This paper addresses the question of whether in-house or contracted maintenance of campus safety in U.S. colleges will be justified on efficiency grounds in the future. According to our analysis, the answer will crucially depend on whether emergency exceptions to amendments such as the Buckley Amendment (FERPA) will be more frequently applied by schools and tested in the courts. If the latter will be the case, we presume the resulting court rulings to be defining an implementable minimum quality standard. It is argued that the Virginia suicide-legislation that was passed before the Virginia Tech shooting could offset such a potential minimum standard. With or without a minimum standard, our model can make a point for in-house maintenance of campus safety. However, the two scenarios bear completely different policy implications.

1. INTRODUCTION

Shooting rampages on college campuses in the United States are a contemporary problem. Seven out of eight killings have taken place in the last two decades (Table 1). In most of the cases (six out of eight) these on-campus shooting rampages have ended with suicide of the shooter. Obviously, the sample is too small to draw any inference on determinants such as regional patterns, type of school (private or public), or size and endowment of university.

Given this lack of data, the challenge is to narrow the problem with regard to preventing such disasters in the future. Barrios et al. (2000) report that by the beginning of the century the leading causes of death among the U.S. college-aged population is now injury, homicide, and suicide. In 2002 a conference on lethal school violence organized by the National Academy of Science (NAS) was held at Harvard University. Its centerpiece was the report
“Deadly Lessons: Understanding Lethal School Violence,” a qualitative and quantitative study of incidents of lethal school shootings released by NAS in spring 2002. The report, commissioned by the U.S. Congress, studied six incidences of lethal school violence that occurred in the 1990s. Although concerned with secondary schools, the outcome seems also relevant from a postsecondary perspective: While the conference offered no quick fixes or easy answers, it was found that the usual spotlight-grabbing culprits, such as family instability of shooters and violent media images, played but a minor role in the analyzed shooting rampages. Common to all massacres was the fact that the shooters exhibited warning signs that, for the most part, were ignored by school faculty and staff. This leads us to draw two conclusions. First, there is room for quality innovations in the context of on-campus disaster prevention, which are verifiable as demonstrated in the NAS report. Secondly, at the heart of the problem lies the complex task of finding the needle (the potential rampage shooter) in the haystack (the group of students with suicidal tendencies).

In early 2007, preceding a notorious April 16 shooting rampage at Virginia Polytechnic Institute (alias Virginia Tech or VT), the state of Virginia became the first state to pass legislation that bars colleges and universities from punishing or expelling students “solely for attempting to commit suicide, or seeking mental-health treatment for suicidal thoughts or behaviors” (Smith and Fleming, 2007). School administrations that are required to disclose disturbing, depressed, or menacing behavior on the part of students – who may pose a risk of danger to self or others – face the decision of whether to provide security in-house or to farm it out. This raises the question in which way recent legislation affects optimal crime management. With regard to the latter, U.S. colleges basically have two alternatives: Either install an in-house monitoring and screening process, for example, by the staff of a forensic psychology department, or contract the maintenance of dangerousness assessment. The industry of catastrophic violence prevention is on the rise in recent years. Companies like BCS Behavioral Consulting Services International or IRI International Risk Intelligence offer the possibility of farming out services such as profiling, threat assessment, and crime consultation (UNC, 2007:Subcommittee I, Appendix 1). Among their customers are both private and public schools.

We analyze this problem by introducing a minimum standard of disclosure into the theoretical framework suggested by Hart, Shleifer, and Vishny (1997). Considering such a minimum standard requirement in the provision of services under incomplete contracts (Hart et al., 1997) has a significant impact
on the conditions that determine the efficiency of in-house as opposed to contracted maintenance of campus safety. We do not choose a more general “make or buy” framework like the ones proposed by Grossman and Hart (1986), whose central argument is spelled out in Aghion and Holden (2011:183-185) and Hart and Moore (1990), but rather rely on the Hart et al. framework as it covers the case of a hold-up between the college (principal) and the in-house or external provider (agent) of the security service which we consider particularly relevant in the context of campus safety. Due to on-the-job skills acquired by the agent, even in case of in-house provision, the principal is able to appropriate only a part of the rent from quality improving and/or cost reducing innovations. As the majority of universities in the United States are private institutions (in 2007 the share was 61.3%, including both 2- and 4-year institutions (U.S. Census Bureau, 2011:Table 274)), we focus on the make-or-buy decision aspect of the Hart et al. model rather than on the private vs. government ownership aspect (Schmidt, 1996; Aghion and Holden, 2011) and (re-)formulate the model accordingly.

We find that, in contrast to the results of Hart et al. (1997), farming out strictly dominates in-house provision when quality innovations in de-escalation measures and the prevention of campus shootings are rather limited. A case can be made for in-house provision, however, if there is a significant potential for quality improvement. The intuition behind this result is straightforward. A minimum standard requirement constrains the opportunities of an external contractor to reduce costs. At the same time, the constraining impact of the minimum standard requirement can be weakened by improving quality. Hence, if the potential for quality improvement is rather small and an independent subcontractor wants to reduce costs, she needs to invest intensively to learn about possible quality improvements. It turns out that an external provider may even implement socially efficient innovations when the potential for quality improvement is rather small. On the contrary, if there is large scope for quality improvement in maintaining campus safety, an independent subcontractor only has to invest minimally in quality innovations in order to open up numerous opportunities to reduce costs. In this case, outsourcing may be inferior to in-house provision.

Whether in-house provision of campus safety will be justified on efficiency grounds in the future is a question of the maintenance of a minimum standard requirement for screening and reporting menacing behavior and odd mannerisms by students and its effective enforcement. While there is a statutory duty for timely warnings and for a daily crime log (U.S. Dept. of Education, 2005), the latter is not warranted. As potential rampage shooters

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are a subset of students with suicidal tendencies, but not the other way around, the respective pieces of legislation interfere with each other. Therefore, the question of in-house versus contracted security will ultimately depend on the approval or challenge of emergency exceptions and of legislation defining exceptions from these exemptions.² Both are largely untested in the courts so far.

Table 1. On-Campus Shooting Rampages in the United States

<table>
<thead>
<tr>
<th>Year</th>
<th>University (no. people killed; fate of shooter)</th>
<th>School Type</th>
<th>Endowment [mn $US]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966</td>
<td>University of Texas, Austin (15; killed by police)</td>
<td>public</td>
<td>5,540.0</td>
</tr>
<tr>
<td>1991</td>
<td>University of Iowa (6; suicide)</td>
<td>public</td>
<td>830.0</td>
</tr>
<tr>
<td>2000</td>
<td>University of Arkansas (2; suicide)</td>
<td>public</td>
<td>763.0</td>
</tr>
<tr>
<td>2002</td>
<td>University of Arizona Nursing School (4; suicide)</td>
<td>public</td>
<td>466.7</td>
</tr>
<tr>
<td>2007</td>
<td>Virginia Polytechnic Institute (33; suicide)</td>
<td>public</td>
<td>447.4</td>
</tr>
<tr>
<td>1996</td>
<td>San Diego State (3; suicide)</td>
<td>public</td>
<td>99.6</td>
</tr>
<tr>
<td>2008</td>
<td>Northern Illinois University (6; suicide)</td>
<td>public</td>
<td>34.0</td>
</tr>
<tr>
<td>2002</td>
<td>Virginia Appalachian School of Law (3; 3xlife sentence)</td>
<td>private</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

2. MINIMUM QUALITY STANDARD OF DISCLOSURE

Whether emergency exceptions to amendments like the Buckley Amendment³ will be more frequently applied by schools and tested in the courts is an open question. Basically, there are two scenarios conceivable in the future. These emergency exemptions either will establish a minimum “quality” standard of disclosing odd behavior by students who may pose a risk of danger to self and others, or they will not impose a standard. Indications for the latter can be seen in the Virginia suicide-legislation that was passed before the April 2007 shooting. An affirming ruling clearly would offset such potential minimum standards of disclosure.

2.1. ESTABLISHMENT OF AN ENFORCEABLE MINIMUM STANDARD

In the following, we introduce a minimum standard requirement into the Hart et al. (1997) framework.⁴ As outlined in the preceding section, we assume that this requirement will be verifiable and, given the event of an
affirming ruling, enforceable by court. Contractual incompleteness thus refers to the effort the producer of the service “campus safety” spends to develop quality and cost innovations after the initial contract has been written, but not to the level of quality that the producer is required to provide. Examples of a standard requirement considering quality as a global “score” and that an outsider such as a court of law is able to assess and to verify ex post can be found, particularly, in the emergency measures dimension of campus safety. For example, Cleveland State University in Ohio outlines such “metrics and benchmarks” in its 2009 annual report on campus safety. One such metric that is verifiable ex post is the percentage share of the equipment down-time of video cameras used as part of an on-campus video security system. A minimum requirement might, for example, state that shortfalls in 24/7 video camera recording should fall below 0.1% for susceptible on-campus housing areas or dormitories. How this standard is met is left to the provider. In case of a shooting, the share can be verified ex post by a court. A similar score is the percentage share of subscribers of an alert or emergency communications system that are contacted and can be reached within the first five minutes of an alert broadcast. Court rulings might define a minimum requirement of 50%. Habitually, however, this quality aspect of the campus safety service is tested—if at all—in campus-wide tests only once a year (CSU, 2009:10). Again, the service can be provided in-house or farmed out. Adhering to the standard can be measured and verified ex post. Similarly, the percentage share of false alarms can be dealt with. A final example is on-campus blood storage (as stored blood, obviously, can be a crucial necessity for saving lives in case of a shooting rampage). An in-house or external provider is free to choose a mode of production; however, a certain minimum quality has to be met which can be verified ex post by a third party.

We will show that considering such a minimum standard requirement in the Hart et al. (1997) model has a significant impact on the conditions that determine the efficiency of in-house versus contracted maintenance of campus safety and the prevention of on-campus killings. In contrast to the results of Hart et al., farming out will strictly dominate in-house provision when quality innovations are unimportant. A case can be made for in-house provision, however, if there is a significant potential for quality improvement.

Let the president of an institution or university $U$ (irrespective of being a private or public campus) decide on whether to provide the service of maintaining campus safety either in-house or by contracting it out. Note, we consider a representative or average campus that has the option and the resources to field its own security staff. If in-house provision is chosen, the
school is the owner of the facility $F$ (for example, some part of the forensics department) used to prevent shooting rampages, for example, by improving the quality of the personnel through training at facility $F$, whereas $F$ is owned by the independent subcontractor if provision is contracted out. In other words, it is not only the service itself, but also the infrastructure that is contracted. Therefore, we do not deal with a temporary and limited transfer of decision rights as modeled in the framework of partial contracting and transferable control (Aghion et al., 2002, 2004). This is not a far-fetched scenario as security service companies such as Blackwater Worldwide (formerly Blackwater USA) providing private sector solutions to the U.S. government and other clients usually also provide a (training) facility to support the needs of their clients. $F$ possibly includes classrooms, but it may as well include a shooting range. Here, we assume that facility $F$ is used by a single chief executive officer or manager $M$ who is a college employee when production is in-house and identical to the external provider otherwise.\textsuperscript{6} Initially, $U$ and $M$ write a long-term contract specifying a minimum standard that the service provided has to meet and a price that $U$ pays $M$ for providing the service.\textsuperscript{7} It is assumed that a service which does not meet the minimum standard involves a serious social damage. The minimum standard is verifiable and can be enforced by court. Examples include video security systems, emergency communications, and alert broadcasts. Corresponding quality metrics are percentage shares of equipment down-time of cameras, false alarms, and subscribers reachable by an alert broadcast.

It guarantees society a benefit of at least $B_0$ and implies costs of $C_0$. It should be noted that we assume $B_0$ to really represent a standard requirement or, in other words, that it does not only allow to define what actually is contractible. The latter generalization would require addressing the question of whether or not the authority has any interest in defining such a standard. This in turn would require the consideration of costs of application and monitoring, as well as a thorough modeling of ex-ante and ex-post contracting costs (Tirole, 2009; Bolton and Fraure-Grimaud, 2009), sketched in Aghion and Holden (2011:194-195), which is beyond the scope of the present paper. The price $P_0$ that $U$ pays for the service can be interpreted as a wage that $M$ receives as a university employee in the case of in-house production or as the compensation that $M$ receives as an external contractor in the case of outsourcing. After having written the contract, $M$ may find ways to reduce the costs of disaster prevention and to improve the quality of maintaining campus safety. However, although the effort made by $M$ to develop quality and cost innovations is observable, it is not verifiable and, therefore, cannot

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be part of an enforceable initial contract. Consequently, the initial contract is incomplete with respect to quality and cost innovations. As an example, consider $M$ installing a new metal detector device to replace a full-body scanner at the entrance of a lecture hall. A full-body scanner is more efficient in terms of also scanning, for example, for weapons that are made of ceramics. However, it is both the more expensive and also the less used (as more modern) technology. The latter may make it in the short run more difficult to operate and less reliable. The effort measured by saved costs and the percentage share of false alarms is not verifiable ex ante. Implementing a quality innovation leads to higher quality of the service, whereas implementing a cost innovation reduces costs but, at the same time, deteriorates quality. More precisely, efforts can be made with regard to quality innovations $i$ and/or with regard to cost innovations $e$. The societal benefit and the costs of the prevention of on-campus rampage shootings may be written as

$$
B = B_0 - b(e) + \tau \beta(i), \\
C = C_0 - c(e),
$$

(1) (2)

when both innovations are implemented. The cost innovation leads to a cost reduction of $c(e)$ units but, due to its deleterious effects on quality, reduces the benefit of the service to society by $b(e)$ units. The quality innovation, on the other hand, augments the benefit to society by $\tau \beta(i)$ units, where parameter $\tau$ measures the potential of quality innovations. If $\tau$ is large, quality innovations are important. They are negligible if $\tau$ is small. Function $b$ is assumed to be monotonic and weakly convex: $b(0) = 0$, $b' \geq 0$, $b'' \geq 0$. Functions $c$ and $\beta$ are assumed to be monotonic, concave, and satisfying the standard Inada conditions: $c(0) = 0$, $c'(0) = \infty$, $c' > 0$, $c'' < 0$, $c'(\infty) = 0$, $\beta(0) = 0$, $\beta'(0) = \infty$, $\beta' > 0$, $\beta'' < 0$, $\beta'(\infty) = 0$. A priori, we plausibly allow for socially inefficient investment, that is, a priori cost reducing innovations need not always be socially efficient: $c'(e) - b'(e) \geq 0$.

The payoffs of $U$ and $M$ depend on whether prevention, de-escalation and emergency measures are organized in-house or by an independent subcontractor, and on whether $U$ and $M$ renegotiate the contract after $M$ has developed innovations to improve quality and to reduce costs. Quality trade-offs in this context can arise, for example, from the experience, information quality, and realized economies of scale of an external provider. While the in-house forensic department might be more up-to-date in terms of timely de-escalation and emergency measures, the subcontractor may not

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implement the latest technologies (due to cost reduction), but can possibly realize offsetting gains. The latter can arise from economies of scale and experience if the provider has several campuses as customers. The external provision of campus safety can be certified by an independent agency and more transparently documented, for example, on a comprehensive professional webpage. The signal value of such innovations may offset the loss in quality from not implementing the latest technologies.

Consider first the case of outsourced preventive and emergency case action. An external contractor can implement cost and quality innovations without the approval of $U$. $M$ only needs to perform the minimum standard requirement. However, $M$ will renegotiate the contract with $U$ if the intention is to provide a higher quality than specified in the initial contract. This is because the school is the buyer of the service and only pays for a higher quality of campus safety if a new contract is written. In contrast, if no renegotiation takes place, an external contractor only implements the quality innovations that are necessary to meet the minimum standard requirement when reducing costs. Thus, if $F$ is owned by an external subcontractor and no renegotiation takes place, $M$ provides measures according to the minimum standard quality as specified in the initial contract. In this case, the payoffs of $U$ and $M$ are

$$V^O_s = B_o - P_\ast,$$

$$W^O_s = P_o - C_o + c(e) - e - i,$$

where superscript $O$ and subscript $N$ denote outsourced service and no renegotiation, respectively. Notice, in $(4)$ $e$ and $i$ must satisfy $\tau \beta(i) = b(e)$. In case of renegotiation, the parties bargain for the benefits exceeding the ones resulting from campus safety measures and the disclosure policies of minimum standard quality. Following Hart et al. (1997), we assume that the parties split the gains in equal shares. Thus, the payoffs of the two parties under outsourced provision of rampage prevention and emergency measures can be written as

$$V^R_s = B_o - P_\ast + \frac{1}{2} [\tau \beta(i) - b(e)],$$

$$W^R_s = P_o - C_o + c(e) - e - i + \frac{1}{2} [\tau \beta(i) - b(e)],$$

where subscript $R$ denotes renegotiation.

Consider next the payoffs in case of $U$ owning $F$. In this case, any
innovation requires the approval of $U$. Generally, an innovation developed by $M$ can either be implemented with the participation of $M$, or $M$ can be replaced by a different college employee who then implements the innovation. However, assuming that some fraction $\lambda$ of the benefit resulting from the innovation requires the participation of $M$, $U$ can only appropriate the fraction $1 - \lambda$ of the net social gain from innovation, given by $\tau \beta(i) + c(e) - b(e)$, when replacing $M$. Thus, if no renegotiation takes place and the innovation developed by $M$ is consistent with the minimum standard requirement, payoffs in the case of in-house production are

$$V_s = B_o - P_o + (1 - \lambda) [\tau \beta(i) + c(e) - b(e)],$$ (7)

$$W_s = P_o - C_o + c(e) - e - i,$$ (8)

where superscript $I$ denotes in-house provision. By renegotiating the contract, $U$ and $M$ bargain for the fraction $\lambda$ of an innovation's net social gain which $U$ cannot realize without the participation of $M$. Under the assumption of an equal sharing of gains, in-house production payoffs after renegotiation amount to

$$V'_s = B_o - P_o + \left(1 - \frac{\lambda}{2}\right) [\tau \beta(i) + c(e) - b(e)],$$ (9)

$$W'_s = P_o - C_o - e - i + \frac{\lambda}{2} [\tau \beta(i) + c(e) - b(e)].$$ (10)

In what follows, attention will only be paid to allocations where the parties renegotiate the contract, since each of them can at least realize its disagreement payoff in case of renegotiation.

2.1.1. Maintenance Structure: First Best
Consider as a benchmark the first-best allocation. It is obtained for $e$ and $i$ taking on values that maximize the total social surplus of innovations defined as

$$S = \tau \beta(i) + c(e) - b(e) - e - i,$$ (11)

subject to the minimum standard requirement. Notably, the damage to society in case of a rampage shooting is so serious that preventive and emergency measures are only of use for society if the minimum standard is met. In this case, the first best solves
\[
\max_{e,i} S = \tau \beta(i) + c(e) - b(e) - e - i, \text{ s.t. } \tau \beta(i) - b(e) \geq 0, \quad (12)
\]

where the minimum standard has been normalized to zero.

Given the assumptions on \(b, c, \text{ and } \beta\), the first-best solution \(\{e^*, i^*\}\) is unique and implicitly defined by

\[
c'(e^*) - (1 + \mu) b'(e^*) - 1 = 0, \\
(1 + \mu) \tau \beta'(i^*) - 1 = 0,
\]

where the Lagrangian multiplier \(\mu\) can be interpreted as the shadow price of maintaining the minimum standard. It is positive if the minimum standard requirement binds and zero otherwise. At the first best, marginal cost reduction equals the marginal social costs of cost reduction. The latter is determined by the marginal effort to reduce costs (equal to one) plus the direct effect of marginal quality deterioration on the benefit of the service caused by cost reduction – given by \(b'(e^*)\) – plus the indirect effect of marginal quality deterioration through a strengthening of the minimum standard constraint – given by \(\mu b'(e^*)\). Similarly, the marginal social benefit resulting from efforts to improve quality, which consists of the direct marginal quality improvement \(\tau \beta'(i^*)\) and the indirect effect of marginal quality improvement through a looser minimum standard constraint, i.e., \(\mu \tau \beta'(i^*)\), equals the marginal cost of extra effort. Again, it equals one.

2.1.2. Equilibrium for Outsourced Maintenance

In the case of \(F\) being owned by the external provider, \(M\) solves

\[
\max_{e,i} S_o = c(e) - e - i + \frac{1}{2} [\tau \beta(i) - b(e)], \text{ s.t. } \tau \beta(i) - b(e) \geq 0, \quad (13)
\]

The first part of \(S^o\) is the reduction of costs that directly benefits \(M\). The part in squared brackets denotes the renegotiation gains. Given the Lagrangian function \(L = S^o + v[\tau \beta(i) - b(e)]\), the solution of the above maximization problem is implicitly defined by the following first-order conditions

\[
c'(e^o) - \left(\frac{1}{2} + v\right) b'(e^o) - 1 = 0, \\
\left(\frac{1}{2} + v\right) \tau \beta'(i^o) - 1 = 0.
\]
The Lagrangian multiplier $v$ is positive if the minimum standard constraint binds and zero otherwise. Analogously to the first best, we can interpret the latter equations in the following: $\frac{1}{2} + v$ can be interpreted as the marginal return that $M$ receives for providing extra-quality (exceeding the minimum standard) to society. Manager $M$ receives half of the benefits of extra-quality as an additional payment through bargaining. In addition, the independent subcontractor receives an implicit marginal return of $v$ by weakening the minimum standard constraint, since this offers her the possibility to reduce costs. If we compare these two equations with the first-best solution, we find that the external provider undervalues the additional benefits that the society enjoys when the quality of the service exceeds the minimum standard because $M$ gets only half of these benefits. However, since the external provider also cares about how quality modifications affect the minimum standard constraint and, therefore, the scope for cost reduction, a further incentive to consider the positive effects of quality improvement and the detrimental effects of cost reduction is generated. The additional incentive in the form of the implicit marginal return $v$ that is given to an independent subcontractor as a result of the minimum standard constraint is most important for $M$’s decision on quality and cost innovations. In the presence of a minimum standard requirement, this additional incentive is related to the importance of quality innovations as measured by $\tau$.

**Proposition 1.**

(i) $v \rightarrow \infty$ if $\tau \rightarrow 0$,

(ii) Let $v > 0$; then $v$ strictly decreases in $\tau$.

(iii) There is some $\tau > 0$ such that $v > 0$ iff $\tau < \tilde{\tau}$.

**Proof:** See Appendix. $\square$

For an intuition of these results, first recall that $M$ needs to innovate with respect to quality in order to reduce costs without violating the minimum standard requirement. This argument requires that the gains from some innovations may offset the losses from other innovations as already expressed in eq. (1). As an example, consider an independent subcontractor replacing a 24/7 electronic monitoring system in the student dormitories with a warden who has different tasks, among others immediate intervention. Suppose that the warden is cheaper but of lower quality in terms of 24/7 monitoring of the dormitories. However, given that the warden is trained in
de-escalation and emergency issues, the hands-on aspect may actually lead to a result that innovation increases the overall quality of the service. In general, the smaller is $\tau$, the more effort is necessary to improve quality and, therefore, the more value $M$ ascribes to extra-quality in maintaining campus safety. If $\tau$ is large, on the other hand, $M$ can soften the minimum standard constraint without expending much effort for quality innovation and, consequently, does not ascribe particular value to extra-quality apart from the payment that is received for extra-quality from $U$.

The extent to which the social surplus of extra-quality is implicitly priced by the return that an external provider receives remains to be answered. From Proposition 1 it is obvious that it is not fully priced if quality innovations are important, i.e. if $\tau$ is large. In this case $v$ is zero and an external owner receives, on the margin, only half of the benefits of extra-quality, which undermines the incentive to innovate with respect to quality in disaster prevention. However, as the following proposition states, if the room for safety quality innovations is rather narrow, an external owner faces socially efficient incentives and implements first-best cost and quality innovations.

**Proposition 2:** There is some $\bar{\tau} \in (0, \tau)$ such that $e^o = e^*$, $i^o = i^*$ for all $\tau \in (0, \bar{\tau}]$ and $e^o > e^*$, $i^o < i^*$ for all $\tau > \bar{\tau}$.

**Proof:** See Appendix. □

If there is only minimal scope for quality improvement, an external contractor implements the first-best solution, although $M$ is predominantly interested in cost reduction and only innovates with respect to quality in order to maintain the minimum standard. Notice, all statements of Proposition 2 refer to equilibrium values, implying that $b(e)$ is adjusted and taken care of through $e^*$. The proof of Proposition 2 reveals that implementation of the first best by an external provider occurs if it is socially efficient to exploit quality innovations solely to accomplish the minimum standard requirement when reducing costs. This is precisely what an independent subcontractor is doing when $\tau$ is small. In contrast, when there is a large potential for quality improvement in rampage shooting prevention and emergency measures, it is socially desirable to provide more quality to society than specified in the initial contract. This, however, is not fully internalized by a contractor to whom maintenance of campus safety is farmed out.
2.1.3. Equilibrium for In-House Maintenance

Suppose that \( U \) owns \( F \) (e.g., as part of the forensics department). In this case, \( M \) solves

\[
\max_{e, i} S' = \frac{\lambda}{2} \left[ c(e) - b(e) + \tau \beta(i) \right] - e - i, \text{ s.t. } \tau \beta(i) - b(e) \geq 0. \tag{14}
\]

The solution \( \{e^*, i^*\} \) satisfies the following first-order conditions

\[
\frac{\lambda}{2} c'(e') - \left( \frac{\lambda}{2} + \xi \right) b'(e') - 1 = 0,
\]

\[
\left( \frac{\lambda}{2} + \xi \right) \tau \beta'(i') - 1 = 0,
\]

where \( \xi \) denotes a Lagrangian multiplier that is positive if the minimum standard constraint binds. It is zero otherwise. The implicit marginal return that \( M \) receives when providing extra-quality to society in this case is given by \( \frac{\lambda}{2} + \xi \). Comparing these first-order conditions with the ones of maximization problem (12) under first best, it can be seen that the incentives of a college employee are distorted for two reasons. First, since any modification of the campus safety service requires the approval of \( U \), manager \( M \) can only extract half of the gains from renegotiation. Secondly, the smaller the value of \( \lambda \), the smaller the fraction of the net social gain \( M \) can appropriate, and consequently the weaker the incentives to innovate. The following proposition relates the solution in the case of in-house provision of campus safety to the one of the first-best scenario.

**Proposition 3**: \( e^i < e^*; i^i < i^* \).

**Proof**: See Appendix. \( \square \)

As expected, the incentive structure in the case of in-house maintenance of campus safety fosters inefficiently low effort with respect to both quality of service and cost innovations.

2.1.4. Optimum Maintenance Structure: When to Outsource?

In this subsection we compare in-house with external provision of campus safety measures. The following proposition contrasts the innovation effort made by an independent subcontractor with the one by an in-house provider, both with respect to cost saving and quality improvement.
Proposition 4:

(i) \( e^o > e^i \).

(ii) \( i^o > i^i \) for all \( \tau \in (0, \tau) \) and \( i^o \geq i^i \) for all \( \tau \geq \tau \) with equality iff \( \lambda = 1 \).

Proof: See Appendix. \( \square \)

Obviously, an external contractor always shows more effort with regard to cost innovations than an in-house employee in the position of the chief security officer, since an external agent can fully appropriate the gains from cost reduction, whereas an in-house provider or college employee obtains at most half of the gains. Furthermore, if there is only a small potential for quality improvement, i.e., if \( \tau < \tau \), outsourcing implies an external contractor spending comparatively more time and effort to innovate with respect to quality. This is because for \( \tau < \tau \) the implicit return to extra-quality that an external provider realizes by weakening the minimum standard constraint is higher than the one of a college employee. The former is compensated with the full returns of cost innovations, whereas the latter obtains at most half of it. For \( \tau \geq \tau \), a college employee shows as much effort with regard to quality innovation as an external contractor if and only if the in-house provider is irreplaceable (\( \lambda = 1 \)). Only in this case both an in-house and an external provider obtain half of the benefits of extra-quality.

In order to assess whether in-house or outsourced maintenance of campus safety is socially preferable, we compare which of the two modes implies a higher social surplus of innovations \( S \) as defined by (11). In general, an external contractor makes more effort with regard to both cost and quality innovations than a college employee. The incentives of the latter are the weaker, the lower the value of \( \lambda \), i.e., the more readily a college employee can be replaced. If the college employee is fully replaceable (\( \lambda = 0 \)), there is no incentive for such an in-house provider to devote any effort to either innovation. In this case the total social surplus of innovations \( S \) equals zero. In contrast, an external contractor always generates a positive \( S \), which is, given the assumptions on functions \( b, c \) and \( \beta \), an immediate consequence of the requirement of a minimum quality of maintaining campus safety. Hence, the following proposition results.
**Proposition 5:** There is some \( \lambda \in (0, 1] \) such that for all \( \lambda \in (0, \lambda] \) the total social surplus of innovations \( S \) is lower under in-house provision than under outsourced provision of campus safety.

A case for in-house provision can not only be made when incentives to innovate of a college employee are rather weak, but also when there is only a small potential for quality innovations. An independent subcontractor implements the first-best solution through maximizing the net social surplus of innovations if quality innovations are unimportant \((\tau \leq \tau)\). In consideration of the fact that a college employee’s level of innovation is always inefficiently low, the following proposition holds (again by continuity)

**Proposition 6:** Whatever the degree of \( \lambda \), there is some \( \bar{\lambda} > \lambda \) such that for all \( \tau \in (0, \bar{\tau}) \) the total social surplus of innovations \( S \) is higher under outsourced provision than under in-house provision of campus safety.

However, although an external contractor generally faces stronger incentives with respect to both kinds of innovation than a college employee, outsourcing does not always dominate in-house provision. Since, in the case of preventing on-campus shootings and providing emergency service, cost reduction may have a seriously detrimental effect on the quality of the service, the strong incentive of an external provider to reduce costs may translate into a social disadvantage relative to in-house provision as the following proposition states.

**Proposition 7:** Let \( \lambda = 1 \) and assume function \( c \) to be iso-elastic and function \( b \) to be of the form \( b(e) = \theta e \), where \( \theta > 0 \) measures the strength of the detrimental effect of cost reduction on quality. If, in this case, \( \tau \) and \( \theta \) are sufficiently large, the total surplus of innovations is lower under outsourced provision than under in-house provision of campus safety.

**Proof:** See Appendix. \( \Box \)

Thus, in-house provision may in fact be more efficient than outsourcing when quality innovations are important and cost reductions have a substantial adverse effect on quality. In the case of a large potential for quality innovations, the minimum standard constraint becomes loose. As a consequence, it does not constrain excessive cost-cutting in a farming-out scenario. Given that cost-cutting has a sizable quality-reducing effect, it
renders suboptimal the outsourcing of campus safety to an external contractor.

In summary, if following the April 2007 Virginia Tech shooting, emergency exceptions to amendments like the Buckley Amendment will be more frequently applied by schools and tested in the courts, then this has important consequences for the question of whether in-house provision of such campus safety measures is preferable to outsourcing this service. In an accordingly modified Hart et al. model, the resulting minimum standard adds not just an additional constraint in the decision problem of the provider of the service, but also changes bargaining under outsourcing. Without a minimum standard, the college and the external provider of the service bargain over the full return on quality innovations. In contrast, with a minimum standard the parties only bargain over the returns that exceed the standard, which implies that the parties internalize the quality-reducing effect of cost-cutting. The main implications resultant from an enforceable minimum standard can be summarized in the following way. In general, if the opportunities for quality innovation are limited, an external contractor implements first best. If the opportunities are large, outsourcing results in an over-investment in cost reduction and an under-investment in quality improvement. Answers to the two central questions provided by the modified model are summarized below.

When is outsourcing superior to in-house provision?

- If the college employee can be readily replaced in the sense that there is no need for participating in the implementation of the developed innovations. In this case, in-house provision of campus safety leads to a lower social surplus than outsourcing the service.

- If the opportunities for quality innovation are limited, in-house maintenance of campus safety implies a lower social surplus than outsourcing.

When is in-house provision superior to outsourcing?

- If there is (ample) room for quality innovation, and the detrimental effect of cost reduction is large, in-house provision generates the higher social surplus.
Table A.1 in the Appendix makes the point, displaying the numerical outcome of a sample specification of the model. It can be seen that it is only in the lower right corner where in-house provision outperforms outsourcing in terms of efficiency ($S^0 < S^i$).

2.2. NO ESTABLISHMENT OF AN ENFORCEABLE MINIMUM STANDARD

Now we suppose that future court rulings will be in line with the Virginia suicide-legislation that was passed before April 16, 2007. Thus, no minimum “quality” standard of precautionary safety measures will be established. Adhering to the above set-up, the results are the classic ones derived in the seminal paper by Hart et al. (1997). In line with the modified model, costs are always lower for outsourcing, a college employee always invests too little in cost reduction, and an external contractor always invests comparatively more in cost reduction and at least as much in quality improvement of the service. However, the Hart et al. model’s answers to the two central questions raised above crucially differ from the ones of the modified model:

When is outsourcing superior to in-house provision in the Hart et al. model?

- If the deterioration of the quality of the service from cost reduction is small.
- If the opportunities for cost reduction, with damaging results for quality, are small and the college employees face weak incentives ($\lambda$ is small).

When is in-house provision superior to outsourcing?

- If the adverse effect of cost reduction on quality is large. Superiority of in-house provision also requires either limited opportunities for quality improvement or strong incentives for college employees in improving quality of the service ($\lambda \rightarrow 1$).

There remain two questions that need to be addressed in order to assess either scenario (2.1 and 2.2). First, in the context of on-campus shooting prevention, is it at all possible to define and observe minimum standards? Secondly, how to assess in practice whether or not there are limited opportunities for quality improvement of the service? Both issues are dealt with in the following section.
2.3. POLICY IMPLICATIONS AND DISCUSSION

Figure 1 summarizes our results for the two scenarios, that is, with and without the establishment of a minimum standard. Cost saving measures plausibly have a rather detrimental effect on quality. Hence, due to the dramatic downside potential of economization, we may concentrate on the respective lower half of the boxes in Figure 1. Obviously, the two scenarios then bear completely different policy implications for schools: With (Without) minimum standard in-house provision is preferable to outsourcing of campus safety if there is a large (small) scope for quality improvement: $I > O$. In the following, we will discuss the central aspects and implications from a practical perspective.

The first question to address is whether a verifiable and enforceable minimum standard of on-campus shooting prevention is at all possible to define. A basis for definable minimum requirements is set out in the Clery Act. As a part of the murder and non-negligent manslaughter crimes category, rampage shootings are covered by the clear-cut definitions of Clery Act Crimes (U.S. Dept. of Education, 2005:23-26), including the comprehensively defined regulatory requirements of the Act. They are mandatory irrespective of whether campus security is contracted out or provided as an in-house service. But is the minimum standard defined by these requirements also enforceable? The fact that the U.S. Department of Education can issue civil fines up to $27,500 per violation of the monitoring compliance suggests that there is actually a likelihood of enforcement with this standard. However, this minimum standard, though possibly verifiable and enforceable, is not warranted. As potential rampage shooters are a subset of students with suicidal tendencies, the respective pieces of legislation interfere with each other. On the one hand, there is an explicit emergency exemption of FERPA protection given in the Handbook for Campus Crime Reporting targeted toward anyone coordinating compliance with the Clery Act: “Although personally identifiable information is generally precluded from disclosure, FERPA recognizes that information can, in case of an emergency, be released without consent when needed to protect the health and safety of others” (see U.S. Dept. of Education, 2005:63). On the other hand, there is also recent state legislation on student-suicide that implicitly defines an exception to such exemption. In early 2007, Virginia became the first state to pass legislation that bars colleges and universities from punishing or expelling students “solely for attempting to commit suicide, or seeking mental-health treatment for suicidal thoughts or behaviors” (see Smith and Fleming, 2007).
Both the broadly tailored emergency exception to FERPA and its exemption through recent state law and litigation\textsuperscript{12} are largely untested in the courts so far. Thus, the question of farming out or providing campus safety in-house will ultimately depend on the approval or challenge of emergency exemptions and of legislation defining exemptions from these exemptions. If court rulings after April 16, 2007 are rather in favor of a pro-disclosure minimum standard, in-house provision of campus safety and disaster prevention is superior to contracting this service out ($I > O$) given a large scope for quality improvement. If legal practice develops towards favoring a less standardized handling (allowing various exemptions to requirements such as Clery Act compliance), the opposite results, that is, a small scope for quality improvement is required to justify in-house maintenance (i.e., $I < O$).

The second question to address is as to whether there are, at least on average, opportunities to improve the quality of on-campus disaster prevention. And, given that there are such opportunities, it is to clarify how to assess in practice whether these are limited or not.

As noted earlier, in 2002 a conference on lethal school violence organized by NAS was held at Harvard University. Its central conclusion was that the best shot at prevention of school shootings is to enhance screening. Similarly, in the aftermath of the VT tragedy, the state of North Carolina announced a task force to update and improve campus safety plans and measures.\textsuperscript{13} At the heart of the security concerns raised by the NC task force is the identification of potential shooters and better communication with students.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{Policy Implications by Legal Practice Projection}
\end{figure}

\begin{itemize}
  \item $\theta$ – strength of adverse effect on quality through cost reduction
  \item $\tau$ – potential for quality improvement
\end{itemize}
One of the central Clery Act disclosure requirements is the daily crime log (DCL): “Any institution that has a campus police department or security office, regardless of size, must create, maintain and make available a daily crime log;” for detail on the DCL see U.S. Department of Education (2005:67-71). We argue that some inference on whether an institution can improve along these dimensions can be drawn from Clery Daily Crime Log. The conscientiousness and accuracy that a campus police or security office devotes to the DCL can serve as a proxy for the limitation of opportunities to improve quality of the service. Thus, careful inspection of an institution’s DCL can help determine into which category of Figure 1 a campus falls: A rather sloppy DCL suggests a high value for $r$; an accurate DCL speaks in favor of a small $r$.

3. CONCLUSION

The aim of this paper has been to identify the efficient institutional provision of campus safety and disaster prevention for the two conceivable directions in which legal practice could develop after the recent on-campus shootings in 2007 and 2008. We find that either direction, that is, towards the establishment of a minimum standard of disclosure of suspicious students or towards its rejection, bears completely different policy implications. While a minimum standard requires a large scope for quality innovation to justify in-house provision on efficiency grounds, a scenario without a minimum standard requires a narrow scope to make in-house maintenance preferable to contracting out. In order to apply the derived policy implications depending on the development of legal practice, the daily crime log as one of the central Clery Act disclosure requirements may serve as a proxy for the limitation of opportunities to improve the quality of campus safety. It remains for future work to consider more sophisticated and realistic frameworks of contracted management such as the ones of Hart and Moore (2008) or Desriieux (2009). The former would allow the parties to agree on some, i.e., perfunctory but not consummate, aspects of the quality of campus safety, the latter for organizational structures in maintenance of campus safety, with decision rights shared between university and (sub-)contractor.
APPENDIX

Table A.1. Numerical Outcome of Sample Specification

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<th>ε*</th>
<th>i*</th>
<th>δ*</th>
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<th>i0</th>
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<th>i'</th>
<th>δ'</th>
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<td>0.711</td>
<td>0.348</td>
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<td>0.711</td>
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<td>0.778</td>
<td>0.444</td>
<td>0.111</td>
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<td>0.063</td>
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<td>0.987</td>
<td>0.640</td>
<td>0.080</td>
<td>0.880</td>
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<tr>
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<td>0.082</td>
<td>0.141</td>
<td>0.789</td>
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</table>

Note: * and ** denote $\bar{r}$ and $\tau$, respectively.

Proof of Proposition 1

Proof of (i): In contrast to the claim made in (i), suppose that there is, for all $\tau > 0$, some $\nu \in \mathbb{R}$, such that $\nu \leq \nu$. It follows that
(a) there is some $\epsilon^* > 0$ such that $\epsilon^0 \geq \epsilon$ for all $\tau$;
(b) $i^0 \rightarrow 0$ if $\tau \rightarrow 0$.

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Proof of (a): From the first first-order condition (FOC) of (13) and \( v \leq \nu \), it follows that
\[
c'(e^o) - \left( \frac{1}{2} + \nu \right)b'(e^o) \leq 1
\]
for all \( \tau \).
From our assumptions for functions \( b \) and \( c \), it follows that the left hand side of (A.1) monotonically decreases in \( e^o \) and approaches infinity if \( e^o \) approaches zero. Thus, (A.1) implies that \( e^o \) is bounded from below by some \( e > 0 \). This proves (a).

Proof of (b): From the second FOC of (13) and \( v \leq \nu \) it follows that
\[
\beta'(i^o) \geq \frac{2}{(1 + 2\nu)\tau}.
\]
For \( \tau \to 0 \), the right hand side of (A.2) approaches plus infinity. Considering our assumptions for \( b \), this is only consistent with (A.2) if \( i^o \) approaches zero. This proves (b).
From (a) and the minimum standard constraint, it follows that
\[
\tau\beta(i^o) - b(e) \geq \tau\beta(i^o) - b(e^o) \geq 0.
\]
From (b) it follows that \( \tau\beta(i^o) \to 0 \) if \( \tau \to 0 \). Hence
\[
\lim_{\tau \to 0} \tau\beta(i^o) - b(e^o) \leq \lim_{\tau \to 0} \tau\beta(i^o) - b(e) = -b(e) < 0.
\]
For standard continuity, it follows from (A.4) that there exists some \( \tau > 0 \) with \( \tau\beta(i^o) - b(e^o) < 0 \) which violates the minimum standard constraint (contradiction). Thus, \( v \) exceeds all bounds if \( \tau \) approaches zero.

Proof of (ii): Let \( v > 0 \). Then the outsourcing solution is determined by the first order conditions of (13) and \( \tau\beta(i^o) - b(e^o) = 0 \). Using the implicit function theorem yields \( \frac{d}{d\tau} \leq 0 \).

Proof of (iii): Given (i) and (ii), it suffices to show that there exists some \( \tau > 0 \) such that \( v = 0 \). Suppose, on the contrary, that \( v = 0 \) for all \( \tau \in \mathbb{R} \).
Then the second FOC of (13) implies that \( \tau\beta'(i^o) < 2 \) for all \( \tau \). Thus, if \( \tau \) increases without bound, \( i^o \) must also increase without bound (as \( \beta'(\infty) = 0 \) and \( \beta^+ < 0 \). Then, because of \( \tau\beta(i^o) - b(e^o) = 0 \) for \( v > 0 \), \( e^o \) must also approach plus infinity. Letting \( e^o \) increase without bound, implies

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\[
\lim_{e^0 \to \infty} c'(e^0) - \frac{1}{2} b'(e^0) - 1 = \lim_{e^0 \to \infty} -\frac{1}{2} b'(e^0) - 1 \leq -1 < 0. \quad \text{A.5}
\]

Hence, there exists some \( \tau \in \mathbb{R} \), with \( c'(e^0) - \frac{1}{2} b'(e^0) - 1 < 0 \). However, from the first FOC of (13) and \( \nu = 0 \) it then follows the contradiction that \( c'(e^0) - \frac{1}{2} b'(e^0) - 1 > 0 \). Q.E.D.

**Proof of Proposition 2**

From Proposition 1, it follows that there exists some \( \zeta \in (0, \tau) \) with \( \nu \geq 1/2 \) for \( \tau \in (0, \zeta) \) and with \( \nu < 1/2 \) for \( \tau > \zeta \), respectively. For \( \nu \geq 1/2 \) the first order conditions associated with the first best and external provision coincide. The solutions are unique in both cases. This implies \( 1 + \mu = 1/2 + \nu \), \( e^* = e^0 \), and \( i^* = i^0 \). For \( \nu < 1/2 \), the first order conditions of the first best and external maintenance cannot coincide as \( \mu < 0 \) is excluded. It follows that \( \mu = 0 \). From the second FOC of (12) and (13), respectively, we get \( (1/2 + \nu) \tau \beta'_i(i^0) = 1 = \tau \beta'_i(i^*) \). Because of \( \nu < 1/2 \) this implies \( i^0 < i^* \). The analogue proof applies to \( e^0 > e^* \). Q.E.D

**Proof of Proposition 3**

Suppose, contrary to Proposition 3, that \( i^i \geq i^* \). It follows that \( \tau \beta'(i^i) \leq \tau \beta'(i^*) \). Considering the second FOC of (12) and (14), respectively, we find

\[
\lambda/2 + \xi \geq 1 + \mu. \quad \text{A.6}
\]

Subtracting the first FOC of (14) from the first FOC of (12) and considering (A.6), it follows that

\[
c'(e^*) - \frac{1}{2} c'(e^*) - (1 + \mu)[b'(e^*) - b'(e^i)] \leq 0. \quad \text{A.7}
\]

This is only consistent if \( e^* > e^i \). From the minimum standard constraint, it follows that

\[
\tau \beta(i^i) - b(e^i) > \tau \beta(i^*) - b(e^*) \geq 0. \quad \text{A.8}
\]

This implies \( \xi = 0 \). From (A.6) it follows that \( \lambda/2 \geq 1 + \mu \). This contradicts \( \lambda/2 \leq 1/2 \). Thus, \( i^i < i^* \). To show that \( e^i < e^* \), consider first the case where the minimum standard constraint in the first-best solution binds, i.e., \( \tau \beta(e^*) - b(e^*) = 0 \). Then \( i^i < i^* \) implies \( \tau \beta(i^i) - b(e^*) < 0 \) so that \( e^i \) must be smaller than \( e^* \) in order to satisfy the minimum standard. Now let \( \tau \beta(i^*) - b(e^*) > 0 \). This implies \( \mu = 0 \) and the first FOC of (12) becomes

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DOI: 10.2202/1555-5879.1522
\[ c'(e^*) - b'(e^*) - 1 = 0. \]  \hfill \text{A.9}

From the first FOC of (14) and 0 \leq \lambda \leq 1, on the other hand, we can infer that
\[ c'(e^i) - b'(e^i) - 1 \geq 1 + 2\xi b'(e^i) \geq 1. \]  \hfill \text{A.10}

Since \( c - b \) is increasing and concave, the last two equations imply \( e^i < e^* \).

Q.E.D.

**Proof of Proposition 4**

From Propositions 2 and 3, it follows that \( e^0 \geq e^* \) and \( e^i < e^* \). Hence, \( e^0 > e^i \). Now suppose, on the contrary to Proposition 4, that \( i^i \geq i^0 \) for \( \tau \in (0, \tau) \). From the second FOC of (13) and (14), respectively, in combination with Proposition 1, it follows that \( \lambda/2 + \xi \geq 1/2 + v \), implying \( \xi > 0 \). Furthermore, considering the minimum standard constraint, \( i^i \geq i^0 \) and \( e^i < e^0 \) imply
\[ \tau b(i^i) - b(e^i) > \tau b(e^0) - b(e^0) \geq 0, \]  \hfill \text{A.11}

leading to the contradiction \( \xi = 0 \). Now let \( \tau \geq \tau \), and suppose, on the contrary to Proposition 4, that \( i^i > i^0 \). Taking into account that \( e^i < e^0 \), it follows that the minimum standard constraint in case of in-house provision of campus safety does not bind, so that \( \xi = 0 \). From the second FOC of (13) and (14), respectively, then follows the contradiction \( \lambda/2 > 1/2 \). Thus, \( i^i \leq i^0 \). If \( \lambda = 1 \), the second FOC of (13) and the second FOC of (14) imply \( \beta'(i^i) = \beta'(i^0) \) which is equivalent to \( i^i = i^0 \). Q.E.D.

**Proof of Proposition 7**

Since \( c \) is iso-elastic, it is restricted to the form \( c(e) = ae^\gamma \), where the further assumptions on \( c \) imply that \( a > 0 \) and \( 0 < \gamma < 1 \). For \( \lambda = 1 \) and sufficiently large values of \( \tau \), Proposition 1 and Proposition 5, respectively, imply that \( v = \xi = 0 \). Considering the first FOC of (13) and the first FOC of (14), straightforward algebraic manipulation renders
\[ e^0 = \left( \frac{a\gamma}{2 + \theta} \right)^{\frac{1}{1-\gamma}}, \]  \hfill \text{A.12}
\[ e^i = \left( \frac{a\gamma}{2 + \theta} \right)^{\frac{1}{1-\gamma}}. \]  \hfill \text{A.13}

The difference between the social surplus under private maintenance of campus safety \( S^0 \) and the social surplus under in-house provision \( S^i \) can be
defined as

\[ \Delta S = \tau \beta (i^0) + c(e^o) - b(e^o) - c^o - i^0 - \tau \beta (i^t) + c(e^t) - b(e^t) + c^t - i^t. \]  \( \text{A.14} \)

For \( \tau \) taking on large values and \( \lambda = 1 \), it follows from Proposition 5 that \( i^0 = i^t \). Taking into account the specific forms of \( b \) and \( c \), and substituting for \( e^o \) and \( e^t \) using (A.12) and (A.13), \( \Delta S \) can be re-written as

\[ \Delta S = \left[ \alpha \left( \frac{2^{\gamma - 1}}{2^{\gamma} - 1} \right) - \left( \frac{\alpha \gamma}{2 + \theta} \right)^\gamma - 1 - \theta \right] (e^o - e^t). \]  \( \text{A.15} \)

When \( \theta \) increases, the expression in square brackets eventually becomes negative. Since \( e^o - e^t > 0 \), it follows that \( \Delta S = S^o - S^t \) becomes negative for sufficiently large values of \( \theta \). \( \text{Q.E.D.} \)

Endnotes

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1. Using data from the National College Health Risk Behavior Survey, Barrios et al. (2000) find students who report suicide ideation to be significantly more likely to carry a weapon and to engage in a physical fight than students who do not report considering suicide.

2. The 2007 Virginia suicide-law represents such an exception (Smith and Fleming, 2007).

3. Also known as Family Educational Rights and Privacy Act (FERPA) of 1974; U.S. federal law codified at 20 U.S.C. § 1232g, with implementing regulations in title 34, part 99 of the Code of Federal Regulations. The regulations cover violations such as school employees divulging information to someone other than the child’s parents about a child’s homelife, grades or behaviors. As the vast majority of rampage shooters are suicide commandos, guidelines for identifying and disclosing potential shooters on the one hand and students with suicidal tendencies on the other interfere with each other. Therefore, ex ante the same amendments and emergency exceptions apply. Notably suicide is the third leading cause of death among the U.S. college-aged population. The first and second are unintentional injury and homicide; see Barrios et al. (2000).
4. A first application of this modification to a related problem can be found in Wigger and von Weizsäcker (2000), and Wigger (2004).

5. Note, principal $U$ in this set-up is identical to the social planner. In the framework of Grossman and Hart (1986) and Hart and Moore (1990), therefore, $U$ would always install first best and would actually never outsource.

6. The Office of Postsecondary Education (OPE), U.S. Department of Education, provides security officer information on all postsecondary institutions that receive Title IV funding (i.e., about 4,000 institutions that participate in federal student aid programs) as required by the Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act. It is made available on its Campus Security Data Analysis Cutting Tool Website: http://ope.ed.gov/security/search.asp.

7. In practice, the Federal Student Aid (FSA) Handbooks set out consumer information, including campus security (Clery Act). For the Award Year 2007-2008, it can be found in Volume 2: School Eligibility and Operations, Chapter 6: Providing Consumer Information. The disclosure requirements arise from the Student-Right-to-Know and Campus Security/Clery Act and the Equity in Athletics Disclosure Act. In an effort to assist schools in complying with the Crime Awareness and Security Act of 1990, the U.S. Department of Education has developed “The Handbook for Campus Crime Reporting” (U.S. Dept. of Education, 2005). The Handbook defines the categories of crime and procedures for reporting them, as well as the requirements for timely warnings and maintenance of a daily crime log.

8. An equal split would be the outcome of a Nash bargaining solution or, alternatively, of a Rubinstein bargaining model for sufficiently low discount rates (Rubinstein, 1982).

9. Keep in mind that the disclosure of odd behavior by students and other precautionary safety measures are extremely subtle and complex tasks, requiring a constant (and hence costly) high level of empathy.


11. Violation is reported for a substantial misrepresentation of the number, location or nature of the crimes required to be reported according to Civil penalty cite 20 U.S.C. 1092(f)(13) and 1094(c)(3)(B); see U.S. Dept. of Education (2005:7).

12. A series of sample cases, where universities in different states were hemmed in by legal red tape, is given by Smith and Fleming (2007).
13. http://www.northcarolina.edu/content.php/safety_taskforce/index.htm. Similar task forces were commissioned in most other federal states by the respective Governor's Office. The National Task Force on School and Campus Safety Issues Report and the National Association of Attorneys General call for federal and statewide reforms to increase school and college campus safety from September 2007 may be found at http://www.naag.org.

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