit (as defined in the equation above), leading to:

probability of a successful attack absent the security measure =

cost of the security measure
/
(losses sustained in the successful attack
×
reduction in risk furnished by the security measure)

Before September 11, 2001, the FBI assigned 1,351 agents to counterterrorism tasks—at a cost of roughly $600 million in 2014.[4] In the wake of 9/11, the FBI elevated counterterrorism to its highest priority. The growth in FBI counterterrorism expenditures (i.e., protecting the United States from terrorist attack) was considerable. Annual FBI counterterrorism efforts—separating them out from those devoted to counterintelligence—account for close to $3 billion (36 percent) of FBI expenditures in 2014.[5]

To evaluate how much the FBI reduces the risk of terrorism, we need to consider their effectiveness in deterring, disrupting, or protecting against a terrorist attack. Because no one knows with any certainty how many attacks there might have been without the FBI's efforts (terrorism is characteristically a rare event), it difficult to calibrate is the actual risk. However, whatever the magnitude of the risk of terrorism, the FBI probably has substantially reduced it.

Our analysis will supply a range of risk reduction estimates, but in our discussion we will assume considerable success for the FBI since it is the lead agency for investigating the crime of terrorism. We posit that by its efforts, and the quadrupling of its budget, the Bureau has succeeded in reducing risk—the consequences and/or the probability of an otherwise successful attack—by a full 90 percent. This estimate, while not unreasonable, is likely to err on the generous side.

Table 1 shows an array of break-even points: the number of successful attacks in the absence of FBI's counterterrorism measures that would need to occur each year to justify a counterterrorism budget of $3 billion per year. We display results for attacks at various levels of destruction and for various degrees of risk reduction. Central to our discussion will be the entries that are boxed in Table 1 if we assume the Bureau's efforts reduce risk—the consequences and/or the likelihood of such an attack—by an impressive 90 percent. Under that condition, there would have to have been six or seven Boston Marathon attacks (or the equivalent of such attacks) each year—one every two months—to begin to justify the FBI's $3 billion budget. Alternatively, the FBI's efforts would need to reduce the effect of one or two London-type bombings by 90 percent every two years. Or again alternatively, the FBI budget would justify itself by reducing by 90 percent a huge attack with direct and indirect damage equivalent to that inflicted by 9/11 once every 60 years.

Table 1, on the final page of this article, also shows the net benefit, or the benefit minus the cost. A high estimate of loss for 99 percent of successful attacks would be $100 million: the cost inflicted in the 2009 Fort Hood shooting in which 13 people lost their lives. The table indicates that, even if the likelihood of such an attack were 100 percent per year, the money spent to prevent or protect against the attack would not be worth the cost. If we posit that a 2005 London-type attack would occur once per year and is not deterred, foiled, disrupted, or prevented by other security measures (such as DHS, secret service, state or local

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[4] U.S. Dep't of Justice, Federal Bureau of Investigation, *Report to the National Commission on Terrorist Attacks upon the United States: The FBI's Counterterrorism Program Since September 2001* (2004), available at http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CB4QFjAA&url=http%3A%2F%2Fwww.fbi.gov%2Fstats-services%2Fpublications%2Ffbi_ct_911com_0404.pdf&ei=D78RVOyKKsShyASDhYLAAg&usg=AFQjCNFX6iJRjcO9Rd-Z5J-H4DJjiqs7EQ&sig2=Euvj_hC_SrRsjbS-kzb1hQ&bvm=bv.74894050,d.aWw.

[5] U.S. Dep't of Justice, Federal Bureau of Investigation, *FY 2015 Authorization and Budget Request to Congress (2014)*, available at http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCUQFjAB&url=http%3A%2F%2Fwww.justice.gov%2Fjmd%2F2015justification%2Fpdf%2Ffbi-justification.pdf&ei=YL8RVOnxOMuhyAT_5YLYBA&usg=AFQjCNH0h-VDO4nB34oL4ZpxFntdVG-GeQ&sig2=vhumjWNKyGIMVIH6WyhtKA&bvm=bv.74894050,d.aWw.

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police, and protective measures), a conservative threat likelihood by any measure, the net benefit of FBI counterterrorism expenditures is $1.5 billion for a 90 percent risk reduction. However, a more plausible threat on the scale of the Times Square or Boston Marathon bombings results in a net loss of over $2 billion per year—meaning that spending $1 buys less than 30 cents of benefits.

The assumption about risk reduction in all this is quite significant: if the FBI's counterterrorism efforts only reduce the total risk of losses in a terrorist attack by 50 percent rather than 90 percent, Table 1 shows that the number of terrorist events that would need to occur nearly doubles.

Even if we assume the Bureau reduces risk by a full 100 percent, it would have to deter, prevent, disrupt, or protect against six half-billion dollar attacks per year, or more than one London-style attack every two years, to begin to justify its counterterrorism budget.[6] The question then becomes: is it likely to have done so?

Some 55 terrorism cases have come to light since September 11, 2001 that involve Islamist terrorists who were apparently planning to commit, or actually did commit, violence within the United States.[7] However, even in the highly unlikely event that each of the 55 plots, absent the FBI's efforts, resulted in a terrorist act inflicting half a billion dollars in damage, there would only be a total of about four per year, fewer than the six or seven per year required to deem the FBI's efforts cost-effective (applying the half-billion dollar loss benchmark). However, a full consideration would add in at least some of the plots that may have been disrupted by the FBI at a lower level—before reaching the point where they could be brought to court on specific terrorism charges. In addition, the efforts of the FBI together with other security measures may have deterred plots by putting some targets—the airlines and military bases, for example—out of sight for many terrorists. However, there still remain a huge number of lucrative targets available, and it is not clear why a motivated terrorist would be deterred from attacking them just because other targets have become difficult.

The risk-analytic approach applied is designed to represent the issue in a clear, understandable, and systematic manner. It supplies decision-makers with a coherent perspective on the relevant parameters and how they interact, but it does not of itself make the decision.

We recognize that perceptions of risk and risk averseness are commonly cited as reasons to overinvest in homeland security measures. Ultimately, however, we follow guidance from the U.S. Office of Management and Budget that strongly recommend risk-neutral attitudes in decision-making. This entails using mean or average estimates for risk and cost-benefit calculations, and not worst-case or pessimistic estimates.

In the end, whatever is decided about the cost-effectiveness of the FBI's counterterrorism efforts, they are certainly far closer to being so than many other security measures. The yearly cost for the Transportation Security Administration's Federal Air Marshal Service is about $1.2 billion, as is the cost of its AIT/body scanner technology when fully deployed. Together, these aviation

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[6] (cost of the security measure) / (losses sustained in the successful attack).
[7] John Mueller, ed., *Terrorism Since 9/11: The American Cases* (2014), available at http://politicalscience.osu.edu/faculty/jmueller/since.html.
[8] John Mueller & Mark G. Stewart, *Terror, Security, and Money: Balancing the Risks, Benefits, and Costs of Homeland Security* (Oxford University Press, New York, 2011); Mark G. Stewart & John Mueller, *Cost-Benefit Analysis of Advanced Imaging Technology Full Body Scanners for Airline Passenger Security Screening*, 8(1) JOURNAL OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT (2011), available at http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCAQFjAA&url=http%3A%2F%2Fpolisci.osu.edu%2Ffaculty%2Fjmueller%2Fait2.pdf&ei=JcARVLbeNI_-yQSq6oL4BQ&usg=AFQjCNHQHtNDEGhH8keBkf0Y3Hwxk7cjQA&sig2=GvdDRP96rTbkgylGVuMEfA&bvm=bv.74894050,d.aWw; Mark G. Stewart & John Mueller, *Terrorism Risks and Cost-Benefit Analysis of Aviation Security*, 33(5) RISK ANALYSIS, at 893 (2013), available at http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCAQFjAA&url=http%3A%2F%2Fpoliticalscience.osu.edu%2Ffaculty%2Fjmueller%2FFAMSraFIN.pdf&ei=nMARVLXHFtSzyAS5-oCoCA&usg=AFQjCNFXdBNx42dzBn_ZcOMTnNEMjhN23Q&sig2=68zjuf8V1W1tay2UcRJ5pw&bvm=bv.74894050,d.aWw; Mark G. Stewart & John Mueller, *Aviation Security, Risk Assessment, and Risk Aversion for Public Decisionmaking*, 32(3) JOURNAL OF POLICY ANALYSIS AND MANAGEMENT, at 615 (2013), available at http://onlinelibrary.wiley.com/doi/10.1002/pam.21704/pdf.

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security measures are nearly as costly as the FBI's counterterrorism efforts, but their risk reduction is negligible.[8] Moreover, they only deal with specific threats associated with hijacking and body-borne bombs on aircraft. If this is the comparison, enhanced FBI expenditures would seem a preferable option: they deal with all terrorism threats, almost certainly do reduce the terrorism threat, and can be rapidly deployed or re-deployed as threats emerge or evolve. ❖

For additional and wider-ranging assessments of the issues raised and the approaches used, please contact the authors.

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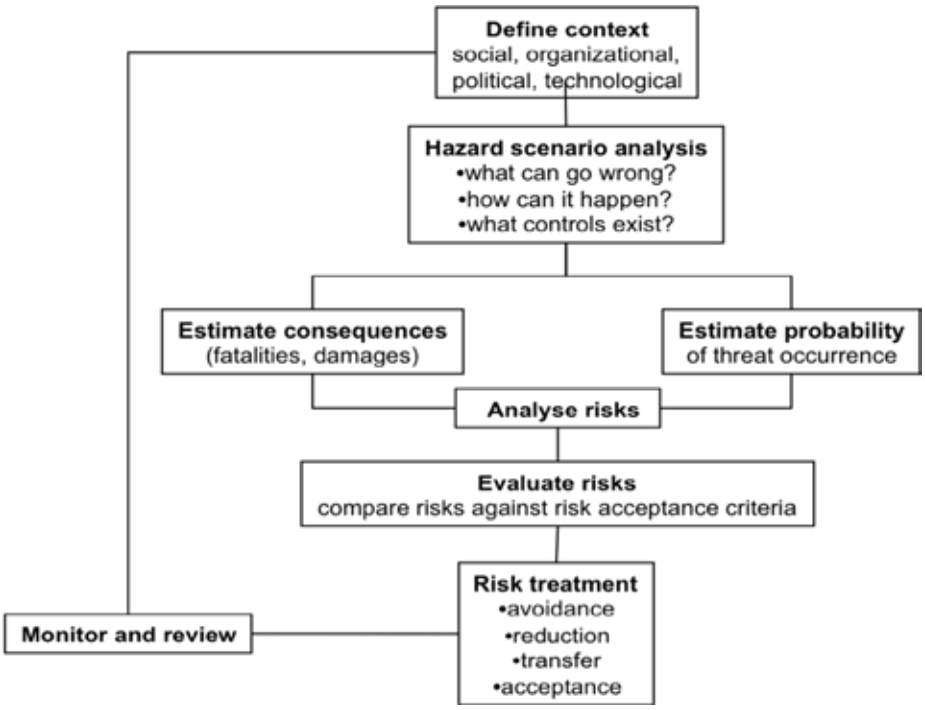

Figure 1

Table 1
The annual number of otherwise successful attacks in the absence of the FBI's counterterrorism efforts needed to begin to justify its annual expenditure of $3 billion for attacks of various magnitudes and at various degrees of risk reduction

Risk reduction by FBI	Losses from a Successful Terrorist Attack						
	$100 million *Ft. Hood shooting*	$500 million *Boston bombing*	$1 billion *Times-Sq bombing*	$5 billion *London bombing*	$200 billion *9/11*	$1 trillion *nuclear port*	$5 trillion *nuclear Grand Central*
5 percent	600	120	60	12	0.3	0.06	0.012
10 percent	300	60	30	6	0.2	0.03	0.006
25 percent	120	24	12	2.4	0.06	0.012	0.002
50 percent	60	12	6	1.2	0.03	0.006	0.001
75 percent	40	8	4	0.8	0.02	0.004	0.0008
90 percent	33	6.7	3.3	0.7	0.02	0.003	0.0007
100 percent	30	6	3	0.6	0.015	0.003	0.0006

Net Benefit
Net Benefit in billions of dollars for FBI counterterrorism expenditures of $3 billion assuming one attack per year in the absence of FBI counterterrorism efforts and 90 percent risk reduction

-2.9	-2.6	-2.1	1.5	177	897	4,497

Each entry represents the benefit-minus-cost result for each loss. Entries that are positive would be considered to be cost-effective.

Table 1

The Center for Infrastructure Protection and Homeland Security (CIP/HS) works in conjunction with James Madison University and seeks to fully integrate the disciplines of law, policy, and technology for enhancing the security of cyber-networks, physical systems, and economic processes supporting the Nation's critical infrastructure. The Center is funded by a grant from the National Institute of Standards and Technology (NIST).

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