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The Law & Economics of Private Prosecutions in Industrial Revolution England

Mark Koyama*

Abstract

Can the market provide law enforcement? This paper addresses this question by examining an historical case-study: the system of private prosecutions that prevailed in England prior to the introduction of the police. Using a model of the market for crime, I examine why this system came under strain during the Industrial Revolution, and how private associations were able to emerge to internalize the externalities that caused the private system to generate too little deterrence. The model and historical evidence suggest that these private order institutions were partially successful in meliorating the problem of crime in a period when Public Choice considerations precluded the introduction of a professional police force.

Key words: Economics of Crime, Private Prosecutions, Club Goods, Deterrence, Free-Riding

JEL classification: K14, N43

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1 Introduction: The Private Provision of Public Goods

The provision of law enforcement is traditionally held to be a public good that has to be provided by the state (see for a recent statement Polinsky and Shavell, 2007). But this view has been challenged by research demonstrating that the private provision of policing is both theoretically possible and empirically feasible (Becker, 1974; Landes and Posner, 1975; Friedman, 1979, 1984). A number of issues, nonetheless, remain unresolved. In particular, while it is established that private law enforcement institutions can function well in small-scale and close-knit communities, it is not clear whether they are *scalable*, that is, capable of generating an effective level of deterrence in larger societies.

In this paper, I examine an historical case study: England during the Industrial Revolution (1750-1850) to shed light on this question. By using a model of crime and law enforcement in conjunction with historical evidence, I argue the scalability problem did cause the pre-modern private system of prosecutions that operated in England before the Industrial Revolution to breakdown. However, there was no publicly-funded, professional, police force in London until 1828 and parts of the country remained unpoliced until 1856. Using a combination of theory and archival evidence, I show that a private-order institutional response was able to respond to the break down in law and order, and to ameliorate the problem of crime in the period prior to the introduction of the police. Clubs, known as associations for the prosecution of felons, subsidized prosecutions for their members and increased the overall level of deterrence.

The example of private law enforcement in eighteenth and nineteenth century England is highly significant because, while most other examples of private law enforcement are based on small-scale societies, which arguably do little to inform our understanding of how such institutions would function if scaled up, England in the late eighteenth century was a large, rapidly urbanizing economy, experiencing the onset of sustained economic growth. The example of how England fared without a police force until 1856 illustrates both the inefficiencies associated with a private system of law enforcement and the ability of private individuals to come up with institutional responses to these inefficiencies.

Economists in the Pigovian tradition identified instances of justified government provision by identifying possible market failures (Pigou, 1952). This provided a clear rationale for the growth of government in the nineteenth and twentieth centuries: the rise of the state could be straightforwardly interpreted as representing the correction of longstanding market failures. Indeed, the fact that the government had taken over a particular industry that had previously been in public hands was used *ex post* to infer that there must indeed be a market failure present.¹

¹Classic papers in this tradition like Samuelson (1954) argued that private provision of a pure public good like a lighthouse was impossible.

This view was entirely in keeping with the views of the mid-twentieth century historians of English policing, who portrayed the traditional private system in the worst possible light: a disordered and arbitrary system that failed to provide security (Armitage, 1932; Reith, 1936, 1943, 1956; Critchley, 1967; Tobias, 1979). In their opinion, the rationale for a professional police force was clear-cut: they corrected a market failure that persisted only because of the irrational attitudes of reactionary elites.²

Revisionist historians undermined and discredited these traditional policie histories in the 1970s (Silver, 1967; Storch, 1975, 1976; Hay and Snyder, 1989). Similarly, the Pigovian framework was undermined by the Law and Economics and Public Choice revolutions. The latter demonstrated that the motives of policy makers, in asserting state control over parts of the economy that had previously been privately organized, were not necessarily benign (Buchanan and Tullock, 1962; Tullock, 1965, 1971). The former showed that, even in the presence of externalities, government intervention may not be required in order to obtain efficiency or to provide public goods (Coase, 1960; Demsetz, 1970).³

More recently economists working in the ‘economics of anarchy’ have demonstrated that in many situations private individuals are capable of organizing governance without government in a wide range of settings.⁴ Becker (1974), Landes and Posner (1975) and Friedman (1984) outlined the theoretical case for the efficiency of a private system of law enforcement and a number of studies provided empirical case-studies of the private provision of law enforcement services. In particular, Friedman (1979) studied private legal institutions and law enforcement in medieval Iceland, and more recently Leeson (2007*a*) has shown how order was maintained on pirate ships, despite the fact that these ships were run by criminals beyond recourse of the law. A principal finding from this work and from the extensive literature in anthropology, economics, and sociology is that, since

²See in particular Reith (1943, 2-3) and Critchley (1967, 27). Hay and Snyder (1989) comments: ‘Much of the older police history, in short, was a classic instance of the historical fallacy of presentism, the search for the origins of a present institution using modern definitions of organization and function’ (Hay and Snyder, 1989, 5-6). Philips and Storch (1999) have shown that many of the criticisms of lazy or incompetent village constables come straight out of the literature produced by those advocating and justifying reforms in the 1830s and 1840s. They observe ‘Since regular police forces have long been the norm in the West, it is hard to imagine a workable society in which this was not the case. The natural tendency is to think that the establishment of paid, embodied forces was sensible, obvious and inevitable, and that people who resisted or argued against it were foolish, reactionary, wicked or all three’ (Philips and Storch, 1999, 6).

³Coase (1974), for example, showed that lighthouses were at least partially privately funded until the mid-nineteenth century thereby undercutting the claims of Samuelson and opening up the question of private provision of public goods such as law enforcement for debate.

⁴Benson (1989); Greif (1989, 1993); Bernstein (1992); Clay (1997); Dixit (2004) and many others, have demonstrated how self-enforcing contracts can support trade in the absence of government law enforcement. For surveys on the economics of anarchy see Boettke (2005) and Powell and Stringham (2009). This paper focuses exclusively on private forms of law enforcement and ignore other issues such as competing sources of law.

restitution and ostracism are commonly and successfully used to resolve disputes, public forms of legal enforcement are unnecessary, at least in small-scale societies.⁵

Private systems of law enforcement typically rely on either repeated interactions between individuals or on reputation. In small-scale and closely-knit societies, these mechanisms are powerful in enforcing cooperation: the shadow of the future induces individuals to refrain from violence or theft (see Greif, 1989, 1993; Kandori, 1992; Dixit, 2004). Cooperation can be self-reinforcing amongst small groups of individuals or individuals who interact frequently with one another.

The important question that this raises is: can the private forms of law enforcement be used in modern societies comprising not dozens or hundreds, but hundreds of thousands, or millions of individuals, who do not know one another and will not necessarily interact with each other in the future. There are strong theoretical reasons for thinking that, on their own, mechanisms dependent on the Folk Theorem may be unable to support cooperation in large scale societies. In particular, if punishing offenders is costly, then private systems of law enforcement may face a free-rider problem and this free-rider problem may become exacerbated as the society becomes larger.⁶ In sum, the literature on private forms of law enforcement has established the effectiveness of private systems of law enforcement in small-scale, tightly-knit, societies, but it has not yet demonstrated that these institutions can effectively provided similar services in larger, or more fluid, societies. This is the ‘scaleability problem’.⁷

The system of private prosecutions that operated in eighteenth and early nineteenth cen-

⁵See Hoebel (1967); Bates (1983); Fletcher (2003) and Scott (2009). For further references see Posner (1980) and Benson (1988) who consider how a range of legal questions are settled in preliterate societies and Leeson (forthcoming*b,f*) who considers the role superstitious beliefs plays in premodern legal systems; Volckart (2004) who examines the role of feuds in medieval Germany; Leeson (2009) who considers how a decentralized legal system emerged to govern disputes between “reivers” along the Anglo-Scottish border in the late middle ages; Anderson and Hill (1979) studied the American West in the nineteenth century; Benson (1994) and Curott and Stringham (210) who consider the Anglo-Saxon legal systems; and Skarbek (2010, 2012*a,b*) who studies how prison gangs provide governance.

⁶Additionally, cooperation is fragile in such systems; it is only one among innumerable possible strategies that can be thus supported (Friedman, 1971; Fudenberg and Maskin, 1986). Indirect reciprocity based on reputation-based mechanisms also break-down in large and fluid populations (Nowak and Sigmund, 2005). Most example of private law enforcement come from small-scale societies at low levels of economic development. Examples include modern Somalia (see Leeson, 2007*b*) or the hill people of Zomia studied by Scott (2009). This supports Adam Smith’s observation that ‘[w]here there is no property, or at least none that exceeds the value of two or three days labour, civil government is not necessary’ (Smith, 1776, Bk. V. chap. 1).

⁷One important paper that does tackle the scaleability problem is Leeson (2008) who demonstrates how, in a large-scale society, trade can still take place in the absence of third-party enforcement if individuals who do not known one another and are socially distant invest in signals that service to reduce this social distance. These investments screen out individuals who are likely to cheat and ensures that mutually beneficial trades take place. It shows how trade can still take place in a large-scale society but does not directly address the subject of private law enforcement.

tury England allows us to address this issue. This is not the first paper to study how the English system of private prosecutions functioned. Friedman (1995) also considers the legal system of eighteenth century England from a law and economics perspective. He discusses how private prosecution associations increased deterrence by (1) pre-committing potential victims of crime in undertaking prosecutions and (2) internalizing the benefits of deterrence among members. Allen and Barzel (2011) consider how the increasing standardization of production shaped the evolution of criminal law, the introduction of the police, and the introduction of factory colonies in this period. Koyama (2012a) provides a detailed historical analysis of associations for the prosecutions of felons, drawing on archival evidence, and shows how the internal organization of these associations enabled them to privately provide public goods.⁸

The example of eighteenth and early nineteenth century England is informative because, during the industrial revolution, a private system of prosecutions that had worked effectively for centuries came under severe strain. However, it was not replaced by a professional police force. For important political economy reasons, Parliament rejected the idea of a nationwide police force in the 1780s, and it was not until 1856 that every county in England had a police officer. The unique feature of the English example, therefore, is that it allows us to study how a *private* system of law enforcement responded to the increase in crime that accompanied the industrial revolution.

The remainder of the paper is organized as follows. Section 2 describes how the private system of law enforcement functioned in preindustrial England. Section 3 introduces a model of the market for crime and Section 4 uses that model to study how this private system came under strain during the Industrial Revolution. Section 5 augments the model by allowing clubs called prosecution associations to form in order to mitigate the free-rider problem that exists under a private system of prosecutions; it demonstrates how these associations were able to provide additional deterrence, attract members, and how their demise, and replacement by a professional police force, led to a shift in the types of crimes that were prosecuted. Section 6 concludes.

⁸Historians have discussed these associations at some detail; notably Schubert (1981); King (1989); Philips (1989). Davies (2002) summarizes the existing historical research on the rise of a professional police force and argues that at the time associations for the prosecutions of felons provided a genuine private alternative to public law enforcement. Mokyr (2008, 2009) discusses the importance of private-order organizations and social norms that encouraged honesty and fair-dealing in producing a conducive institutional backdrop for the Industrial Revolution.

2 The Private System of Prosecutions

Continental European countries had long relied on public prosecutors but law enforcement in pre-industrial England was largely private.⁹ The set of legal institutions that characterized eighteenth century England emerged during the middle ages as the Norman kings of England imposed their own system of royal courts and ‘common law’ onto a preexisting set of earlier, decentralized, Anglo-Saxon legal institutions (Pollack and Maitland, 1895; Benson, 1994; Klerman, 2004; Stringham and Zywicki, 2011).

England in the eighteenth century did not rely upon purely informal systems of restitution which are typical of small-scale societies. The legal system was centralized and publicly provided (although costs were defrayed through fees). Nevertheless, the extent to which this system relied on private individuals is striking. Local magistrates, Justices of the Peace (JPs) and constables, involved themselves in assisting victims in pursuing and apprehending criminals, but, with the exception of crimes against the state, such as treason and coining, the costs associated with assembling a prosecution were borne by the victim (Hay and Snyder, 1989, 26).¹⁰ This system evolved little and in the eighteenth century most of ‘the country was policed by arrangements which had been inherited from the Middle Ages’ (Tobias, 1979, 25).¹¹

Although there are no nation-wide estimates of offenses committed, the private system of law enforcement appears to have functioned adequately in pre-industrial England. McMullan summarizes the historical consensus as follows: ‘[t]he “system of amateur policing,” drawn as it was from the local village or ward, seems in the hands of the new social history to have been remarkably able, conscientious, efficient, and adequate to the needs of rural and small-town England’ (McMullan, 1987, 254). Perhaps the most compelling evidence we have for this is that the absolute number of executions fell steadily during the seventeenth and much of the eighteenth century, despite population growth

⁹Police forces were introduced by absolutist rulers across continental Europe during the sixteenth and seventeenth centuries (for the example of Maximilian I of Bavaria, see Haude, 2007). For details on the French system, see Emsley (2007). Scotland also employed a public prosecutor and a police force. The United States, however, was as unpoliced as England in the early nineteenth century (Little and Sheffield, 1983). For details on the development of policing across Europe in the nineteenth century, see Liang (1992).

¹⁰Constables were ‘parish households’ who took turns as ‘volunteers’. As they were unpaid, they typically did little more than ‘assist the private citizen who was the victim of a theft or other crime and who himself paid for the prosecution and largely organized it’ (Hay, 1980, 48). Even in the murder cases, the state typically refused to pay for information leading to a conviction. The notable exception to this rule were the Ratcliffe highway murders in 1811 which shocked the entire country and led to a series of Parliamentary committees that looked into police reform (see James and Critchley (1971) who comment that ‘[i]t was common enough for the Government to offer rewards for information that led to the conviction of an offender against the public good, but requests relating to crimes against individuals, even murder, were invariably refused’ (James and Critchley, 1971, 46)).

¹¹Also see Critchley (1967) and Rawlings (2002).



Figure 1: The increasing number of committals between 1807 and 1838 in absolute numbers and per 100,000 people. Source: *First Report from the Commissioners Appointed to Inquire as to the Best Means of Establishing an Efficient Constabulary Force in the Counties of England and Wales* (1839).

and despite the fact that the number of crimes liable for the death penalty increased dramatically.¹²

A number of factors were at work limiting crime in pre-industrial England. First, the small-scale nature of the rural communities that made up most of England (outside London) meant that opportunities for property crime were limited. Valuable possessions were carefully locked away and guarded; and what goods there were, were often personal items that could be easily identified (and hence recovered) by their owners (Allen and Barzel, 2011). Second, the existence of well-established social norms meant that there were a range of alternative forms of punishment that could be used in conjunction with the formal legal system. James Sharpe observes that formally ‘indictable behaviour’ could be deterred or punished by ‘dismissal or chastisement by an employer; informal coercion or admonition by a priest or landowner; arbitration; and control through the poor law. Ostracism and eventual ejection from the community (an informal secular equivalent of excommunication) and control through the ritualized satire of rough music or stang riding’ (Sharpe, 1980, 117-118).¹³ Third, these very same social norms also meant

¹²See Beattie (1974), Sharpe (1983), and Philips and Storch (1999).

¹³Rough music—often the banging of tin kettles, tea trays, and drain pipes—was used to humiliate individuals who had committed offenses that were socially disapproved of, but not seen as worthy of an indictment (see Conley, 1991). Similarly, Philips observes: ‘It is a very modern idea, dating from no earlier than the early nineteenth century, to think that every discovered offence should be

that the criminal justice system, when it was used, functioned effectively. Volunteer constables and Justices of the Peace assisted victims and pursued criminals because they were incentivized to do so by local social norms. To the extent that this system of strong social norms was effective, it could ensure that individuals prosecute crimes when it was in the social interest to do so, and refrained from prosecuting crimes when it was not in the social interest to do so.¹⁴

However, this changed during the eighteenth century and, by the time of the Industrial Revolution, contemporaries believed that they were experiencing a crime wave. The view at the time was that ‘crime has much increased’ everywhere in the years before Victoria came to the throne,’ (Jones, 1992, 51-52). No estimates of the actual number of offenses were kept until 1857, so the main evidence that we have for this crime waves comes from the increase in committals, which reflects attitudes towards crime and resources devoted to eradicating crime as much as it does the actual level of offenses. This is depicted in Figure 1.¹⁵ Nevertheless, local studies certainly suggest that property crimes were increasing in the late eighteenth century (Beattie, 1986, 215).¹⁶ In order to examine why the private system of prosecutions came under strain during the Industrial Revolution, it is useful to introduce a model of the market for crime in order to better understand the conditions under which a private system of law enforcement can function.

3 The Market for Crime

I develop a model based on Becker (1968); Ehrlich (1996) in order to analyze how a system of private prosecutions might work in a society like Industrial Revolution England. The

followed automatically by prosecution; for centuries, the English system had worked on the principle that indictment before court was the last resort to be tried; there were all sorts of alternative informal means which the potential prosecutor might try short of formal prosecution’ (Philips, 1980, 158). Similarly, Taylor observes that ‘[f]ace-to-face communities and informal sanctions, legitimized in part by religion and custom, meant that the legal system was often used as a last resort. The courts, dominated by amateurs, dealt with the cases that came before them with breathtaking rapidity and operated in a highly personalized manner’ (Taylor, 1998, 2).

¹⁴The strength of village norms in early modern England in another context is attested to by the extraordinarily low numbers of illegitimate births recorded in the seventeenth century. This is particularly striking once it is realized that the average age at first marriage was late (27-28 for men and 24-26 for women) (Wrigley and Schofield, 1981).

¹⁵The disparity between recorded and actual crime is always a problem with criminal statistics but it is particularly acute in early nineteenth century England where no estimates of offenses were kept until 1857. Hence the true number of crimes—‘the dark figure’—is itself unknowable. The only nation-wide criminal statistics that we have for the first part of the nineteenth century refer to committals. These statistics interpreted by most contemporaries as representing a crime wave (see Gatrell, 1972; Philips, 1977; Emsley, 1996; Taylor, 1998). As Philips and Storch note the committal statistics ‘cannot prove that ‘crime’ in Wiltshire or Herefordshire was increasing more rapidly than in Lancashire or Durham, but [they] do show why we may forgive rural gentlemen for thinking that they had a big problem on their hands’ (Philips and Storch, 1999, 44-45).

¹⁶Violent crime, however, continued to decline during this period (see Beattie, 1974).

supply of crime is an increasing function of the cut-off level of criminal ability at which a potential criminal is indifferent between offending and not offending. There are $i \in Z$ potential criminals where Z is large, who can be ordered in terms of their criminal ability x_i , where x_i is distributed between 0 and 1. The net benefit of engaging in crime for individual i is $\pi_i = x_i - \kappa - \Lambda p \gamma$, where κ is the direct cost involved in theft, Λ is the probability that a victim will prosecute the criminal, p measures how likely this is to succeed, and γ is the cost of being convicted. Importantly, we assume that crime is opportunistic and targets are randomly chosen so that criminals face a common $\Lambda p \gamma$. This assumption is both appropriate for modeling crime in industrial revolution England and simplifies our analysis considerably. In order to determine which potential criminals actually engage in crime we identify the marginal individual who is indifferent between committing crime and pursuing honest pursuits. Such a marginal criminal has ability: \hat{x} such that $\hat{x} = \kappa + \Lambda p \gamma$. It follows that the overall supply of crime q is a function of this cut-off: $q(\hat{x}) = (1 - \hat{x})Z$; all individuals with ability $x_i < \hat{x}$ are deterred from engaging in crime. Note that since each criminal commits one crime $q(\hat{x})$ is equal to \hat{q} the total amount of crime in equilibrium.

There are $j \in N$ potential victims of crime where N is large. Individuals can be ordered according to the value of their possessions that are at risk from crime: d_j , which is distributed uniformly between zero and \bar{d} . Without loss of generality we normalize $\bar{d} = 1$. Since, criminals do not target specific individuals, the probability that any individual is the victim of crime is given by $q(\hat{x})/N$. Therefore the cost of crime for individual j in expectation is $d_j q(\hat{x})/N$. Prosecutions are private; the responsibility of the victim. If individual j is the victim of a crime and he successfully prosecutes the criminal then he can recover the value of his goods d_j . It follows that individual j prosecutes if the benefits outweigh the costs or:

$$p d_j \geq \nu,$$

where ν is the cost of prosecuting and $p \in (0, 1)$ is the probability that a prosecution is successful. Denote the decision to prosecute by λ_j which equals one if j prosecutes and zero otherwise. Hence, potential victims of crime obtain the following payoffs: $\frac{1}{N} [q(\hat{x}) [\lambda_j p d_j - d_j - \lambda_j \nu]]$.

The market level of prosecution is consequently given by:

$$\hat{\Lambda} = \sum_{j=1}^{j=N} \lambda_j \quad \text{where} \quad \lambda_j = \begin{cases} 1 & \text{if } p d_j \geq \nu, \\ 0 & \text{otherwise.} \end{cases} \quad (1)$$

Define $\hat{d} = \nu/p$: the cut-off level of criminal damage at which a victim of crime decides to prosecute under a system of private prosecutions. Using the uniform distribution of d_j , we can write:

$$\hat{\Lambda} = 1 - \hat{d} = 1 - \frac{\nu}{p}.$$

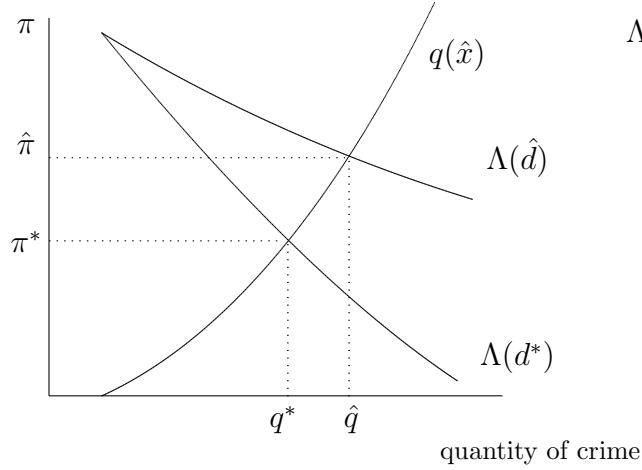


Figure 2: The optimal level of prosecutions, $\Lambda(d^*)$, and the market level of prosecutions $\Lambda(\hat{d})$.

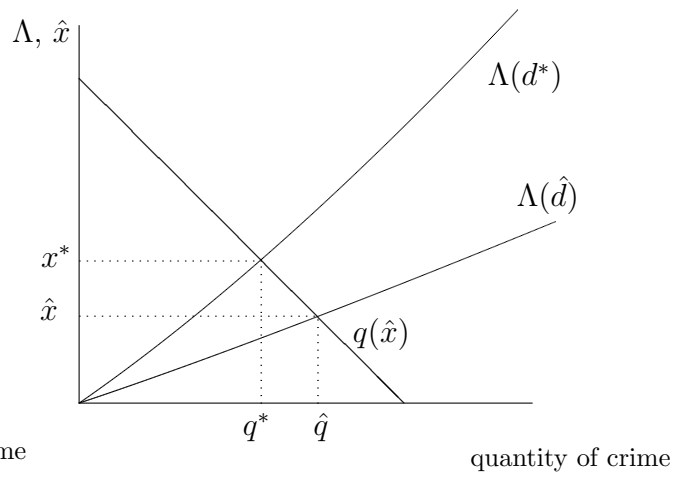


Figure 3: The ability of the marginal criminal under a private system \hat{x} is lower than is socially optimal: x^* .

Putting this all together, the total amount of crime under a system of private prosecutions is given by $q(\hat{x}) = (1 - \hat{x})Z$; or $v(1 - \kappa - p\gamma + v\gamma)Z$. We can now contrast this to the socially optimal level of prosecutions.

The optimal level of prosecutions $\Lambda(d^*)$ is determined by:

$$\Lambda(d^*) = \sum_{j=1}^{j=n} \lambda_j^* \text{ where } \lambda_j^* = \begin{cases} 1 & \text{if } pd_j - \epsilon_{q\Lambda}q(\hat{x}) \geq \nu, \\ 0 & \text{otherwise.} \end{cases} \quad (2)$$

where $\epsilon_{q\Lambda} = \frac{\Lambda}{q(\hat{x})} \frac{dq(x)}{d\Lambda} = -\frac{\Lambda p\gamma}{(1-\kappa-\Lambda p\gamma)}$ is the point elasticity of the market supply of crime with respect to an increase in the proportion of crimes prosecuted. Assessed at $q(\hat{x})$, $\epsilon_{q\Lambda}q(\hat{x}) = -p\gamma Z$. It follows that there is a cut-off level of d above which pursuing a prosecution is socially beneficial, and that this is lower than that which obtains under a private system of prosecutions:

$$d^* = \frac{\nu - p\gamma Z}{p} < \hat{d}. \quad (3)$$

Hence the socially optimal level of deterrence $\Lambda(d^*) = 1 - d^*$ exceeds the market level of deterrence $\Lambda(\hat{d}) = 1 - \hat{d}$ and the market cutoff value generates higher level of crime than is socially optimal: $q(\hat{x}) > q(x^*) = (1 - \kappa - \Lambda(d^*)p\gamma)Z$. Figures 2 and 3 illustrate this equilibrium: the lower market level of prosecution means that more individuals have an incentive to become criminals. This inefficiency comes about because each individual prosecutor does not take into account the effect his decisions have on the total supply of crime.

In a small-scale society the difference between the socially optimal level of deterrence, d^* , and the level of deterrence that obtains in a private system of prosecutions, \hat{d} , is likely to

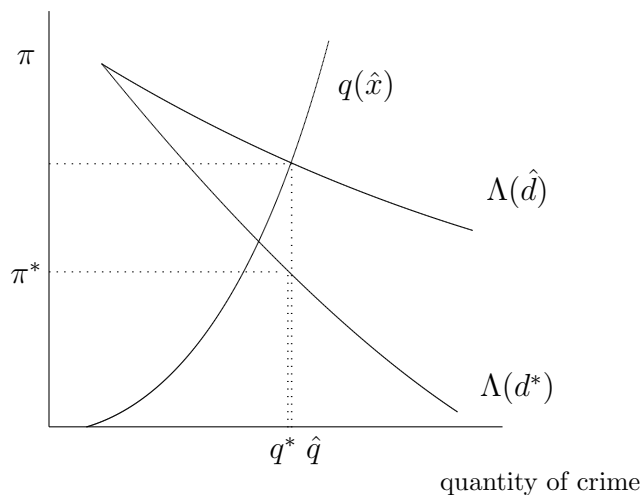


Figure 4: The difference between the market level of crime \hat{q} and the socially optimal level of crime q^* in a small-scale society.

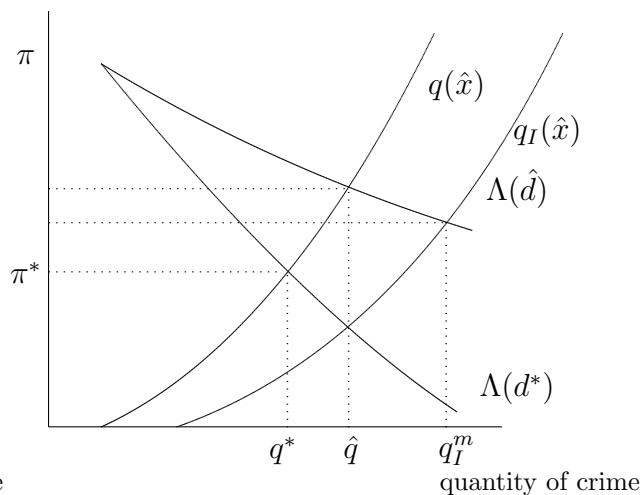


Figure 5: The difference between \hat{q} and q^* in an industrializing society. An increase in the net benefits of crime causes \hat{q}_I to increase further.

be small for the reasons discussed above. Figure 4 depicts this case. Furthermore, social norms may pressure individual i into undertaking a prosecution for which $d_i \in (d^*, \hat{d})$. Under these conditions, a private system of law enforcement can functioned effectively. However, these conditions would no long obtain once the Industrial Revolution began.

4 The Industrial Revolution and the Problem of Crime

The Industrial Revolution increased crime through a number of channels. On the supply-side, a range of factors related to urbanization and industrialization increased the incentive individuals had to commit crime—particularly property crimes. Contemporary writers argued that economic growth increased the ‘temptation’ to steal (Fielding (1751, 4) and Colquhoun (1796, 34)). Colquhoun argued that ‘[t]he progressive, and (of late years) the very rapid increase of its Trade, and the consequent influx of Wealth, without such checks as regularly applied are necessary to restraint the progress of vicious inclinations, has certainly tended in an eminent degree, to the production of crimes’ (Colquhoun, 1803, 6). Certainly, the consumer revolution of the eighteenth century meant that there were many more valuable personal possessions that a thief could steal than had previously been the case as wrist-watches and ready-to-wear garments became common (see Brewer and Porter, 1993; Lemire, 1991; de Vries, 2008; Styles, 2007; Koyama, 2012b).¹⁷ Secondary markets developed for stolen goods for the first time in cities like London (see for a discussion of this Fielding, 1751, 68).

¹⁷In 55 cases from the Northern Circuit Assize in the second half of the eighteenth century, men whose occupations were listed as labourers, husbandmen and servants reported watches stolen from them (Styles, 2007, 344).

Recently Allen and Barzel (2011) have ingeniously argued that theft became easier as standardized products increasingly replaced personalized items. Greater standardization lowered the probability of detection, p , thereby causing $\Lambda(\hat{d})$ to rise, and resulting in a larger gap opening up between the actual and the socially optimal level of prosecutions. But it was not only standardized goods and industrial by-products that became easier to steal. Better toll roads encouraged horse theft (Styles, 1989, 20). The rise of new industrial towns made faceless crime much more common and made it easier for criminals to escape with their gains (Critchley, 1967, 21).¹⁸

On the other hand, increased poverty and declining opportunities in traditional sectors of the economy made a life of crime more tempting for many individuals. Recent accounts of the industrial revolution stress that it was characterized by rapid population growth, urbanization, and structural change as much as by per capita income growth (see Crafts, 1985; Harley, 1999). There was a tremendous increase in total output, but real wages were stagnant, while inequality grew dramatically (Allen, 2009).¹⁹ Manufacturing boomed in Lancashire and the Midlands, but in other parts of the country such as East Anglia the traditional textile industry went into decline, causing widespread hardship and unemployment (Mokyr, 1988; Hudson, 1989).²⁰ Economics growth, increased inequality and standardization increase the returns to crime, π , directly, while stagnant or falling real wages reduce the value of the next best alternative to crime, increasing π indirectly. This increased the supply of potential criminals as shown in Figure 5.

Industrialization also increased tension between employers and employees. The shift from artisan production and cottage industries, in which the scale of production was small, and whatever hierarchy there was in the workplace was flat, to large-scale production,

¹⁸The old system was particularly ill-equipped to deal with crime in the fast-growing manufacturing towns of the north. In cities like Manchester the number of constables and magistrates did not keep up with population growth, with the result that it was extremely difficult for victims of crime to even report offenses (Radinowicz, 1958, 208). C.f. Radinowicz (1958, 208–209). A contemporary opinion is Wade (1829, 6). For details on Middlesborough, see Taylor (2002).

¹⁹There was dramatic structural change. The share of population in agriculture fell from 48 percent in 1750 to 20 percent in 1850 (Mokyr, 2004, 4–10). Per capita income growth was low: 0.17 percent between 1760 and 1800 and 0.52 percent between 1800 and 1830 according to Craft's (1985) estimates. The gradual rise in income is consistent with real wages that did not increase at all between 1800 and 1830 according to Allen (2009), as the number of days worked increased (Koyama, 2012*b*).

²⁰Among contemporary writers, John Wade recognized the role of inequality and the uncertainty of employment in 'pushing' individuals into crime, observing that '[c]rimes have multiplied from peculiarities in our condition—the extremes of indigence and opulence . . . the fluctuations in employment and subsistence—the enormous increase in property and population . . . the avidity of gain—the temptations to luxury and dissipation—and the rivalry in individual expense and ostentation which peculiarly marks the present period' (Wade, 1829, 25). The anonymous author of Anonymous (1836)—an opponent of a professional police force—conceded that 'No doubt the progress of society and *the large increase of population engaged in manufactures*, has created a necessity where these changes have occurred, of a more vigilant and organized Police' (Anonymous, 1836, 10, emphasis added).

either in workshops or in factories, changed the relationship between workers and bosses (Thompson, 1963). Before the move towards factory production, workers had been allowed to take home the scraps and by-products of the production process—a practice known as gleaning (see Ignatieff, 1978, 26-27). Standardization, however, increased the costs of this practice to employers, and factory owners took actions to limit and criminalize it (see Allen and Barzel, 2011, 10-11). This resulted in acts that had previously been permissible becoming criminalized.

If we turn to the incentives facing potential victims of crime, these, too, began to change with industrialization. On the ‘demand’ side of the market, social norms in pre-industrial society had encouraged prosecutors to internalize the externality $e_q q(\hat{x})$. Urbanization eroded these norms and thereby exacerbated the externality problem. More importantly still, at the same time as informal alternatives to the criminal justice system began to disappear, the costs of using the law courts increased as the law became more professional and the use of lawyers became more common.²¹ Reformers from the mid-eighteenth century onwards noted that too few individuals carried prosecutions to conclusion.²² They argued that the increased cost of prosecuting was one reason for the rise in crime. The advocate of police reform, Patrick Colquhoun stated this reasoning most clearly: ‘many persons who suffer by means of small robberies, afraid of the trouble and expence of a discovery and prosecution, submit to the loss without enquiry, while others, from being strangers to the law, and to the proper mode of application, fall into the same mistake, which, by proving a great encouragement to thieves of every class, is of course an injury to the public’ (Colquhoun, 1796, 212).²³

Prosecuting was costly. Serious crimes were tried at the assize courts, where by the mid-nineteenth century the average cost of bringing a case was between £20 and £50 at the assize courts (*Report of the Commissioners for inquiring into County Rates*, 1836, 15).²⁴

²¹According to Smith: the ‘increased presence and activity of defense counsel at the eighteenth-century Old Bailey only further contributed to the problems faced by prosecutors in proving private ownership of nondescript goods ... in 1784 James Scott, who had been indicted for stealing forty four pounds of spermaceti, was acquitted after his counsel, William Garrow, subjected the prosecutor’s witnesses to a withering cross-examination concerning the precise age, shape, color, and size of the “spermaceti cake” alleged to have been stolen from the victim. After the court instructed the jury that it was “incumbent” on the prosecution’s witnesses not to “swear rashly” at trial to the article’s purported identification, the jury acquitted the defendant’ (Smith, 2006, 44).

²²See *Report of the Commissioners for inquiring into County Rates* (1836, 8)

²³For further evidence on the reluctance to prosecute see Hay (1975, 41), Beattie (1986, 35), Philips (1989, 115–116) Jones (1992, 5). Hay (1975) argued that this system gave the prosecutor a degree of discretionary authority that he could use to his advantage.

²⁴Less serious cases were heard at the Quarter sessions where the cost was less, around £3–10 on average; however ‘it occurs that as much as £500 is paid upon a single assize prosecution’ in the early nineteenth century (*Report of the Commissioners for inquiring into County Rates*, 1836, 15). The costs of prosecuting one Thomas Mills as totaling £6, 6s, 8d *Evidence Taken by the Constabulary Force Commissioners: state of the rural districts as to crime and the means of its prevention* (1839). This

To begin with, the victim had to give evidence before a magistrate (perhaps traveling dozens of miles to do so). Then, he had to find and interview witnesses, and hire a solicitor if he wanted one. He had to decide on a charge and obtain an indictment from an assize court which could take days. The witnesses had to testify in front of a grand jury when making depositions. And witnesses typically needed to be paid expenses. At the trial the prosecutor was responsible again for ensuring that the witnesses were present and hence responsible again for their expenses. And after the trial, he might have to intervene again if the defendant sought a pardon (Hay and Snyder, 1989, 26).

As the model suggests, it was not just that undertaking a prosecution was costly, rather there was an incentive to free-ride on the prosecutions of others, with the result that the actual number of prosecutions was below the socially optimal number. Contemporaries understood this. Fielding noted that ‘[r]obbery is an Offence not only against the Party robbed, but against the Public, who are therefore entitled to Prosecution; and he who prevents or stifles such the Prosecution is no longer an innocent Man but guilty of high Offence against the Public Good’ (Fielding, 1751, 108). In the view of contemporaries, deterrence was a public good that was under-provided by a private system of prosecutions.²⁵ Perhaps the most influential critic of this system and advocate of reform, Edwin Chadwick, observed that a foreigner might have ‘plausible reasons for believing that it [the English legal system] was craftily framed by a body of professional depredators, upon a calculation of the best means of obtaining from society, with security to themselves, the greatest quantity of plunder’ (Chadwick, 1829, 254).²⁶

Our model rationalizes many of the complaints contemporaries made about the private system of law enforcement that existed in England at the turn of the nineteenth century. The increased gap between \hat{q} and q^* explains the sense of crisis that pervades contem-

included, taking Mills to Buckingham to be examined which cost 10*s*. Paying witnesses, surgeons etc. 2*s* each, hiring a conveyance to the goal, and paying 2*s* 6*d* for information. To clarify, prior to decimalization, there were 240*d* or 20*s* to the £. A guinea was 21*s*. Farmer labourers earned around 22*d* per day during the summer time according to the 1834 Poor Law report (Clark, 2007). Per capita nominal GDP is estimated as being around £24 in 1801. (Officer, 2010).

²⁵The initial response to this problem during the early eighteenth century was to increase the number of crimes punishable by death. Theoretically, this should have resolved by the problem. However, in practice it soon proved to be flawed. It created a problem of marginal deterrence as analyzed by Friedman and Sjoström (1993). Moreover, increasingly over the course of the eighteenth century juries and judges colluded in actions that undermined the deterrence effect. Theft of any item worth more than 6*d* was punishable by death. But juries typically committed pious perjury in these cases undervaluing the goods in question in order to spare the felon the gallows. For this reason, Romilly (1810) argued: ‘The severity of the law it was said deters men from prosecuting, and the consequence of so inhuman a punishment being threatened is, none is suffered. Abolish the capital sentence, inflict a severe punishment but one less repugnant to all men’s notions of justice; and your law will be enforced, prosecutions will necessarily multiply, and punishment will be inflicted where now immunity prevails. What was foretold has happened.’ (Romilly, 1810, 75). On this point also see Friedman (1999).

²⁶Chadwick’s analysis is discussed in detail in Ekelund and Dorton (2003).

porary discussions of crime.²⁷ Colquhoun argued that the problem was so grave that a public prosecutor was required. ‘Experience’ had taught him that the moral arguments in favour of prosecuting ‘powerful as they are, will neither awaken in the mind of men that species of public spirit which shall induce’ individuals ‘to become willing prosecutors under all the trying delays, added to the expence often of bringing a number of witnesses from the country, and keeping them hanging on in the court of justice, perhaps for several days together’ (Colquhoun, 1796, 246-247). A public prosecutor, acting in combination with a professional police force, would not ‘only remove that aversion which prosecutors manifest on many occasions, to come forward, for the purpose of promoting the ends of public justice; but it would prevent, in a great measure, the possibility of compounding felonies or of suborning witnesses’ (Colquhoun, 1796, 252).²⁸

4.1 A Professional Police Force?

Advocates of police reform contrasted the largely private English system with the public French system. Charles Cottu, who visited England in the 1810s, observed that the English were uninterested in the causes of crime and were ‘very indifferent as to the condemnation of the accused, should those whom he has injured suffer themselves to be touched with commiseration, or overcome by indolence’ (Cottu, 1820, 23).²⁹ The anonymous author of the *Code D’Instruction Criminelle* (thought to be James Mill) argued that the French system was superior to the English system in that it excelled in the ‘preliminary business’ of assembling a case, securing the suspect, and searching for evidence for his guilt. As ‘[t]here is no public prosecutor’:

‘we trust entirely to the information of the individual whom the crime has injured. For want of a prosecutor, we bind this voluntary informer to prosecute;

²⁷C.f. Fielding (1751); Colquhoun (1796); Wade (1829) and the eight Parliamentary Reports commissioned during this period. Piecemeal reforms were carried out. Parliament granted poor prosecutors some expenses after 1752, if they were successful in securing a prosecution, and an act of Parliament of 1754 allowed courts to pay the expenses of poor witnesses. In 1818 and 1826 this allowance was expanded so as to cover expenses incurred prior to the trial for felony cases (but not for misdemeanors).

²⁸The writings of Fielding, Patrick Colquhoun and Edwin Chadwick should be treated cautiously as they they not disinterested observers, but partisan political entrepreneurs trying to push through a program of police reform but this argument was not seriously contested even by those who who in favor of retaining the traditional system. For further evidence on the reluctance to prosecute see Hay (1975, 41), Beattie (1986, 35), Philips (1989, 115–116) Jones (1992, 5).

²⁹According to Alexis De Tocqueville:

‘[i]t is impossible to imagine anything more detestable than the criminal investigation police in England . . . There is no official charged with a duty to prosecute, which both makes worse the defect mentioned above, that of placing justice out of reach of the poor, and means that the criminal law is never enforced continuously or firmly’(de Tocqueville, 1958, 63).

Interestingly, however, Cottu, unlike De Toqueville, was actually favorably disposed towards the English legal and criminal justice system as a whole.

which is imposing upon him so great a burden, in loss of money, loss of time, and in trouble of various kinds, that, in a great proportion of instances—in, probably, by the majority of instances—where the injury is not of an atrocious sort, the injured person conceals it, and withholds complaint. Instead of taking measures to secure the notice of crimes, we thus take measures to secure their concealment’ (*Code d’Instruction Criminelle*, 1810, 108).

From the point of Utilitarian reformers like Mill and Chadwick as for modern Pigovian economists, the solution to this problem seemed obvious: introduce a publicly funded and professional police force and public prosecutor.

Parliament did in fact discuss introducing a publicly funded police force as early as the 1780s. However, a professional police force was not introduced for several decades and there was no nationwide force until 1856. Opposition to such a force was widespread. Only a few Utilitarian reformers seriously considered imitating the French system. Douglas Hay observed that the rural ‘gentry would not tolerate even the idea of a police force’. Hay claimed that their opposition was partly self-serving and partly ideological: ‘they remembered the pretensions of the Stuarts and the days of the Commonwealth, and they saw close at hand how the French Monarchy controlled its subjects with spies and informers’ (Hay, 1975, 18). They also controlled the magistrates and retained discretionary authority over local constables which they stood to lose if a national police force came into being.

However, the fears of the gentry were widely shared. A willingness to privately take on the responsibility of a prosecution was seen as the price of a liberal society, that in the words of an anonymous county magistrate ‘[s]ome degree of trouble and expense in the vindication of our rights is the condition of a free government’ (Anonymous, 1836, 34). The legal theorist William Paley clearly stated that

‘[t]he liberties of a free people, and still more the jealousy with which these liberties are watched, and by which they are preserved, permit not those precautions and restraints, that inspection, security, and control, which are exercised with success in arbitrary governments . . . least of all will they tolerate the appearance of an army force, or of military law, or suffer the streets and public roads to be guarded and patrolled by soldiers; or lastly, entrust the police with such discretionary powers, as may make sure of the guilty, however they involve the innocent’ (Paley, 1830, 164).³⁰

³⁰William Blackstone was of the same opinion. Radzinowicz noted that ‘It is not surprising that Blackstone should not have recognised ‘Police’ as an institution. With all his conservatism, and largely because of it, the thing that mattered most to him was the concept of a State, patriarchal perhaps, but firmly grounded in the rule of law. He was an exponent of the liberal doctrine and of the liberal spirit, anxious to see the liberal doctrine and of the liberal spirit, anxious to see the rights of the subject secured

Whig reformers who aimed at overturning many aspects of the old eighteenth century criminal justice system (such as the reliance of capital punishment) shared Paley's opposition to a police force. One historian observes that 'to the notion that the law might be more effectively enforced if there were a reformed and efficient police, they exhibited in general a notorious repugnance. If in this they were partly influenced by a dislike of putting stronger instruments of power in the hands of the government, they were also manifesting a deep-rooted popular prejudice which characterized all parties and all classes' (Gash, 1961, 320). A public police force might not be used to crush English liberties directly, but it might still be an inefficient and bloated source of patronage for the King's ministers, and thereby corrode these freedoms indirectly. Given that in late eighteenth and early nineteenth century administrations, there was little distinction between private and public office or income streams, these fears were not irrational or driven by ideology.³¹

5 Prosecution Associations

The private system of prosecutions was unable to cope with crime in Industrial Revolution England. The Pigovian solution to the problem of crime in early-nineteenth century England was off the table for Public Choice reasons. This gives us a unique opportunity to see how private-order institutions were able to respond to a recognized market failure and to address the scalability critique.

Beginning in the mid-eighteenth century, private associations and organizations began to be formed across the country. These associations emerged out of agreements neighbors made with one another to prosecute any crime committed against them. Over time, the agreements became more formal. Associations drew up constitutions, membership lists, and rules which committed them to fund prosecutions on behalf of their members. Members paid entry fees and annual subscriptions which were used to help pay for the expenses involved in apprehending and prosecuting a suspect. Most associations had their own solicitor who represented the association in court and provided legal advice to members. The funds of an association were also used to pay informers and to advertise rewards.³² Here we can demonstrate how such associations could have ameliorated the

and respected, and the actions of the government jealously watched, lest it drift into arbitrariness and despotism' (Radinowicz, 1948, 418-419).

³¹Historians have traditionally seen the eighteenth century British state as corrupt (Rubinstein, 1983; Root, 1991). The spoils system, or what later became known as 'Old Corruption' consisted of the widespread sale of offices and favors (Haring, 1996; Philips, 2004). Allen (2011) persuasively argues that this system made a lot of sense in a world of high variance and high measurement costs (the 'spoils' were a form of efficiency wages). Nevertheless, this set of institutional arrangements was not necessarily one to which one would want to entrust a professional police force.

³²Associations for the prosecutions of felons have been studied by Schubert (1981); Philips (1989); King (1989); Davies (2002); Koyama (2012a) amongst others. For an example of the kinds of relationships associations built with solicitors see *Rules of the Cawthorne Association for the prosecution of felons*

free-rider problem.

5.1 A Club for Prosecutions

Let us augment the market for crime model as follows. Suppose individuals can join a club (prosecution association) that commits its members to pursuing prosecutions that are in the public interest. The following establishes that such a club can exist in equilibrium and reduces the level of crime observed under a system of private prosecutions. By assuming commitment we initially assume away free-rider problems.

Membership of the club commits all members to a common $\lambda_{j \in M} = \lambda^c$ determined by:

$$\Lambda^c = \sum_{j \in M} \lambda_{j \in M}^c \quad \text{where} \quad \lambda_{j \in M}^c = \begin{cases} 1 & \text{if } m_j p d_j + p \gamma Z \geq \nu \quad , \\ 0 & \text{otherwise,} \end{cases} \quad (4)$$

where m_j is an indicator variable that is equal to one if j is a member of the club and zero otherwise. Let \tilde{M} be the proportion of individuals N who are members of the club: $\tilde{M} = M/N$. The club generates an intermediate level deterrence in between the socially optimal level of deterrence and the market level of deterrence:

$$d^* \leq d^c = \frac{\nu}{p} - \frac{\gamma Z}{\tilde{M}} \leq \hat{d}. \quad (5)$$

The club produces a higher level of prosecutions than obtains under the private system: $\Lambda^c = 1 - d^c > 1 - \hat{d}$ for $M > 0$. Hence a club with a nonzero membership reduces the overall level of crime.

Who joins the club? Consider an individual j such that $d_j = \hat{d}$. In the absence of a club this individual is indifferent between prosecuting and not prosecuting. We wish to obtain the conditions under which he will join the club. The club imposes an additional cost on him as he is obliged to prosecute crimes which he would not otherwise prosecute. This additional cost is given by:

$$g(M) = [q(x^c(M))p\gamma Z], \quad (6)$$

where g is a continuous function that is strictly decreasing in M . However, the club also generates an additional benefit in terms of greater deterrence and less crime:

$$q(\hat{x}) - q(x^c)(M).$$

This, in turn, is equal to

$$\gamma Z \tilde{M} = \frac{\gamma Z M}{N} \equiv h(M)^{33},$$

(1843).

³³Recall:

$$q(\hat{x}) = (1 - \hat{x})Z = 1 - \kappa - \Lambda(\hat{d})\gamma = 1 - \kappa - (1 - \hat{d})p\gamma = 1 - \kappa - p\gamma + \nu\gamma$$

which is continuously increasing in M . We seek a fixed point where $h(M) = g(M)$ or:

$$M^* = q(x^c(M^*))pZ. \quad (7)$$

Note $g(0)$ is bounded at Z and $g'(M) < 0$, whereas $h(0) = 0$ and $h'(M) > 0$. Hence M^* identifies a unique fixed point. Thus M^* is the size that the club has to be for individual j such that $d_j = \hat{d}$ wishes to be a member. At M^* all individuals j such that $d_j > \hat{d}$ join the club. The club increases the number of prosecutions from $\Lambda(\hat{d})$ to $\Lambda(d^c)$. This is summed up in the following proposition.

Proposition 1 *In the absence of free-riding there exists a club of size M^* such that*

1. *all individuals j with $d_j \geq \hat{d}$ join the club;*
2. *and the number of prosecutions increases from $\Lambda(\hat{h}) = 1 - \hat{d}$ to $\Lambda(d^c) = 1 - d^c$, thereby reducing the level of crime by $\gamma Z/M^*$.*

Proposition 1 suggests that prosecutions associations should be comprised of individuals with property. This is indeed what we find—although associations did sometimes commit to prosecuting crimes on behalf of the poorer non-members. It also suggests that the membership of a prosecution association should be larger and more socially diverse where d was evenly distributed. The evidence we have is consistent with this finding. Most associations did not keep records of their members' occupations but the evidence we have from those that did is consistent with this prediction. Many rural associations took their membership exclusively from the gentry classes. Urban associations like the Cambridge association drew on a much broader membership base that included merchants, shopkeepers, blacksmiths, brewers, bankers and textile workers (see *Rules of the Town of Cambridge Association for the Prosecution of Felons, 1841, 1841*).³⁴

Note that the club we have described above suffers from a potential free-riding problem as non-members benefit from the additional deterrence generated by members.³⁵ We

$$q(x^c) = (1 - x^c)Z = 1 - \kappa - \Lambda(d^c)\gamma = 1 - \kappa - (1 - d^c)p\gamma = 1 - \kappa - p\gamma + \left[\frac{\nu}{p} - \frac{\gamma Z}{M}\right]p\gamma$$

³⁴Similarly, Little and Sheffield (1983) found that the social membership of the Halifax associations was likewise diverse. They found the occupations of members of the committees they studied included 'gentlemen, merchant, weaver, attorney, clergy and dyer' suggest that these associations did not just comprise the rural elites (Little and Sheffield, 1983, 799). They note that the occupations of committee members is consistent with the 'nature of the staple industry in the Halifax region' as 'a significant proportion of the membership was connected with the textile industry' (Little and Sheffield, 1983, 799).

³⁵One factor we do not explicitly model meliorating this free-rider problem was the possibility that membership of an association might displayed crime onto non-members. If this was the case, even individuals with $d < \hat{d}$ had an incentive to join. This could theoretically led to 'too much' deterrence, although this is unlikely to have been the case in practice. The displacement effect is briefly discussed in (Koyama, 2012b, 120).

can show that the free-rider problem is partially alleviated by charging membership fees that are used to directly subsidize the costs of prosecuting by establishing the following proposition.

Proposition 2 *In equilibrium there exists a membership fee e^* such that*

1. *all individuals j such that $d_j \geq \hat{d}$ pay e^* and join the club; and*
2. *the club is able to fund all prosecutions for which $m_j p d_j + p \gamma Z \geq \nu$.*

The proof of this proposition is confined to the Appendix.

This proposition is consistent with the practice of many associations which was to charge a uniform fee. The Lanvrechva association all charged members 10s as an initial subscription and all expenses were paid out of a general fund (*Lanvrechva Association* 1819).³⁶ The Belper association charged all members an initial entrance fee of 5s (*Belper Association*, 1791). But from the second decade of the nineteenth century onwards many associations began to experiment with charging differential fees. This enabled them to reach out to additional members and pursue more cases.

Price discrimination enabled some associations to attract more members. Associations were generally small with dozens rather than hundreds of members and they were geographically confined within a radius of a couple of miles. It is therefore realistic to assume that the value of an individual's property was common knowledge within a community. In this case, it follows that the club could offer each potential member an individualized fee e_j such that equation (10) is satisfied. Some associations did attempt to tie membership fees to income or wealth. Other associations based their membership rates on property values.³⁷

Associations did not practice perfect discrimination as they did not necessarily aim for the largest membership possible. There were several reasons for this. Associations, like other economic clubs, were characterized by non-rivalrousness in consumption up to a certain congestion point. They could not be expanded or 'scaled-up' indefinitely. Associations did not just require fees from their members; there were meetings that had to be attended and members were expected to assist one another in apprehending and prosecuting suspects. For this reason, associations attempted to screen-out individuals who were likely to free-ride or individuals who lived too far away to either actively participate in, or benefit from, the association (see Koyama, 2012a). The Caddesley

³⁶'The society aims at a fund of 1 pound for every member'. Every subscriber had to pay 3s per quarter until the fund reached one pound and one shilling per member, after which point membership fees would be reduced to 5s per year (*Lanvrechva Association*, 1819, 3).

³⁷The Ecclesfield association ties its membership fees to the local tax (poor rate) members were assessed for. Individuals who were assessed at £60 for the poor rate had to pay an annual membership fee of 60d (*Rules of the Ecclesfield General Association, for the Prosecution of Felons.*, 1843).

Corbett association charged its poorest members just 10s and its richest members £1. However, to become a member of the association you need to be recommended by at least three existing members (*Copy of a Deed of Association for the Prosecution of Felons*, 1799).³⁸ These non-monetary factors would have precluded associations from practicing perfect price discrimination and setting $M = N$.

Propositions 1 and 2 demonstrate that prosecution associations could have provided additional deterrence relative to the private equilibrium. Propositions 1 and 2 also suggest the reasons why associations were unlikely to have been able to provide the socially optimal level of deterrence. We can now use the insights obtained from this model in conjunction with the historical evidence to better understand how these private associations functioned and to develop some comparative statics.

5.2 *The Emergence of Prosecution Associations*

Prior to the middle of the eighteenth century there was little need for prosecution associations to form. Property crime was not a major social problem. The surviving data on associations for the prosecution of felons is patchy. Nevertheless, the data that is available suggests that the number of associations grew rapidly after 1780. In the course of research for this paper I have come across a total of 534 separate associations. However, a lot of information is missing for many of these associations. For example, unless there is a surviving account book for an association we do not know how many members it had, what its rules were or how many cases it prosecuted and for many associations we do not even know when they were founded or when they were dissolved. The account books that do survive provide a wealth of qualitative information about how associations operated. But the small number of associations for which we have this kind of detail precludes using this information in a regression framework. Figure 7 plots the founding dates for the 215 associations for which it is possible to identify a founding data. Associations only began to emerge in noticeable numbers after 1750 and the number of associations increased rapidly in the last two decades of the eighteenth century and the first two decades of the nineteenth century.³⁹

³⁸Article III of the Burnham association states that: ‘every Member occupying a Farm, or having Stock of a Farm description, and equally liable to risk, shall pay into the hands of the Treasurer the sum of one Pound and one Shilling. Tradesmen, Shopkeepers, and Market Gardeners the sum of Fourteen Shillings; and persons retired from business and occupying property under Twenty Pounds a Year, the sum of Seven Shillings’ (*Rules and Regulations of the Burnham Association for the Protection of Persons and Property and the Prosecution of Felons*, 1833, 4-5). See Koyama (2012a) for a list of associations known to practice price discrimination.

³⁹The total number of 534 associations comes from the following sources: a list of associations that claimed expenses from the County Rates between 1830 and 1835 (*Report of the Commissioners for inquiring into County Rates*, 1836, 319-327); the list of associations compiled by Philips (1989); a search of local newspapers, the details of all associations for the prosecution of felons list on the Access Archives

Figure 7 indicates that prosecution associations emerged at the same time as contemporaries argued that a crime wave was taking place. Contemporaries held that crime rates spiked in the aftermath of major wars as large number of demobilized soldiers and sailors returned to civilian life (Beattie, 1986, 213-235). Consistent with this, there was a spike in number of associations founded at the end of the American war of independence and at the end of the Napoleon Wars. The expansion of prosecution associations was associated with a large increase in the number of committals depicted in Figure 1.

5.3 *The Number of Prosecutions and Marginal Deterrence*

We have shown the prosecution associations existed and established how they were organized and functioned; now we can attempt to consider their effectiveness. Historians have argued that associations for the prosecution of felons were a marginal phenomenon that did little to reduce overall levels of crime because they only carried out a relatively small number of prosecutions (see Schubert (1981, 28-29) and (Beattie, 1986, 49-50)). In fact, it is difficult to estimate what proportion of prosecutions were undertaken by prosecution associations. It is certainly true that many associations were small and only prosecuted a small number of criminals.

The Wheldrake association in North Riding for example was small and inactive and only subsidized a couple of prosecutions in its 48-year history (*Wheldrake association* 1816-1864). Other associations such as the Bradfield and Doncaster associations were involved in between one and two prosecutions a year (*Minute Book of the Bradfield Association for the Prosecution of Felons*, 1838-1886; *Book of Proceedings of the Doncaster Boro'*

website; and the records of local archives in Doncaster, London, Sheffield, and York. The newspapers consulted were *The Derby Mercury*, *The Leeds Mercury*, *The Leicester Chronicle*, *The Hull Packet and East Riding Times*, *The Ipswich Journal*, *Jackson's Oxford Journal*, *The Newcastle Courant*, *The York Herald and General Advertiser*, *The Sheffield Independent*, and *Yorkshire and Derbyshire Advertiser*, *The Bury and Norwich Post and East Anglian*, and *Gazetter and New Daily Advertiser*. The archival sources used were (*Belper Association*, 1791; *Rules of the Beverley Guardian Society for the Protection of Trade*, 1834; *Copy of a Deed of Association for the Prosecution of Felons*, 1799; *The Association of the Parish of Bolton Percy for the Prosecution of Felons, Cheats and for the defraying of all expenses of Advertisement, Handbills etc.*, 1825-1890; *Rules and Regulations of the Burnham Association for the Protection of Persons and Property and the Prosecution of Felons*, 1833; *Rules of the Town of Cambridge Association for the Prosecution of Felons*, 1841, 1841; *Rules of the Cawthorne Association for the prosecution of felons*, 1843; *Rules and Regulations for the Government of the Chaddesley-Corbett Association for the Prosecution of Felons*, 1837; *Duffield, Makeney, Holbrook and Little Eaton Association for the Prosecution of Felons*, 1791-1794; *Rules, Orders and Regulations of the Hemsworth Association for the Prosecution of Felons etc.*, 1821; *Rules of a society called the Equitable Association of the inhabitants of Mansfield and neighbours for the Apprehending and Prosecuting Felons and receivers of stolen goods and other offenders against the law*, 1842; *Rules and Regulations of an Association for the Prosecution of Felons and other Offenders, adopted at a meeting of the several inhabitants of the parishes of Lanvrechva Lower and Upper, Panteague, Lantarnam and Lanthewy*, 1819; *Rules and Regulations of the Worsbro' Association for the Prosecution of Felons, Trespassers, & etc.*, 1880).

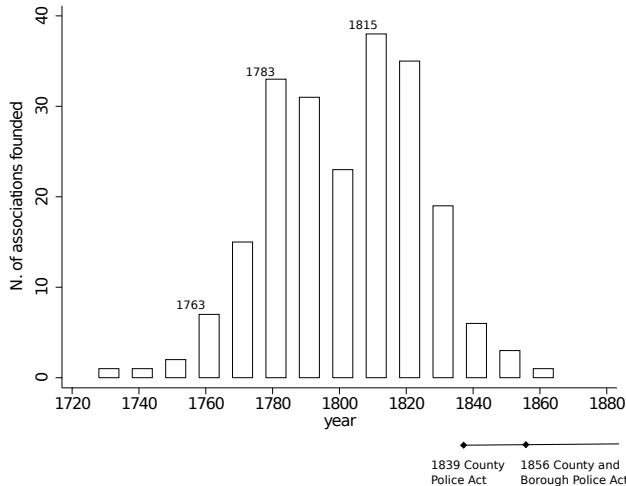


Figure 6: The number of associations founded per decade. The dates refer to major demobilizations. The total sample consists of 215 associations.

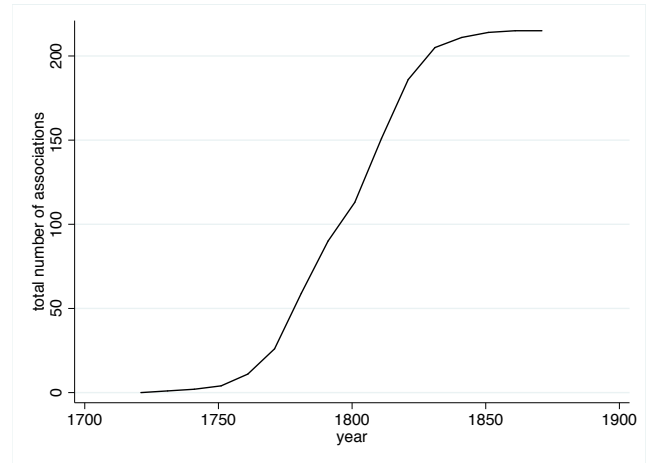


Figure 7: Cumulative distribution of associations founded per decade. The total sample consists of 215 associations.

Stoke Association for the Prosecution of Felons, 1821-1838).⁴⁰ The model suggests that the true measure of the impact of prosecution associations is not merely the number of prosecutions that associations undertook, but which prosecutions they undertook.

What is important is that associations increased the *marginal* level of deterrence. The difference between $q(\hat{x})$ and $q(x^e)$ is driven by the fact that the association prosecutes those marginal cases for which $d_j < \nu/p$ but not $d_j/\nu/p - \gamma Z/\tilde{M}$. Hence an association that only prosecuted a small number of cases could nevertheless make a decisive difference in terms of increasing Λ and reducing $q(x)$ if they prosecuted cases that would not otherwise have gone to court. This suggests that associations for the prosecution of felons may have played a more significant role in combating crime than many historians have hitherto recognized.

5.4 Property Crimes and Public Order Crimes

This framework suggests that associations should be predominantly concerned with property crimes. The free-rider problem to which they were a response was likely to be most

⁴⁰The City of York association it was typically recorded (and offered rewards relating to) 10 to 20 offenses a year and appears to have successfully prosecuted between 5 and 10 of these during the 1850s (*City of York Association for the Prosecution of Felons, Cheats, etc. Minute Book*, n.d.). Philips (1989) surveyed a large number of associations and he found that while on average many associations prosecuted a relatively small number of cases a year, in some periods associations could be involved in a large number of prosecutions. The Harleston association in Norfolk was involved in 7 prosecutions a year between 1808 and 1815. The Salt Hill association was involved in an average of over 13 prosecutions per year between 1836 and 1860 (Philips, 1989, 167–168).

acute for theft and robbery. Personal crimes (especially rape and murder) were likely to be prosecuted regardless of the cost-benefit calculation of the individual victim. Associations had little incentive to prosecute more general ‘public order’ offenses. The introduction of a professional police force and the shift from private to public prevention of crime should, therefore, have been accompanied by a change in definition of what constituted crime.

The implications of the the model are consistent with the historical evidence. Philips notes that ‘Rural associations most commonly prosecuted thefts of farm animals (especially sheep and poultry), farm produce, and wood taken from trees, hedges, fences, and stiles. Urban associations were more likely to prosecute theft of raw material from places of work, theft from shops and houses, and garden produce, laundry stolen from gardens’ (Philips, 1989, 142).⁴¹

Associations were concerned with crimes against property, but relatively unconcerned about affray, assault and personal violence. In part, this was a legacy of the early modern attitude which held ‘physical violence’ to be ‘an accepted instrument of social police and of individual and group interaction by almost all sectors of society’ (King, 1996, 44). In part, it reflected the view that assaults were more a private than a public concern and that personal acts of violence were less rational and calculating and hence less amenable to deterrence than were property crimes (Beattie, 1986).⁴² Associations were, in any case, ill-equipped to deal with violent crime. Their success in the Industrial Revolution period was, in this sense, related to the overall decline in violent crime noted by Beattie (1986) and others.

Also consistent with the predictions of our framework is the fact that advocates of police reform criticized constables and associations for not acting against public order offenses. Associations acted against specific crimes committed against members. The Parliamentary commissioner, William Henry Newham, wanted the police to be used to remove paupers, and noted that a regular police could be used to suppress the ‘great evils that we suffer from . . . the ill-regulated state of the beer-shops, pilfering, poaching, petty offences’ (*Evidence Taken by the Constabulary Force Commissioners: state of the rural districts as to crime and the means of its prevention*, 1839, 17).

In the wake of the French Revolution, and the Peterloo Massacre of 1819, public fear

⁴¹This is consistent with the account books I have examined and with the observation that many associations only listed rewards for property crimes (see Koyama, 2012b, 112).

⁴²Cases of assault and personal violence were typically settled and tended to result in only nominal fines (King, 1996). This attitude persisted into the nineteenth century. Conley notes that “Violence had a legitimate place in Victorian society, and few people would have favoured its complete eradication. The criminal justice system, if not the law itself, was geared to regulating interpersonal violence, not abolishing it’ (Conley, 1991, 67).

of rioting and disorder increased. Prosecution associations and other informal forms of policing were relatively ineffective in dealing with riots. The new police forces, first introduced in London, in contrast, were seen as particularly useful ‘in meeting the recurrent concern with arson, riot, and politicized disorder as a background motif of the first half of the nineteenth century’ (Hay and Snyder, 1989, 6).⁴³ Indeed, elites outside London, accepted the County Police Act of 1839 in face of riots and public disorder associated with Chartism (Hart, 1955, 426).

There was, however, another side to this. While local prosecution associations protected the property of the middle and upper classes from the depredations of the poor, the new police introduced in the 1830s were employed to reform the manners and behavior of the working classes (Storch, 1975, 1976, 1989; Davies, 2002).⁴⁴ The police punished crimes that previously had gone unpunished under the decentralized traditional system. They became increasingly involved in suppressing ‘immoral behavior’, notably prostitution, gambling and public drunkenness. Hay summarizes the revisionist view that ‘the new police were frequently the agents of a middle-class assault on popular mores, not just crime or riot, and they introduced constant surveillance into working-class communities which had long since escaped the knowledge of squire and parson’ (Hay, 1980, 58). Hence, the shift from private to public policing was, in part, a response to the increased demand for protection against riots and public order. However, once the police were created, they were used to prosecute behavior that had not previously been considered as criminal.

5.5 *Specialization and Integration*

Another notable feature of prosecution associations was the extent to which they were vertically integrated. They were often involved in all stages of a criminal investigation from the apprehension and arrest to the securing of a conviction in court. The high degree of vertical integration characteristic of prosecution associations made sense. Providers of club goods often display high levels of vertical integration (see, for a discussion, Klein et al., 1978, 322-324). There were fixed costs involved in setting up and running the associations and members could not be expected to be involved in numerous different

⁴³Emsley observes that in the ‘pre-policed period rioting was part of a system of demands and responses between the ruled and their rulers . . . City-dwellers tolerated the levels of crime and disorder grudgingly until the early nineteenth century when their concern about the change in the targets of rioters from symbolic ones to property’ (Emsley, 1983, 5-6). This analysis explains why earlier episodes of public disorder like the Gordon Riots of the 1780s did not lead to an equivalent demand for a professional police force.

⁴⁴‘Studies of the introduction of new police forces into communities suggest that one immediate effect which they produced is a marked increase in prosecutions for minor public order offences—brawls, drunkenness, disorderly conduct in public, etc. The new police bring with them a heightened sensitivity to disorder which has previously been tolerated or at least not punished by legal sanctions; the imposition of this new order is initially resisted by the people who feel its effects resulting in a sharp initial rise in prosecutions for such offences’ (Philips, 1977, 84).

organizations, each providing separate but related services. In a world of high information costs, associations harnessed the local knowledge of individual members—who were typically long-time residents, rooted in their community and in possession of specific knowledge that no outsider could easily know.⁴⁵ Association meetings provided forums where this information could be widely disseminated amongst individuals who had an incentive to use it to identify likely suspects, locate criminal hiding places, or get witnesses to come forward.⁴⁶

The local character of most associations, however, meant that there was no formal communication or cooperation between different associations: they were horizontally distinct and separate. The professional police, in contrast, displayed less vertical integration than did associations for the prosecution of felons. They were involved in the apprehension and arrest of suspects but, until the later nineteenth century, did not usually prosecute them directly. The new police, were, however, more horizontally integrated than prosecution associations were, even though each local force retained a high degree of independence.

The downside to this high level of vertical integration, and to the absence of any horizontal integration across associations, was a lack of specialization. Associations may have perfected amateur policing, but they did not provide opportunities for individuals to acquire any particular skill in investigating crime.⁴⁷ As Shpayer-Makov notes: ‘formal detection was mostly ad hoc, contingent on the good will and free time of law-enforcers who were not experts in gathering information or acting upon it.’ (Shpayer-Makov, 2011, 19). The small size of most associations meant that they only pursued a small number of crimes and this ensured that they typically could not afford to employ specialists private detectives.⁴⁸

After the 1856 County and Borough Act, police forces, though under local rather than state control, were nevertheless directed to cooperate with one another. This could be a source of tension. Conley (1991) reports several clashes between county and borough police forces in the 1860s.⁴⁹ However, it also enabled police forces to share information

⁴⁵It is reasonable to infer that many offenders were known to members because when an offender was a stranger this was usually mentioned. The Harrow-on-the Hill Association for instance noted on September 12, 1812 that the daughter of Mr Sim’s ‘had been stopped and and robbed by a Person unknownen in a field leading from Kenton to Edgeware’ (*Harrow on the Hill Association Book*, 1801–1826, 12).

⁴⁶See, in particular, the detailed account books kept by *Harrow on the Hill Association Book* (1801–1826), *Minute Book of the Bradfield Association for the Prosecution of Felons* (1838–1886), and *The Association of the Parish of Bolton Percy for the Prosecution of Felons, Cheats and for the defraying of all expenses of Advertisement, Handbills etc.* (1825–1890).

⁴⁷They relied on advertisements and rewards as detailed in Koyama (2012b).

⁴⁸See Philips (1989). I found no instances of associations hiring professional thief-takers, although they frequently paid small rewards to local constables.

⁴⁹For example: ‘when a murder was committed on a road leading out of Maidstone, both the Maidstone police and the county police claimed jurisdiction. In a heated exchange reported in the local press,

and skills. The 1830s and 1840s saw the expansion of the rail network across Great Britain and the 1850s saw the introduction of the telegraph. These factors made horizontal integration increasingly valuable. In particular, from mid-century onwards police forces began to train specialist detectives who could be assigned to investigate particularly difficult cases (Shpayer-Makov, 2011). In 1842, Scotland Yard—the first modern detective agency—was established within the Metropolitan police. These detectives specialized in solving cases which required a degree of expertise and training such as fraud, forgery, embezzlement, extradition cases, or cases involving foreign governments. Scotland Yard was ‘where real professionalism was expected to be found’ and these detectives were sent elsewhere in the country as police specialists: with ‘the establishment of an official detective department at Scotland Yard, and the reputation it acquired as an elite force, communities with and without police detectives applied to the Yard for aid in serious and unsolved cases’ (Shpayer-Makov, 2011, 45). As the opportunities for productive specialization in detecting crimes increased, so did the relative merits of a professional police force over the older private prosecution associations.

6 Conclusion

Pre-industrial England relied on a private system of law enforcement. Victims and their families were responsible for prosecutions. This created an incentive to free-ride and under-provide deterrence. Nevertheless, the available evidence suggests that the system functioned effectively enough so long as societies remained small-scale and so long as informal norms supported it and limited the incentive victims had not to engage in costly prosecutions.

This paper has shown how industrialization exacerbated the free-rider problem using a model of the market for crime. Critics of the private system argued that it should be replaced by a professional police force and a public prosecution. Importantly, this did not happen for several decades, and in the meantime, individuals increasingly relied on private associations for the prosecution of felons. Using a club-goods model, we have shown how these associations could ameliorate this free-rider problem. The club-goods model of prosecution associations is consistent with the available historical evidence. It suggests that even though associations may only have been involved in a funding a small proportion of prosecutions, their impact on the marginal level of deterrence may still have been significant.

This historical case study both cautions economists about extrapolating from institutional mechanisms that can function in small-scale societies and arguing that they can be relied upon in the large, open-access, market societies, while also suggesting that

the county police superintendent called the Maidstone superintendent a donkey and claimed unwarranted interference had permitted the murderer to escape. The case was never solved’ (Conley, 1991, 29).

private-order legal institutions can be scaled-up to a considerable extent. However, it is important to note that this scalability was limited. While prosecution associations partially rectified the problems associated with individualized prosecutions, the limits imposed by distance and geography meant that they remained relatively small.

Associations had other shortcomings. They could not provide preventative policing. They responded after the fact to crimes and struggled to undertake large-scale operations against well-organized criminals. And maintaining a watch or a patrol was difficult. Some associations, notably the Barnet Association, were successful in maintaining a permanent watch, but many other small societies found it too costly to do so (for more details see Koyama, 2012*a*, 117-120).

Associations were also victims of their own success. They often formed in response to specific threats and once those threats were overcome they might subsequently disappear. Charles Bathurst of Gloucester in answering to the Constabulary Force Commissioners describes a successful association at Cheapstow which he suggests had formed to break up a sheep-stealing gang and was now inactive (*Evidence Taken by the Constabulary Force Commissioners: state of the rural districts as to crime and the means of its prevention*, 1839, 39).⁵⁰ Some associations were unable to prevent free-riding and declined due to an inability to collect fees.⁵¹

But the problems associated with prosecution associations have to be seen in context. The new police faced arguably still greater problems. A full consideration of the foundation of the first police forces in England is beyond the scope of this paper. Nevertheless, it is important to note that while there was only modest resistance to the Metropolitan police force established by Robert Peel in 1828, ‘[m]ost of the backbenchers who acquiesced in the appearance on London’s streets of blue-uniformed and truncheoned ‘Peelers’ would have been mortified had they known that these strange novelties formed the advance guard of a professional police force which would appear throughout the country within thirty years’ (Evans, 2001, 244).⁵² Many parts of the country resisted the introduction

⁵⁰Similarly we are told that ‘[n]otwithstanding the great benefits said to have been derived at Stow in the Wold from the operations of a Constabulary paid by voluntary subscription, those benefits it appears are in danger of abandonment, unless a measure for a compulsory rate be conferred. It has become difficult to get in the subscriptions. “The farmers have no longer fear depredations, and they do not choose to part with their money”’ (Magistrate, 1839, 26).

⁵¹This problem affected an association in Wandsworth. According to James Collingbourn there had been an association for the prosecution of felons but it was ‘a temporary one; it is hardly an association; it has been formed, but it has fell off; it did not exist above eighteenth months. What was the effect while it did last? — The prosecutions came so heavy. In one instance a man stole two or three fowls; the prosecution came to £30 or £40 (*Report from the Select Committee of the Police of the Metropolis*, 1828, 240).

⁵²Emsley observes: ‘No matter that its founders had wanted it to appear non-military, that was precisely how many thousands of Londoners perceived it’ (Emsley, 1993, 116).

of police forces.⁵³ In Yorkshire in 1839 for example magistrates were ‘bombed with petitions from numerous townships whose inhabitants, like those from Kirby Moorside, had ‘learnt with great Alarm, that the Establishment of a Rural Police is intended’ despite the fact that in their opinion there were ‘no instances of insubordination or riotous Proceedings . . . but that on the contrary, the Riding is in a state of perfect tranquillity that rendered a police force ‘altogether unnecessary and uncalled for’ (quoted in Taylor, 2002, 26).⁵⁴

Public Choice considerations precluded the introduction of a professional police force throughout the late-eighteenth and early-nineteenth century England.⁵⁵ The police came to be accepted only once these fears had been addressed, after it was made clear that provincial police forces would be under local control, and the plans for a nation-wide, centrally organized, French-style police force as envisioned by Chadwick had been rejected (Finer, 1952; Brundage, 1986; Philips, 2004). In the first few years after they were introduced, the new provincial forces experienced considerable problems. They faced popular resistance and struggled to attract high-quality recruits. Pay was low and turnover extremely high. There was a lack of training and a shortage of capable officers (Taylor, 1998, 29-51)⁵⁶

Prosecution associations persisted after the introduction of professional police forces across England between 1828 and 1856. They worked in cooperation with the new police.⁵⁷ Many associations continued to pay rewards to policemen into the 1880s or later just as they had previously paid constables. However, in the long-run the emergence of the police robbed prosecution associations of their principle reason for existing, partic-

⁵³In 1839 a proposed expansion of the Metropolitan police was strongly opposed by the Clapham Association both because it deprived the council magistrates of their authority and because it would ‘increase the patronage of the Government’ and the burdens of the people’ without enjoying ‘the confidence of the public’ (*Minute book of the committees of Vestry, 1809-1840*, unnumbered).

⁵⁴This resistance came from several quarters: classical liberals combined with trade unionists in their opposition, see Storch (1976).

⁵⁵Leeson and Williamson (2009) apply the concept of the second-best to examine institutional arrangements. Their claim is that ‘If institutional condition (1) required for ideal political governance binding constraints on political actors is not satisfied, the second best can be achieved only by departing from institutional requirements (2)-(4) government provision of law, enforcement, and public goods’ (Leeson and Williamson, 2009, 89). This concept is clearly applicable to the English case.

⁵⁶In Middlesborough 30 percent of the police force resigned between 1854 and 1869 and 36 percent were dismissed, two-thirds of whom had served for less than 12 months. One problem was that wages of policemen did not match wage levels in industry. Many of those dismissed were dismissed for drink-related problems (Taylor, 1998). In the Bedfordshire police force ‘Large numbers of men were dismissed or ‘asked to resign’ generally for drunkenness, absence from their beats or other forms of insubordination’ (Emsley, 1983, 77).

⁵⁷The Stockton association raised a cheer to ‘The Police force’ on the grounds that ‘[w]ithout all of the force in detecting crimes the Association would lose three parts of its value’ (*Stockton Association for the Prosecution of Felons, 1874*). Rural prosecutions associations could cooperate with the police because they were much more modest affairs and did not attempt to provide their own watches.

ularly as the police began to take over the burden of prosecuting felons from the 1870s onwards and those societies that survived did so mainly on the basis of their success as convivial societies.⁵⁸

⁵⁸The Darlington Society, founded in 1811, was still going in 1875 with hundred members. It was still active and in 1874 had made four separate prosecutions and secured four convictions. At the general meeting, reported in the *Northern Echo*, the attorney Mr W. Hodgeson commented 'on the advantages to be derived from such an association and expressed his surprise that instead of having only 100 members they had not five or six times as many' (*The Darlington Association for the Prosecution of Felons*, 1875). Some societies still continue to this day as social clubs.

Appendix

Proposition 2

In the absence of free-riding there exists a club of size M^* such that

1. all individuals j with $d_j \geq \hat{d}$ join the club;
2. and the number of prosecutions increases from $\Lambda(\hat{h}) = 1 - \hat{d}$ to $\Lambda(d^c = 1 - d^c)$, thereby reducing the level of crime by $\gamma Z/M^*$.

Proof. We proceed by finding that values of e that satisfy the budget constraint of the club. We then find that values of e such that individuals with values of $d_j > \hat{d}$ wish to join the club (the incentive compatibility constraint). And we show that there are values of e that satisfy both these constraints at once.

The budget constraint requires the total fees of the club Me to be greater or equal to its expenditures which are determined by the supply of criminals ($q(x^c)$), the size of population (N), the number of crimes that the club prosecutes ($\Lambda(d^c) = 1 - d^c$) and the cost of a prosecution ν :

$$\frac{q(x^c)(1 - d^c)\nu}{N} \leq e. \quad (8)$$

Deriving the incentive compatibility constraint is somewhat more involved. Write non-members' payoffs as:

$$\frac{q(\hat{x})[\lambda(d_j)pd_j - d_j - \lambda(d_j)\nu]}{N}.$$

Members of the club obtain:

$$\frac{q(x^c)[\lambda^c pd_j - d_j]}{N} - e.$$

Thus, an individual j joins the club if the following condition holds:

$$q(x^c)[\lambda^c pd_j - d_j] - q(\hat{x})[\lambda(d_j)pd_j - d_j - \lambda(d_j)\nu] \geq Ne. \quad (9)$$

Let us again consider the individual j such that $d_j = \hat{d}$ in which case $\lambda_j = \lambda^c = 1$. The incentive compatibility constraint can now be rewritten as:

$$[q(x^c) - q(\hat{x})]d_j + q(\hat{x})\nu \geq Ne.$$

Substituting in $d_j = \hat{d} = \nu/p$, solving for $q(x^c) - q(\hat{x})$, and dividing through by N we obtain:

$$\frac{q(\hat{x})\nu}{N} - \frac{\gamma^2 Z \nu}{N \tilde{M}} \geq e. \quad (10)$$

The first part of the LHS of this equation is the cost associated to being a non-member and paying for the cost of a prosecution. The second part of the LHS of this equation is

the cost of being a member and being obliged to undertake prosecutions that one would not otherwise undertake. If the net payoff an individual obtains from membership is greater than e than membership is incentive compatible. It follows that the club can attract M^* members in equilibrium if there exists an e that satisfies both conditions (8) and (10). We can establish that there exists an $e = e^*$ such that:

$$\frac{q(x^c)(1 - d^c)\nu}{N} \leq e^* \leq \frac{q(\hat{x})\nu}{N} - \frac{\gamma^2 Z \nu}{N \tilde{M}}.$$

To see this equate equation (8) with e^* , cancel terms and substituted in for $q(x^c)$ and $q(\hat{x})$ to obtain:

$$1 - \kappa - p\gamma + \nu\gamma - \frac{\gamma^2 Z}{\tilde{M}} \geq \left[1 - \kappa - p\gamma + \left[\frac{\nu}{p} - \frac{\gamma Z}{\tilde{M}} \right] p\gamma - 1 - \kappa - p\gamma + \left[\frac{\nu}{p} \right] \left[1 - \frac{\nu}{p} + \frac{\gamma Z}{\tilde{M}} \right],$$

or

$$q(x^c) > q(x^c)[1 - d^c],$$

which can only be satisfied by a strict inequality. \square

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