Evaluation of alternative policies to combat false emergency calls

Erwin A. Blackstone, Andrew J. Buck, Simon Hakim*

Center for Competitive Government, Temple University, Philadelphia, PA 19122, USA

Abstract

Ninety-four to ninety-nine percent of all police physical responses to burglar alarm activations are false. In 2000 police responded to 36 million false calls at an estimated cost of $1.8 billion. This paper presents and evaluates ten police policies for dealing with this waste of police resources. The paper then suggests that a public–private partnership will yield the highest net social benefits and avoids undesired cross subsidization. It further shows that implementation of a market oriented economic model where the police fulfill merely their public obligation is preferred to intuitive solutions that are often used by police.
© 2005 Elsevier Ltd. All rights reserved.

1. Introduction

An essential function of the police is emergency response. Nationwide, the 911 emergency response system generated 183 million calls in 2002 (Sampson, 2002). More than 36 million were burglar alarm activations. With this number of calls there is a public policy problem to the extent that these emergency response systems generate a high proportion of non-emergency and false calls. Illustrative of the problem is the fact that nationwide 94–99% of all burglar alarm activations turn out to be false. These calls result in a congestion problem for the communications network. Perhaps more importantly, emergency calls often result in an increasing physical response by the police, requiring the use of scarce resources that might be better allocated elsewhere.

The false activation issue is the primary focus of the paper. Nationwide data for emergency responses are not available, but are available for individual communities. In 2000 in Philadelphia 96% of fire alarms, 97% of burglar alarms and 75% of medical alarms were false or of non-emergency nature (Blackstone, Hakim, & Spiegel, 2002: 16). In 2000 the cost of responding to false burglar alarms

was estimated at $1.8 billion nationwide; in the range of $30–$95 per alarm activation (Blackstone & Hakim, 2002). To add context, President Clinton's anti-crime initiative budgeted an additional 100,000 police officers. Solving the problem of false alarms could increase the effective size of the nation's police forces by 35,000 without having to rely on the commitment of federal resources.

Communities across North America and Great Britain attempt to curb false alarms by instituting ordinances and/or special practices by police departments. These ordinances and policies vary significantly across communities and are usually intuitively based. In general these efforts have been unsuccessful; either the number of false activations did not decrease much over the long run or there was a decline in the welfare of alarm owners.[1] The latter occurred because alarm owners discontinued use of their alarm systems, causing a reduction in the sense of, and actual, security (Buck & Hakim, 1991; Hakim, 1995). Further, the variability of the mandated procedures of these ordinances and policies create difficulties for central stations that monitor alarms from many communities.

In this paper we shall describe and evaluate alternative ordinances and policies meant to deal with response to false burglar alarms. We will use economic theory and

---

* Corresponding author. Tel.: +1 215 204 5037; fax: +1 215 204 4491.
E-mail address: shakim@temple.edu (S. Hakim).

---

[1] Aggregate social welfare could either increase or decrease. Fewer false activation relieve the congestion problem in the common pool, police resources may be reallocated to other activities. Both responses can have a significant impact (Benson, Rasmussen & Kim, 1998).

performance data to evaluate and select the preferred alternative. The preferred alternative should maximize social benefits. Such an evaluation framework could be applied to other emergency services.

In Section 2 we describe the economic theory and the associated criteria used to evaluate alternative ordinances and policies. Section 3 incorporates the description and evaluation of the alternatives, and Section 4 presents the theoretically based preferred alternative. In Section 4 we present data on performance for the major alternatives to determine whether economic theory indeed suits the case of false response to emergency calls. In Section 5 we present some issues involved in implementation of the preferred alternative. Section 6 provides the conclusions and policy implications.

2. Theoretical criteria

Economic theory should be applied in the search for an optimal solution to the false alarm problem. Efficient provision of response to requests for emergency services, including alarms, requires understanding the nature of the service. Services can be either public goods or private goods. The categorization hinges on whether non-payers can be excluded from consumption (excludability) and whether consumption by one person reduces the amount of the service available for others (rivalry). The categorization is a continuum in both the excludability and rivalry dimensions, but can be usefully summarized as in Table 1.

National defense is regarded as a pure public good because no resident of the country can be excluded from its consumption, and the consumption of national defense by one person does not reduce the amount of national defense available for others to consume. Wheat is a pure private good since those who do not pay for it can be excluded from its consumption and the amount consumed by one person is not available for consumption by another.

It is very costly or even impossible to exclude anyone from consuming a public good, and each and every person consumes the full amount of the output. The usual policy analysis concludes that without government forcing all to share the cost, each person would have a strong motive to become a 'free rider', or to pay less than the socially optimum amount. Thus, there is essentially no alternative but for government to take responsibility for the supply of

public goods. However, government does not necessarily need to produce the good and could let that be done under competitive market conditions.

The assumptions necessary to classify a good as a pure public good are seldom completely met in reality. For pure public goods the size of the interacting group is the entire society, and the entire supply is commonly consumed. If either or both the requirements of non-exclusion and non-rivalry fail to be met then the good falls into the general category of an impure public good. These impure public goods incorporate the notion of congestion cost or excludable benefits. Unlike pure public goods, a larger number of consumers may cause congestion in the consumption of impure public goods. Examples include swimming pools, tennis clubs, golf courses, and highways (Cornes & Sandler, 1986: 4). All of these examples can be termed common or free-access goods. A feature shared by all common goods is that there is no clear property right, and as a consequence the resource is over-utilized. Observationally, consumption of the good is characterized by congestion and there is too little investment by individuals in the free-access good (Benson, 1994; Ekelund & Dorton, 2003).

Congestion is an externality in consumption. A bridge across a river is an impure public good. If the number of cars on the bridge is small then there is no rivalry in consumption, although those who do not pay the toll can be excluded from using the bridge. Everyone that pays the toll can get onto the bridge. However, if too many cars try to use the bridge then everyone's trip across the bridge is delayed.

A local public good involves congestion, but does not incorporate excludability for the population within the jurisdiction. Examples include local schools, public libraries, or public parks. All of these activities provide positive externalities enjoyed by all of the members of the community, but all of them can be (and are) provided by the private sector. The enjoyment of the positive externality by all members of the community is a result of the institutional arrangement rather than any technological aspect of the good. Since there is a congestion problem in all of these examples it is more appropriate to term them free-access goods.

Local governments often provide emergency services because of life threatening conditions. In case of a major disaster, like an earthquake, emergency services need to be in place in order to serve the general population. Emergency services include fire protection, police response to alarms, stray animals, gas odor, and ambulance services. These are all free-access rather than pure public goods since congestion occurs, and residents in other adjacent localities are often excluded from enjoying the services. Government provides these services because of their significant externalities and potential life threatening conditions.

The most visible form of emergency service is the police. Police patrol that provides an 'umbrella' of security to the community can also be classified as a local public good. However, calls for emergency services can divert police

Table 1
Private versus public goods

| | | Non-rival | |
		Low	High
Non-excludable	High	Commons Good (Fish in the ocean)	Public Good (National defense)
	Low	Private Good (Wheat)	Collective Good (Pay-per-view TV)

resources from the production of the public good to a service consumed by an individual. Hence, what the police do is a mix of public good, private good, and free-access good.

The service provided by the police department, community security, has the same general characteristics as a public good up to a point. Namely, no resident can be excluded from consumption of community security and all households consume the same amount of community security being produced by the presence of the police.[2] The 'up to a point' caveat involves the depletability of police resources when they must respond to a call for emergency help. As long as the calls for emergency response are few in number there is no congestion problem and the cost to society of responding to the next emergency call is essentially zero. Therefore, the correct price to the user for efficient allocation of police services is zero, up to the point of congestion. Without congestion, police simply serve one particular consumer or area but no other consumer is expressly denied police services.

Given the statistics cited in the introduction it would appear that many local jurisdictions are at or near the congestion point in the provision of emergency response. Once the congestion externality has been reached the municipal authority must decide on a course of action in order to restore the efficient allocation of police services. The source of the congestion externality is the lack of a clear property right in the over-used resource. The common access attribute of emergency response gives the appearance of free riding by residents of the community, when in fact the lack of a clear property right causes residents to under-invest in the free-access good.[3] The municipal authority could implement a wholesale change in the policing institution, or respond within the existing framework.[4]

The response taken by the existing institutions can be to exclude some residents from consumption of police services, thereby moving the service along the private good dimension. Or, the response could be to restore non-rivalry in consumption of police services by expanding the size of the police department, thereby moving the service back in the direction of being a public good.

Exclusion can be achieved by charging a price for the specific service that is causing the congestion problem or simply excluding certain consumers by not responding to calls for emergency help. Charging for response and not responding to emergency calls are both in practice around the country.

Expanding the size of the department requires additional financial resources. Additional funding for a larger department can be achieved through either a tax imposed on all residents or by charging the consumers of the service producing the congestion problem. An increase in local taxes in order to increase the size of the local police department in order to deal with emergency response is usually not politically expedient. There is also an efficiency question since all residents are being asked to fund a service being provided to only a subset of the residents.

Around the country a fee for emergency response is often used, but the sums involved are never large enough to be meaningful for the expansion of a police department. Police departments are often reluctant to raise fees for service to the pint where they have a noticeable allocative effect. This may be a result of the incentive structure confronting the police. Namely, their budget is more sensitive to response and arrests than it is to watching and patrolling in order to prevent crime (Benson, Kim, & Rasmussen, 1994).

The public good-private good dichotomy is further clouded by the fact that emergency services are distinctly different in one important aspect from other local public goods. The output of emergency response is a priori uncertain with a high probability level. Emergency services have a common attribute; it is unclear whether a real emergency exists at the time service is actually requested and the emergency crew is dispatched. Only when the service is actually rendered does its 'emergency' nature become known. For example, poor people without medical insurance often arrive for emergency treatment at expensive hospital emergency rooms where service can normally not be denied, even when it turns out to be a non-emergency situation. In a hospital setting the service is often delivered before its emergency status is known. After all, diagnosis is required in order to determine the nature of the illness. Public ambulances are also often dispatched for what turns out to be non-emergency events. The case of police response to burglar alarms is another example. When police are dispatched it is a priori unclear whether a real break-in has occurred. Only after the officers actually provide the service is it known whether an actual break-in is in progress or has occurred. Hence, in all these cases of emergency services, the probability of a real event is less than one. In the case of police, ex ante response to false alarms will be shown to include a large public good component at a probability level of at most 6%.

In case of a bona fide emergency event, public intervention can be justified. However, in the case of a non-emergency event, public financing or intervention is unwarranted. When a real break-in occurs, the public interest requires that police attempt to catch the burglar. Apprehending burglars diminishes the pool of burglars and reduces the probability that others will become victims of burglary; the public good aspect of the emergency response. Several studies confirm that burglars tend to repeat their activities in the same neighborhood unless apprehended (Rengert & Waselchick, 1985). For example, in June 2003,

---

[2] In the police and crime literature there is a discussion of whether police spend their time preventing crime (an unobservable output) or waiting for crime to happen so that they can make an arrest (an observable output) (Sherman, 1983).

[3] Indeed, the purchase of an alarm system that generates false alarms can be viewed as disinvestments in the 'free access' good and an investment in the private good (Benson, 1994)!

[4] Benson (1994) argues that public policing evolved as a result of change in the assignment of property rights and the criminalization of torts.

New York City police were looking for a burglar that broke into a dozen homes and a school in a three-block area of the upper West Side of Manhattan (Mbugua, Fenner, Coleman, & Burke, 2003). Apprehension also has a deterrent effect by raising the expected cost of criminal activity, and thereby may even reduce the future supply of burglars.

Response to a valid alarm can lead to the apprehension of suspected burglars. Seattle police in 2002 responded to 24,505 alarms, of which 325 were valid alarms, and they arrested 46 suspects. (Seattle Police Department, 2003:5). These apprehensions are the public good aspect of alarm response. Unfortunately, the overwhelming proportion of false alarms meant that the cost per arrested Seattle burglar in 2002 was $31,444.

Noteworthy, not all alarm systems provide the same extent of social benefits. Audible alarms scare off burglars and enhance private benefits of the alarm owner, but at the expense of non-beneficial spillover effects to other residents of the community. If the burglar escapes as a result of the audible alarm, the usual event, beneficial spillovers do not exist, only private benefits result. Nevertheless, police involvement is still justified because of the chance of catching the burglar. In the case of a silent alarm, where the burglar is unaware that a signal has been transmitted, the police are more likely to surprise and apprehend the burglar; however, the burglar may cause greater damage and pose greater danger to the residents. If the community's interest is in apprehending burglars then silent alarm installation should be encouraged over audible systems provided that the net social benefits of silent alarms exceed those of audible alarms. Encouragement should not exceed that difference.

Police services are an impure local public good. The presence of the police, like national defense, provides an umbrella of security for all of the residents. No resident can be excluded from consumption of the service and a change in the number of households in the jurisdiction does not change the amount of service available for consumption. However, burglar alarms add a unique element to the mix. When a burglar activates an alarm and the police respond and apprehend the criminal then their response is a public good. It is a public good since community security has increased and a criminal has been taken off the street.

When a false alarm occurs, police response is a free-access private good and government intervention is unjustified. No one in the community is positively affected by police response to false alarms. Furthermore, such police response entails a social opportunity cost since police are withdrawn from other public services. When an alarm is falsely activated, no one else in the community derives any benefit from the response to the false alarm. Therefore, the community should not bear the cost. Restoration of the equality between private marginal benefits of an alarm system and the marginal social cost of responding to alarm activation requires the local government to impose a cost on the alarm user. Essentially the provision of the free-access service is made to mimic the provision of a private good.

Alternatively, initial burglar alarm response could be handled by the private sector, in which case the market place would internalize the social costs of response to those calling for the response.

3. Description and evaluation of alternatives

Table 2 presents three alternative approaches to the false alarm problem: police response, private response, and public-private partnerships. Within police response there have been eight distinct policies regarding response to alarm activation. Compressing the attributes of the eight alternatives to five basic categories of policy features makes evaluation feasible. These categories include punitive actions, education of alarm activators, improved verification, imposing alarm registration fees, and market oriented solutions.

Punitive action involves fines above cost, escalating fines, and ceasing response. This solution can even make alarm activators criminals while they are just obtaining a service that could be priced by markets. High enough fines can reduce the use of alarms and cause a decline in both the level of actual and perceived security with a consequent reduction in social welfare. Punitive actions like raising fines are effective when consumers (violators) are price sensitive. This situation does not seem to exist in the case of false alarms. In Clearwater Florida the fines were increased from $30 to 50 in 2001 but alarm calls only decreased from 7701 in 2001 to 7265 in 2002. A fifty percent increase in price caused only a 5.8% reduction in false alarms.

There are better ways to resolve the problem of response to false alarms than punitive actions undertaken by government. False alarm activators are often taken to court or response is terminated for their persistent actions. However, response to false alarms can be considered a regular commercial transaction. Let's assume that a person enjoys intentionally kicking his own refrigerator and breaking its door on a daily basis. The person calls the service department every time and requests a change of the door. As long as he pays the company's regular charges it will serve him without imposing any unnecessary delays or raising the price. Similarly, alarm activators who innocently cause false alarms should not be treated in a punitive manner.[5] Government should either price the provided service at its cost or just divest itself from responding to false alarms and agree to respond to alarms proven to be valid. In such a case, private providers will emerge and markets will generate ways through which only valid alarms will reach police dispatchers.

In 1996 Toronto, Ontario began pricing all responses to false alarms at $75 (Canadian), a high rate; in 2002 the rate

---

[5] In Phoenix, Arizona unpaid fines can result in misdemeanor criminal offenses. Government considers it a crime since the activators unjustifiably use up its resources.

Table 2
Benefits of programs to curb false burglar alarms

Category	Program description	Examples	Evaluation	Comments	Source
Police response	Police respond to any and all activations at no charge.	Chattanooga, TN as of May 2001.	$MC^1 \approx \$30–95$. When $MC > P$ the result is over production and consumption; the result is inefficient resource allocation. This also yields an inequitable subsidy of those who activate their alarms by non-alarm owners and prudent alarm owners.	Some communities provide for fine collection in their ordinances, however, police refrain from imposing fines for public relations reasons.	Dick Cook, 2003. 'False alarms at alarming rates', Chattanooga Times, January 30.
	Municipal and religious institutions may be exempt from charges.	Buffalo, NY			Brian Meyer, 2003. 'City seeks to trim high cost of false alarms', The Buffalo News, January 27.
	Fees rise after few free.	Overland Park, KS. First 2 free, 3rd-$50, 4th-$100, 5th-$150, 6th-$200, 7th and more $250.	MC of response is constant. Escalating fees above MC introduce inefficiency since usage of alarms is below socially optimal level. Since fees go into a general fund alarm activators subsidize other municipal services causing over supply of those services. Escalating fees are a form of price discrimination that is evidence of monopoly power.	Fees should reflect the cost of service delivery without being punitive. Alarm associations support punitive fees on repeat activators in order to protect police response ordinances.	http://www.opkansas.org/_Res/Safety/Alarms/falsealarms.cfm
	Cease response after a few false alarms. Fee is initially zero, then becomes infinite.	New Orleans ceases response after 20 false alarms. Police in Santa Ana, CA. can discontinue response after six false alarms.	The fines increase in a single step. Ceasing response is similar to setting a price well above marginal cost. As long as price is no less than MC, police should continue to respond.	There is a punitive aspect to this kind of policy. As long as marginal costs are recovered, including normal profits, there is no reason to treat response in a punitive manner.	http://www.alarmsbc.com/safinesca.htm, April 16, 2003.
					E. A. Blackstone, Simon Hakim, and Uriel Spiegel, 2002. 'Not calling the police (first)', Regulation, Vol. 25 (1), Spring: 16–19.
	Activation fee equals average cost of police of response.	Clearwater, FL calculated the cost of response at $49.61. Fees were raised from $30 to 50.	Fees should reflect the MC of response. When a monopolist charges fees that reflect their expenditures it will not necessarily equal marginal social cost, introducing inefficiencies and undesired redistribution effects.	This fee structure is better than the preceding cases, but still possesses social inefficiency features.	Chris Tisch, 2001. 'Price going up for 'crying 'Wolf!'. Largo Times, February 5.
	A nominal fee below the average cost of response.	Huntington Park, CA allows one free false alarm per month.	Since fees are nominal this policy suffers from the same shortcomings as the first case.		http://www.alarmsbc.com/fafinesca.htm, April 16, 2003.
	Police respond to activation only when transmitted over the 900 lines.	Riverside County, CA. A $5 fee is charged to the central station on all alarm calls.	Although nominal, the fee imposed on the central station encourages more careful verification and efforts to educate the client.		'Riverside County Calif., Sheriffs urge supervisors not to revise '900' issue'. Security Sales, August 2000: 12.

(continued on next page)

Table 2 (continued)

Category	Program description	Examples	Evaluation	Comments	Source
	Price discrimination. Businesses charged higher fees than residential.	Irvine, CA. Businesses are charged twice as much as residential for response.	Price discrimination at a minimum suggests the existence of monopoly power; police are the only providers of response. Unless the discrimination is cost justified and is based on elasticity of demand for the two groups, it is socially inefficient.	Higher fees for businesses are common. Demand elasticity is lower for businesses because they can more easily afford higher fees. It is a 'cost of conducting business' and it is deductible for tax purposes.	http://www.alarmsbc.com/safinesca.htm, April 16, 2003.
	Consumer education. Repeat false activators are required to attend police run classes to correct behavior.	Hillborough, CA. P.D. holds monthly seminars to teach alarm owners how to operate their systems.	Educational classes raise the MC for the police. Attendance at the class imposes a cost on the consumer, but it will be below the MC for the police. This policy is similar to any of the above policies where prices do not reflect MC.	It is not the role of police to train residents in the use of a product purchased from a private vendor.	http://www.hillsca.org/alarms.html. 11/13/2002.
	Enhanced verification. The central station (CS) verifies each signal twice. The first call is to the site and the second to the first number on the call list provided by the alarm owner.	ADT applies the procedure in Los Angeles where physical verification is required. About half of CS's use this approach for their problem accounts.	There is clearly a tradeoff to central stations. On the one hand, not dispatching police in case of a bona fide activation may expose the CS to significant liability and negative publicity. On the other hand, two verifications may improve customer satisfaction due to reduced fines.	The CS industry voluntarily applies this policy in contrast with the other government-mandated policies.	http://www.adt.com/news/03-07-10.cfm 08/04/2003.
	Registration of alarm systems. Owners and installers are required to register the system and pay an annual fee.	Buffalo, NY: A bi-annual registration of $20 for 3 false alarms each year.	Such fees are divorced from service delivery by the locality and therefore, have no effect on reducing false alarms. Actually, Buffalo's ordinance may even encourage up to 3 false activations a year. Omaha NE requires an annual fee of $25.	40–50% of alarms are not registered. In case of activation the CS has the updated address that is dispatched to the police.	Meyer op cit. Nichole Aksamit, 2002. 'Security system owners seek grandfather clause emergency calls', Omaha World-Herald, July 20.
Private response	No police response at all. A signal from a central station is directly and solely transmitted to private response company.	No real world example	The private response company will fully internalize all of the costs of congestion in provision of the service. However, if apprehension and deterrence are public goods then the private response alternative does not internalize all of the benefits accruing to the community from alarm ownership	Public good interest requires police involvement in dealing with real burglaries.	
Public–Private Partnership (PPP)	Police are dispatched only after an activation has been physically verified by a private response company.	Las Vegas, NV; Salt Lake City, UT; Eugene, OR	This alternative seems to be the most efficient and equitable since only the users of the private service pay. In practical terms, this option allows for a prompt response to an actual burglary, thereby preserving the public good aspect of alarm ownership and police response.	Private response is provided to private consumption. This solution allows police to better confine its services to public goods.	Data supplied to authors by cited police departments.

Notes: MC refers to the long run marginal social cost of response, including actual cost to the department plus the cost of congestion due to false activations. P refers to the fee paid by the alarm owner.

was $83.50 (Canadian) and was assessed on the monitoring station that called a special, dedicated number to request police response. The fee was high enough that private response soon developed and within one year the number of police dispatches declined from 57,875 to 27,981 (Seattle Police Department, 2003:13). Alarm companies and subscribers now had an incentive to employ less expensive private response to verify the occurrence of a valid alarm (for which the central station would not have to pay).

Education. The police with some participation of the alarm industry usually provide education of alarm owners. Ongoing education on the use of a private product is not the proper function of government and clearly causes unjustified cross subsidization from non-activating alarm owners and non-owners to activators. Police provide education since they bear the burden of response, much of it without adequate reimbursement. Evidence suggests that the benefits of education in reducing false alarms are only temporary; the effects diminish after a concentrated program is terminated or reduced. In any event, one officer assigned to educate false activators must reduce 1000 false activations in a year to pay the officer's $60,000 cost, the average overall cost for an officer. Our review of the evidence did not reveal such a substantial reduction in false responses. For example, Fort Lauderdale, Florida initiated an extensive education program through alarm dealers to curb the worst offending alarm activators. The lack of incentive to participate in such a program is indicated by the fact that only 23 out of 250 invited dealers actually attended the meeting. The program involved at least one police sergeant who visited activators with 35 or more false activations during a 9 month period in 1998. The number of false dispatches fell by only 133, or one percent, at a public cost of over $500 per 'saved' response (Model States Report, 1999: 47-48).

Education of consumers is the sole responsibility and interest of commercial providers. The seller of a refrigerator is blamed when the product malfunctions or when additional information on its operation is needed. When an alarm malfunctions or falsely activates, the police become the target since they traditionally have provided alarm response. The direct relationship between the seller and the buyer is weaker in the case of alarms due to the accepted police obligation for response. Police provided education is a consequence of institutional history rather than technical imperatives. Hence, the seller's interest in educating consumers in avoiding false activations is attenuated in the case of burglar alarms compared to most other goods and services. Once police eliminate their obligation for response, this 'natural' sellers' responsibility and interest in educating their consumers will be restored.

Indeed, when the alarm industry initiated its Model Cities and Model States programs, it encouraged its members to contact repeat activators and educate them in the proper use of their system. However, such peer pressure from the industry was significantly reduced once the program was

complete, and the rates of false alarms tended to return to their previous levels. Apparently reputation effects have a very short half-life. Education by the industry or by police does not have a permanent effect unless the program is retained.

On the other hand, if police respond only to physically verified activations or when police charge their real cost for false activations then the obligation of education shifts completely to the alarm companies, and administrative action to maintain the service is not necessary. This brings the case of burglar alarm response closer to the refrigerator example.

Improved verification by central stations includes calling both the premises from which the signal comes and if unsuccessful calling someone other than at the alarmed premises. For example, the secondary contact for ADT includes a cellular telephone, a work telephone, or anyone else pre-assigned by the alarm owner. ADT claims that such enhanced verification reduces false dispatches by 35% for residences and 50% for businesses (SDM SDM Magazine, 2003).

Improved verification is an improvement. However, non-members of the Central Station Alarm Association often do not verify activations. Further, verification involves immediate cost and exposes the central station to litigation when it cancels response to a real activation while the benefit to the central station is minimal at best. Thus, it is not in the interest of central stations to verify. It is the usual conflict of interest between the individual firm and the industry that leads to a non-optimal solution to the industry.

The state of Florida and the city of Seattle Washington have mandated verification. Seattle fines the dispatching alarm company $250 for requesting police dispatch without verifying the alarm. Assuring compliance with the law involves high cost to the police. In any event, requiring verification is clearly an improvement over current practices and will reduce false alarm response somewhat. However, false alarm response is not a public good that require police involvement.

Registration fees are intended to cover the cost of managing alarm administration and response to false alarms. Unfortunately, there is no connection between registration and the use of service, causing unjustified cross subsidy from non-activating alarm owners to activators. Such a flat fee produces no incentive to reduce false alarm activations when no additional fines are imposed on activations. In practice registration fees seldom cover alarm response cost. For example, in Los Angeles in 2001 alarm registration fees yielded $4.34 million when as much as $11 million was spent responding to false alarms. Part of the shortfall occurred because only 140,000 residences paid the required fee when the estimated number of alarmed residences was 300,000 (Edds, 2003).

Since the activators are well defined, the cost should be directly imposed on false activations. Further, there is little benefit to the police of having information on alarm owners.

When police respond they need to know only the exact address that is indeed updated by the dealer and provided to them by the central station at the time alarm response is requested. Alarm dealers obviously have the addresses of their customers.

It is obvious that ordinances related to response to emergency calls are often based on the intuition of public decision makers. The cost that non-emergency responses impose on public resources causes public decision makers to search for punitive actions like high and escalating fines, ceasing response to repeat activators, or mandatory education sessions. All these solutions appear to have been ineffective or just temporary in duration. The fundamental flaw common to all of them is that they do not equate marginal private benefits with long run marginal social costs in the context of a public good subject to congestion costs.

An efficient solution might be expected to have a solid theoretical foundation that has been shown to apply to a wide range of situations. Economic theory that promotes competitive markets and circumscribes the use of public monopolies can be applied to this particular case of alarm response. Using economic theory we can consider false alarm response as a service that should be priced at the appropriate measure of cost.

Certain elements should be considered in the selection of the best alternative from among those in Table 2. The preferred alternative should allow as much competition as possible in responding to alarm activations. Reducing government monopoly power and allowing private alternatives to emerge to compete with government can accomplish this. Competition might even occur between police departments of adjacent jurisdictions. The greater is the competition among response entities, the greater the pressure to lower the cost of the service. Unfortunately, the current practice of police providing free responses prohibits private response providers from entering this market (Mehay & Gonzalez, 1992).

The preferred alternative should require consumers of false alarm response to pay for the cost of the service rendered. Response to false alarm activation does not entail any of the public goods attributes that require public intervention and therefore, the clearly identified consumers should cover the cost of response.

The selected alternative should be simple in order to reduce transaction costs for central stations that monitor alarms from many different jurisdictions. At present, central stations exploiting economies of scale monitor alarms from numerous communities across North America, making it very difficult for their personnel to follow diverse, complicated and often changing ordinances. Also, complicated ordinances are costly and difficult for both police and the owners of alarms to follow, thus reducing any deterrent impact. It is also important to avoid solutions where concentrated efforts are made for a short period of time, causing the reduction in false activations to be only temporary.

The preferred solution should avoid cross subsidization among users of response by charging all consumers their respective cost. In addition, business consumers should not be charged higher fees than residential or municipal facilities unless the cost of serving them is higher than the other uses. Indeed, competition among providers of response will assure competitive prices and thereby avoid cross subsidization which imposes costs on others. Competition will also avoid price discrimination which signals the presence of the police monopoly. That monopoly is unnecessary and undesirable. If the preferred alternative remains in the domain of police then response to false alarms should be considered as a profit unit. Cutting cost will enable the alarm unit to retain the savings.

4. The preferred alternative

The alternative that performs the best is the public-private partnership. Evidence suggests that this solution, based on economic theory, is preferred. It reduces police involvement in the response to false alarms, provides for a competitive market for response, and eliminates cross subsidization while imposing the cost of response on users. Here the police do not respond to an activation unless an authorized party physically present at the site verifies the validity of the alarm. In effect, the alarm owners contract private response companies to fulfill the private function of responding to false alarms. In case of a real activation, to fulfill the public responsibility of maintaining security and apprehending burglars, someone at the scene dispatches the police. This alternative provides for more efficient and timely response. Since 94–99% of all activations are false, most police departments assign a low priority to alarm response. Toronto, Ontario police take more than 30 min to respond to an unverified alarm, but respond in less than 10 min to a verified alarm. Private companies, however, respond promptly in order to preserve their clientele. Thus, overall, the response time to real activations is lower than when police respond to all activations.

In addition to improved response time and lower resource costs, the public–private partnership also results in lower administrative costs. In a public–private partnership there is no need for police maintenance of the alarm owner database since this becomes the responsibility of the private responder. Therefore, there is no justification for the registration fees paid to the police department. Since police only respond to physically verified activations the onus of imposing and collecting fines is removed from their operations.

The public private partnership can be evaluated in terms of both the level of activations and the direction of change. The following information is indicative of the success of private response: Charlotte NC, Phoenix AZ and Seattle, WA which maintained police response had 656, 482, and 460 false dispatches per 10,000 residents in 2001, respectively. Toronto and Salt Lake City had only 108 and 49, respectively.

How those differences in activations per 10,000 residents were achieved is impressive as well. In Salt Lake City, for example, total police responses to alarms decreased from 9439 in 2000 to 898 in 2001 after the adoption of the physical verification requirement. Valid alarms decreased from 64 to 5 over the same period. In 2002 the respective numbers were 803 and 10. Further, citizens are paying as little as five dollars per month for the service of private guard response. Verified response saved 8482 officer hours per year, or $508,920 in associated personnel costs. Finally, reduced responsibility for false alarm response means that the police now respond two minutes faster than before to high priority calls.

Similar experience was obtained for Eugene Oregon where verified response was adopted in 2002. In the first six months after the change, the number of police responses was 183 versus 2642 in the immediate six-months prior to the change. Valid alarms decreased from 39 to 3 over the same period.[6]

Verified response has also contributed to the development and adoption of new technology. In Las Vegas, whose ordinance was implemented in 1991, many residences have installed alarm systems with video cameras.[7] The police accept video transmissions as evidence of a valid alarm, obviating the necessity for physical verified response. Diffusion of video verification is uncommon in other communities where private response is not required. Clearly, pricing response at real cost encourages adoption of efficient technology.

The ultimate superiority of the public–private partnership alternative is indicated by the satisfaction of police, alarm owners, and the general public with this solution. The only dissatisfied party is the alarm industry that now finds its customers having pay for a service that previously was subsidized by the police.

5. Evidence from the implementation of the market solution

Verified response, which results in the introduction of private response to false alarms, has been implemented in Las Vegas (1991), Salt Lake City (SLC), (2000), and in a slightly different way in Toronto (1996). The larger the city, the more alarm systems exist, and the more private response companies the market can accommodate. Larger markets permit greater competition, lower prices, better service and more service options. Thus, in larger cities a market similar to monopolistic competition will replace the monopoly police provider. Smaller suburban cities can be served by response companies from adjacent locales.

Initially, when physical verification was required many response companies, mainly private guard companies, entered the market. However, as competition increased, exit of less efficient companies occurred. For example, in SLC, the number of response companies declined from seven to five in the three-year period after physical verification was required, indicating that prices were low enough to force exit from the industry. It may be that in a city the size of SLC only a few firms can take advantage of economies of scale and scope.

The process of implementation, after all, showed that response is unlikely to be successful as a stand-alone service. It is difficult to obtain sufficient alarm customers within a small enough area to sustain the market mandated twenty minutes response time. In SLC most firms offer patrol service; one company has its alarm response units monitor stationary guards and perform locking and unlocking services for buildings. There are evidently economies of scope in the provision of alarm response. Thus, the successful companies all provide alarm response in conjunction with other guard-type activities.

Implementing the market solution has led to a wide variety of choices for subscribers. For example, in 2003 in SLC one company offered three responses per year at no additional charge for $4 per month and each additional response at $15. Responses were guaranteed to occur within 15 min. Another Salt Lake company offered to respond for $20–25 per response with service within 10–12 min. Companies also offered the choice of armed response. Indeed, as density within the required market area mandated by the 20 min response time rises, alarm owners enjoy greater variety and quality at lower prices. On average, SLC companies responded within the range of 5–20 min in 2003 compared to 40 min in 2000 when police still responded.

Most alarm dealers and central stations contract with guard companies to obtain response services. Liability and the dangers of adverse publicity from an unfortunate event encourage dealers and central stations to avoid use of their own personnel or vehicles. The market solution has also yielded some alarm companies that provide private response for a fee through a contracted company. Some consumers contract directly with guard companies to respond. The issue of armed versus unarmed responders has also proven to be important. In Toronto, for example, responders were originally armed but liability concerns have led to their being unarmed.

6. Conclusions

Our evaluation of ten alternatives for response to false activations revealed that the public–private option is

---

[6] Change in the accuracy of reporting is the reason for the decline in valid alarms. Before the ordinance took effect, police has reported possible burglary in case of doubt. After the ordinance took effect, private response companies would be more careful before requesting dispatch.

[7] Las Vegas still broadcasts over the police radio alarm activations but police only respond if no higher priority activity is occurring. Still, this is a private service that at minimum causes congestion on the emergency communication system and may impose cost of the physical response for what is essentially a private service.

preferred both on standard economic criteria and experience. Reducing the government monopoly as alarm response provider would result in more competition, would lower cost to society, improve quality of service, and reduce the government bureaucracy of managing the alarm unit. This solution will entail public provision of the public good aspect of alarm response and private provision of the private good aspect of false alarm response. Police response will be quicker since they will respond to fewer alarms and will know that they are likely to encounter a real burglary.[8] Also, police will be prepared for a real event and are likely to provide more careful and comprehensive service.

Response to false alarm activations is a nuisance and a waste of at least ten percent of local police budgets. Police Chiefs have been complaining about the problem of false alarms for many years. A variety of alarm industry and public policy intuitive solutions have been tried and shown to have been largely unsuccessful. This paper reveals a comprehensive identification of alternatives, their evaluation, and a rational selection of the preferred solution. The paper showed that Adam Smith's assertion in his 1776 book *The Wealth of Nations* that greater competition yields a more efficient solution and greater consumer satisfaction is true in the case of alarm response as well. It further shows that government involvement in the marketplace should be kept to the minimum necessary for the public good aspect of the service.

References

Benson, B. L. (1994). Are public goods really common pools: Considerations of the evolution of policing and highways in England. *Economic Inquiry*, *32*, 249–271.

Benson, B. L., Kim, I., & Rasmussen, D. W. (1994). Estimating deterrence effects: A public choice perspective on the economics of crime literature. *Southern Economic Journal*, *61*, 161–168.

Benson, B. L., Rasmussen, D. W., & Kim, I. (1998). Deterrence and public policy: Tradeoffs in the allocation of police resources. *International Review of Law and Economics*, *18*(1), 77–100.

Blackstone, E. A., & Hakim, S. (2002). A Market Solution to False Alarms. *Privatization Watch, Reason Public Policy Institute* , 9. No. 311, November, 3, 9.

Blackstone, E. A., Hakim, S., & Spiegel, U. (2002). Not calling the police (First). *Regulation* , 16–19. No. 311.

Buck, A. J., & Hakim, S. (1991). *Residential security Pennsylvania burglar and fire alarm association, and the alarm industry research and educational foundation, Washington, DC*.

Cornes, R., & Sandler, T. (1986). *The theory of externalities, public goods and club goods*. Cambridge, England: Cambridge University Press.

Edds, K. (2003). In Los Angeles, police toughen policy over burglar alarm. *Washington Post, February*, *18*, A03.

Ekelund, R. B., & Dorton, C. (2003). Criminal justice institutions as a common pool: The nineteenth century analysis of Edwin Chadwick. *Journal of Economic Behavior and Organization*, *50*, 271–294.

Hakim, S. (1995). *Securing Suburban Homes: The Greenwich Connecticut Case*. Washington, DC: Alarm Industry Research and Education Foundation.

Mbugua, M., Fenner, A., Coleman, C., & Burke, K. (2003). Metropolitan report serial burglar loose on upper west side. *The Daily News*, *4*, 31. New York, June 4, News page 31.

Mehay, S. L., & Gonzalez, R. A. (1992). Direct and indirect benefits of intergovernmental contracting for police services. In G. W. Bowman, S. Hakim, & P. Seidenstat (Eds.), *Privatizing the United States justice system, Mcfarland and Co. Jefferson, NC*, 67–81.

Model States Report (1999). *Model States Report*. Bethesda, MD: Alarm industry and research and educational foundation (AIREF). July.

Rengert, G., & Waselchick, J. (1985). *Suburban burglary: A time and place for everything*. Springfield, IL: Charles Thomas Publishers.

Sampson, R. (2002). Misuse and abuse of 911. Problem-guides for police services #19, US Department of Justice, 3.

SDM Magazine, S. D. M. (2003). *Industry leaders aid alarm verification effort*. September 22.

Seattle Police Department (2003). *Response to statement of legislative intent-reducing false alarms*. March.

Sherman, L. (1983). Patrol Strategies for Police. In J. Q. Wilson (Ed.), *Crime and Public Policy*. San Francisco: Institute for Contemporary Studies Press.

---

[8] Benson et al. (1998) provide evidence that there is substitution between types of crime committed in response to a change in the allocation of police resources. Since fewer resources are spent on false alarms, there can only be an increase in the public good aspect of what police do.