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## Property Rights, Theft, and Efficiency: The Biblical Waiver of Fines in the Case of Confessed Theft

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# Property rights, theft, and efficiency: The Biblical Waiver of Fines in the Case of Confessed Theft.

Eliakim Katz and Jacob Rosenberg

December 2, 2001

## Abstract

In this paper we show that costs associated with infractions of property rights, such as theft, can be reduced by imposing lower penalties on individuals who admit to such infractions and make restitution. We find that the socially optimal penalty on a confessed thief may be zero (complete amnesty) or even negative - a person may be given a reward for confessing a theft. The benefits of amnesties were apparently recognized in ancient times and they constitute part of Biblical Law. Moreover, such amnesties have also been informally incorporated into modern legal systems, wherein leniency (a form of partial amnesty) is generally shown to individuals who confess their infractions.

## 1 Introduction

In recent years there has been increasing interest in the economics of amnesties. The literature in this area has focused on two main issues. First, there has been much discussion of the role of tax amnesties.<sup>1</sup> It has been argued that, for a variety of reasons, tax amnesties may increase the amount of tax revenue collected, even if the possibility of such amnesties brings about a greater

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<sup>1</sup>See, for example, Malik (1991), Andreoni (1991), Marchese and Cassone (2000).

amount of tax evasion in the first instance. Second, there has emerged a literature that analyzes the social benefits of “self-reporting”<sup>2</sup> within the context of environmental regulations. This work suggests that treating self-reported infractions of environmental regulation more leniently than unreported infractions may be socially beneficial.

In this paper we explore the potential role of amnesties in reducing social costs created by infractions of property rights. We find that the imposition of a lower penalty (a partial amnesty) on individuals convicted by their own admission may raise social and owner welfare. Indeed, we show that the optimal penalty may be zero (complete amnesty) or even negative - a person may be given a net reward for confessing a crime. Our analysis, which is framed in terms of theft and the return of stolen property has a distinguished pedigree. Amnesties constitute part of Biblical Law, and their benefits have been implicitly recognized in ancient times. Moreover, such amnesties have also been informally incorporated into modern legal systems, wherein leniency is generally shown to individuals who confess their infractions.

The suitability and extent of an amnesty is determined by balancing its costs and benefits. The costs of an amnesty are generally expressed in terms of the additional infractions that it may generate. An amnesty implies that the average cost of committing a crime may be lower, and this may elicit a greater number of such crimes. The benefits of an amnesty are more complex. They include the possibility that the amnesty will cause more stolen items to be returned to their rightful owners; the possibility that by encouraging confessions, less resources will have to be devoted to apprehending thieves; and the possibility that by widening an individual’s choice set, amnesties will discourage further infractions by the same individual.

In this paper we focus on the role of amnesties in encouraging the restitution of property to its owners. We argue that individuals who rationally steal,

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<sup>2</sup>The seminal paper in this area is Kaplow and Shavell (1994). See also Livernois & McKenna (1999) and Innes (1999, 2000).

may, ex-post, rationally wish to undo their crime and return the stolen item to its owner. However, they will not do so unless the penalty for a confessed thief is substantially smaller than the penalty for an apprehended thief. In these circumstances an amnesty, defined as a lower penalty for confessed than for non-confessed thieves, may be socially optimal.

In order to avoid issues relating to redistribution through theft - the Robin Hood approach - we assume that the valuation of a good by its legal owner is never smaller than the valuation put on it by a thief. However, because owners are unable to ensure that their property is not be stolen, some thefts do take place. Social welfare is reduced because the act of stealing uses up resources, and because an owner's valuation exceeds a thief's valuation. And, of course, owner welfare is reduced because owners lose property through theft.

Society would therefore be better off without theft being possible.<sup>3</sup> One way in which all theft might be stopped is by invoking a sufficient deterrent combined with a credible probability of apprehension. However, as is well known, there are social and economic considerations that impose upper bounds on such deterrents.<sup>4</sup> Given such upper bounds, it may not be possible to deter all theft. We show that within this type of scenario, a partial or total amnesty (or even a prize for confession and restitution) may be a powerful second best tool in maximizing social (or owner) welfare.

In Section 2 we consider the theft amnesty offered by Biblical Law. An-

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<sup>3</sup>In this our approach is markedly different from the self-reporting literature initiated by Kaplow and Shavell (1994). In this work Kaplow and Shavell view self-reporting as a replacement for a licensing system. Self-reporting provides an ex-post license, where some parties who find it optimal to break the law (by polluting, for example) do so, and then opt to self-report and pay a fine (buy a retroactive license). This allows parties whose valuation of the illegal act is high to carry out the act and compensate society. In turn, the fact that some parties self report reduces the costs of enforcement. In contrast with the Kaplow and Shavell approach, we consider a situation in which the illegal act always reduces society's welfare. An ex-ante license would never be awarded.

<sup>4</sup>The assumption that there exists an upper bound on penalties is commonly made in the law and economics literature, and originates with Becker(1968).

cient Jewish sources do not offer an explicit analysis of the benefits of a theft amnesty. However, using a positive approach, the Biblical law of theft might well have been designed to capture the social benefits of an theft amnesty. In Section 3 we present a model analyzing the effect of amnesty in relation to theft, and derive an optimal amnesty rule. In Section 4 we consider rewards to confessed thieves in relation to the wider issue of weakened property rights. In Section 5 we offer conclusions and suggestions for further research.

## 2 The Biblical Law of Theft

The Torah<sup>5</sup> imposes a financial *knass* on the perpetrators of certain criminal torts. The *knass*, a term that derives from the Greek word *censur*,<sup>6</sup> is defined in the Talmud<sup>7</sup> as a payment that is over and above the damage caused.<sup>8</sup> A particularly well known example of this is the case of theft. Upon apprehension and conviction, a thief has to make full restitution to the legal owner of the stolen good as well as pay a *knass* that related to the value of the good.<sup>9</sup> Other cases in which a *knass* may be levied include the killing of a person's slave, and the seduction or rape of a woman.<sup>10</sup>

It is important to note that Jewish law imposes very stringent requirement for conviction. To convict it is necessary to obtain the testimony of two witnesses who either actually observed the crime being committed or

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<sup>5</sup>The *Torah*, the Pentateuch, consists of the five books of Moses, which, according to Jewish tradition, were written by God. In view of this, the Torah is the most fundamental and sacred of Jewish Law texts.

<sup>6</sup>This word has clear connection to related concepts in modern English such as censor and censure.

<sup>7</sup>The Talmud, which was written in the first and second centuries A.D. is a vast legal text that consists of the Rabbinic interpretations and discussions of the *Torah*.

<sup>8</sup>Tractate *Ketubot* page 9a.

<sup>9</sup>'If the thief be caught, he shall pay double', , and, 'if a man steals a sheep and slaughters or sells it, he shall pay five-fold for cattle, and four-fold for sheep' (*Exodus* 22, 6 and 8). Note that similar concepts, such as double (or treble) damages or punitive damages, exist in modern law.

<sup>10</sup>In ancient times such crimes were essentially regarded as crimes against property.

whose evidence implies that the accused *must* have committed the crime. In other words, the ‘beyond a reasonable doubt’ paradigm is not sufficient for conviction in Jewish Law. At the same time, a confession by an individual is unambiguously sufficient for conviction, since a confession is ‘as a hundred witnesses’.<sup>11</sup>

Notwithstanding the gravity with which a court views a person’s confession, Jewish law tends to be more lenient with individuals who confess than with others: The *knass* (though not the restitution) is waived if the person confesses in front of a court,<sup>12</sup> and is thereby convicted.<sup>13</sup> Thus, a person who confesses to a theft and returns the stolen item of his own volition does not have to pay a *knass*. The waiving of the *knass* is deduced from the wording of the *Torah* in this case. The text states that a fine should be imposed on a thief whom the *judges* find guilty (*asher yarshiun elohim*).<sup>14</sup> This is taken by the Sages<sup>15</sup> to imply that a thief whose conviction emanates from himself rather than the court i.e. a thief who confesses his crime of his own free will, is not subject to a *knass*.

Indeed, in Tractate *Bava Kama* 14b, the Sages emphasize that the waiver of a *knass* is not easily overridden. The robustness of the waiver is such that once an individual has confessed he is not liable to a *knass*, even if it later transpires that he would have been convicted of the crime independently of his confession. If, after the individual confesses and makes restitution, witnesses of his act are found, he is, nonetheless, not liable to a *knass*.<sup>16</sup>

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<sup>11</sup>See, for example, *Tosefta, Bava Mezia*, chapter 1.

<sup>12</sup>Maimonides insists that the only confession that enables a person to avoid a *knass* is one that is made in front of a Bet-Din (a court).

<sup>13</sup>See *Bava Kama* pages 64b and 75a for a discussion of this principle, which is known as *mode be-knass patur* (he who confesses in a case involving a potential *knass* is exempt from a *knass*).

<sup>14</sup>Exodus 22:8.

<sup>15</sup>The Sages is a generic title for the early compilers of Jewish Law. Basing their work on an oral law (which, according to Jewish tradition, was transmitted together with the *Torah* at Mount Sinai), they interpreted the *Torah* and mapped it into a legal code.

<sup>16</sup>While this is the accepted law, it is subject to dissenting opinions. See *Bava Kama*, *ibid*.

The model presented in the next section suggests that, in the face of the difficulty of obtaining a conviction and the concomitant return of property to its legal owner, Jewish Law attempts to encourage voluntary confessions. Specifically, exempting an individual from a *knass* may increase economic (and even owner) welfare. Indeed, under certain circumstances, welfare may rise even if a thief is not forced to return the full value of the stolen article i.e. if he is given a legal reward for reporting his crime.

### 3 A Model

A society consists of a group of potential thieves and of a group of individuals (owners) each of whom owns a single stealable article. The mass of the group of thieves is unity, as is the mass of owners. Each potential thief has access to a single specific article: owners and potential thieves are matched and thieves do not crowd each other out. The value of each item to its rightful owner is unity, but as a result of the limited saleability of stolen items and other transaction costs, the value of the item,  $b$ , to a thief is a random variable whose density function is  $h(b)$  such that  $1 \geq b \geq 0$ . A potential thief does not know  $b$  at the time of the theft, though he does discover  $b$  once the theft has been carried out. All individuals are risk-neutral.

In order to carry out a theft an individual has to incur an individual-specific cost  $m$ . The population density function of  $m$  is  $k(m)$ , such that  $1 \geq m \geq 0$ . Each individual knows his  $m$  before engaging in theft. The probability of a theft being successful (i.e. of the thief actually effecting a transfer of the article to himself), is  $p$ . If an individual keeps a stolen good he risks being caught with a probability  $q$ . If he is caught he is forced to return the stolen item and to pay a fine,  $f$ . Alternatively, the individual may choose to return the item voluntarily. If he does so he returns the stolen item, and pays a fine,  $g$ , ( $f > g$ ), where  $g$  may be negative (in which case it constitutes a reward). All fines (and rewards) are paid to (by) the owner.

### 3.1 A Potential Thief

We begin the analysis by considering the benefit of a to a thief of having engaged in a successful theft. Once the value to the thief of a successful theft has been calculated we consider the circumstances under which a potential thief finds it worthwhile to engage in theft.

The thief ascertains the value,  $b$ , of a stolen article after effecting its theft. If he keeps the article he obtains a benefit equal to  $(1 - q)b - qf$ . If he returns the item he pays a fine equal to  $g$ . Hence, he keeps the item if and only if  $(1 - q)b - qf > -g \Rightarrow b > \frac{qf - g}{1 - q} = b^*$ .<sup>17</sup> Thus, his benefit from a stolen item equals  $(1 - q)b - qf$  if  $b > b^*$ , and equals  $-g$  if  $b \leq b^*$ . The proportion,  $r$ , of stolen items that are returned is therefore given by the proportion of items whose value turns out to be less than  $b^*$ . Thus,

$$r = \int_0^{b^*} h(b)db = H(b^*), \quad (1)$$

where  $H$  is the cumulative density function of  $b$ . Note that

$$\frac{\partial r}{\partial g} = -\frac{H'(b^*)}{1 - q} < 0, \quad (2)$$

implying that as the fine imposed on returns gets larger, less returns occur.

Hence, once he is in possession of a stolen article (but before knowing its value), a thief's expected benefit equals

$$\begin{aligned} s &= -g \int_0^{b^*} h(b)db + \int_{b^*}^1 ((1 - q)b - qf)h(b)db, \\ &= H(b^*)(qf - g) - qf + (1 - q) \int_{b^*}^1 bh(b)db \end{aligned} \quad (3)$$

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<sup>17</sup>Throughout this paper we assume that some but not all stolen items are returned. This implies that  $1 > \frac{qf - g}{1 - q} > 0$ , requiring that  $qf - g > 0$  and that  $g > q(f + 1) - 1$ .



so that<sup>18</sup>

$$\frac{\partial s}{\partial g} = -H(b^*) < 0. \quad (4)$$

The possibility of returning a stolen article is an option which raises the utility of a successful thief. An increase in the fine imposed upon such returns decreases the value of this option, and thereby reduces the (successful) thief's welfare.

We are now in a position to determine the conditions under which a potential thief will actually attempt to engage in theft. Recall that the probability that an individual who attempts a theft succeeds in this attempt is  $p$ , and that the cost of engaging in theft is  $m$ . The individual's benefit in engaging in theft therefore equals  $s - m$  with probability  $p$  and  $-m$  with probability  $1 - p$ . An individual's expected benefit from engaging in theft is, therefore,

$$t = -m + ps = -m + p[H(b^*)(qf - g) - qf + (1 - q) \int_{b^*}^1 bh(b)db]. \quad (5)$$

Since the alternative to engaging in theft is a benefit that equals 0, the marginal thief will be characterized by  $t = 0$ . Thus, the cost of engaging in theft for the marginal thief will be  $m^*$ , where

$$m^* = ps = p[H(b^*)(qf - g) - qf + (1 - q) \int_{b^*}^1 bh(b)db] \quad (6)$$

Now, the proportion,  $\rho$ , of the population of potential thieves who actually engage in theft consists of all thieves for whom  $m < m^*$ . It is therefore given

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<sup>18</sup>Note that

$$\frac{\partial s}{\partial g} = -H(b^*) + h(b^*) \frac{\partial b^*}{\partial g} (qf - g) - (1 - q)b^* h(b^*) \frac{\partial b^*}{\partial g}.$$

which equals  $-H(b^*)$  since  $(1 - q)b^* - qf = -g$ .

by

$$\rho = \int_0^{m^*} k(m)dm = K(m^*) = K(ps), \quad (7)$$

where  $K$  is the cumulative density function of  $m$ .

The effects of an increase in the fine imposed on a confessed thief can be summarized as follows. From (4) we have that  $\frac{\partial s}{\partial g} < 0$ . An increase in  $g$  obviously reduces the benefit of a successful theft. In turn, this reduces the expected benefit of an attempted theft, so that, for a given  $m$ , the value of  $t$  declines with an increase in  $g$ . Hence, the maximum value of  $m$  for which a potential thief will actually engage in theft, will decline:  $-\frac{\partial t}{\partial g} = \frac{\partial m^*}{\partial g} = p\frac{\partial s}{\partial g} < 0$ . Thus, the proportion,  $\rho$ , of potential thieves who actually engage in theft, and the proportion of owners whose goods are at risk from theft, declines as  $g$  increases,

$$\frac{\partial \rho}{\partial g} = pK'(m^*)\frac{\partial s}{\partial g} < 0. \quad (8)$$

### 3.2 The Group of Potential Thieves

The group of potential thieves consists of a proportion  $\rho$  who actually engage in theft, and a proportion  $1 - \rho$  who choose not to engage in theft. The actual thieves consist of all potential thieves for whom the cost of stealing  $m \leq m^*$ . Hence, since the expected utility of a specific actual thief is  $t = ps - m$ , the average utility of a an actual thief is

$$\bar{t} = \frac{1}{K(m^*)} \int_0^{m^*} (ps - m)k(m)dm = ps - \frac{1}{K(m^*)} \int_0^{m^*} mk(m)dm. \quad (9)$$

Thus, since the proportion of potential thieves who actually engage in theft is  $\rho = K(m^*)$ , the average expected utility of a potential thief is

$$V_t \equiv \rho\bar{t} = \int_0^{m^*} (ps - m)k(m)dm. \quad (10)$$

The effect of an increase in the fine,  $g$ , imposed on a confessed thief on the average expected utility of a potential thief is, therefore,

$$\frac{\partial V_t}{\partial g} = p \int_0^{m^*} \frac{\partial s}{\partial g} k(m) dm + (ps - m^*)k(m^*) \frac{\partial s}{\partial g} \quad (11)$$

Hence, since  $\frac{\partial s}{\partial g} < 0$  and  $ps = m^*$ ,  $\frac{\partial V_t}{\partial g} < 0$ . An increase in  $g$  unambiguously reduces the welfare of potential thieves.

### 3.3 The Owners

Consider now the welfare of an owner of an article. If the article is not stolen, the owner's utility is  $u_n = 1$ , i.e. the value of the article. This occurs if, (a), the article's potential thief decides not to engage in theft, which happens with probability  $1 - \rho$ , or if, (b), the theft is attempted but fails, which happens with probability  $\rho(1 - p)$ . The probability that the article is not stolen is, therefore,  $1 - \rho + \rho(1 - p) = 1 - \rho p$ .

If the good is stolen, which happens with probability  $\rho p$ , there are three possible outcomes. The first, which happens with a probability  $r$ , is that the item is returned. This yields the owner a utility equal to the value of the article *minus* the costs of incurring a theft,<sup>19</sup>  $\delta$  where ( $1 > \delta \geq 0$ ), *plus* the fine paid by the thief upon returning the article. The owner's utility in this case is  $u_r = 1 - \delta + g$ . The second possibility is that the item is not returned but that the thief is caught. In this case, which occurs with probability  $(1 - r)q$ , the utility of the owner equals the value of the article, *minus* the transactions cost,  $\delta$ , *plus* the fine levied on a captured thief,  $f$ . The owner's utility is  $u_c = 1 - \delta + f$ . The third possibility is that the item is

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<sup>19</sup>These involve interaction with law enforcement agencies, foregone use, etc. For simplicity we assume that the owner costs associated with an item voluntarily returned, or one that is retrieved from a captured thief, are the same. Note, moreover, our main results are strengthened if we make the very plausible assumption that owner costs associated with a voluntarily returned item are smaller than the costs associated with an item that is retrieved.

not recovered. This occurs with probability  $(1 - r)(1 - q)$  and provides the owner with utility  $u_{nr} = 0$ .

Thus, once it has been stolen, the expected utility to an owner of an article,  $u_s$ , is, therefore,

$$\begin{aligned} u_s &= ru_r + (1 - r)qu_c + (1 - r)(1 - q) \cdot 0 = r(u_r - qu_c) + qu_c \quad (12) \\ &= r[(1 - \delta)(1 - q) + g - qf] + q(1 - \delta + f) \end{aligned}$$

Clearly, the expected utility,  $V_o$ , of an owner is the weighted average of his utility if the item is stolen and if it is not. Thus,

$$V_o = (1 - p\rho)u_n + p\rho u_s = u_n - p\rho(u_n - u_s). \quad (13)$$

so that

$$\frac{\partial V_o}{\partial g} = -p(u_n - u_s)\frac{\partial \rho}{\partial g} + p\rho\frac{\partial u_s}{\partial g}. \quad (14)$$

As per the above discussion,  $\frac{\partial \rho}{\partial g} < 0$ . An increase in the fine payable upon returning a stolen item deters theft and therefore reduces the cost threshold for which individuals engage in theft. Hence, since  $u_n - u_s$  is positive, the first term in  $\frac{\partial V_o}{\partial g}$  is positive. As for the second term, we have, from (12) that

$$\frac{\partial u_s}{\partial g} = r\frac{\partial u_r}{\partial g} + (u_r - qu_c)\frac{\partial r}{\partial g}. \quad (15)$$

Since  $\frac{\partial u_r}{\partial g} = 1$ , the first term in (15) equals  $r (> 0)$ . An increase in the fine paid to the owner by the thief upon returning a stolen article provides a higher utility to the owner when the article is returned. The second term in (15),  $u_r - qu_c$ , is the difference between the owner's utility upon the voluntary return of the article and his expected utility if the item is not voluntarily returned. It seems reasonable to assume that  $g$  will be given a value such

that the owner prefers that the item is voluntarily returned.<sup>20</sup> Hence, since  $\frac{\partial r}{\partial g} < 0$ , the second term in (15) is negative. Thus, an increase in  $g$  may raise or reduce the owner's utility. A reduction in the fine or an increase in the reward payable to a confessed thief, may therefore benefit the average owner. Moreover, from (11) a thief's utility necessarily rises if  $g$  is reduced. Thus, social welfare may unambiguously rise when the fine imposed upon a confessed thief is reduced, (or the reward for a confessed thief is increased).

Denote social welfare by  $W = \alpha V_o + (1 - \alpha)V_t$ , where  $1 > \alpha \geq 0$  is the weight given to the utility of potential thieves. Then, if  $\frac{\partial W}{\partial g} < 0$  at  $g = 0$ , maximizing social welfare requires that  $g$  be negative, i.e., that a reward be given to a confessed thief

### 3.4 A Numerical Example

The implications of our model may be illustrated with a numerical example. Let  $h(b)$  be a uniform distribution supported by  $[0, 1]$ . Then the proportion of returned stolen articles is

$$r = b^* = \frac{qf - g}{1 - q} \quad (16)$$

Substituting (16) in (3) yields that the benefit,  $s$ , derived by a successful thief is

$$s = \frac{(qf - g)^2}{(1 - q)^2} - qf + \frac{1 - q}{2}. \quad (17)$$

so that the expected benefit of engaging in theft is

$$t = ps - m = p\left[\frac{(qf - g)^2}{2(1 - q)} - qf + \frac{1 - q}{2}\right] - m \quad (18)$$

and the maximum cost for which an individual will engage in theft is

$$m^* = p\left[\frac{(qf - g)^2}{2(1 - q)} - qf + \frac{1 - q}{2}\right] = ps \quad (19)$$

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<sup>20</sup>This imposes a limit on  $g$  that is implicit in the condition  $(1 - q)(1 - \delta) + (g - qf) > 0$ .

Setting  $f = 1$  and  $q = 0.1$  yields that  $r = 0.1111 - 1.1111g$ , that  $s = 0.5556(0.1 - g)^2 + 0.35$ , and that  $m^* = p[0.35556 - 0.11112g + 0.5556g^2]$ .

To analyze the average behavior of potential thieves assume that  $k(m)$  is an independent uniform distribution supported by  $[0, 1]$ . This implies that the average cost incurred by an actual thief is  $m^*/2$ . But from (19), the (gross) benefit of a successful theft is  $s = m^*/p$ . Hence, the (net) average utility of an actual thief equals

$$\bar{t} = ps - \frac{1}{2}m^* = \frac{m^*}{2} \quad (20)$$

In addition, the proportion of potential thieves who actually engage in theft is  $\rho = m^*$ . Hence, the average expected utility of all potential thieves is

$$V_t = \rho\bar{t} = \frac{1}{2}m^{*2} \quad (21)$$

which, in our numerical example, yields

$$V_t = \frac{1}{2}p^2[0.5556(0.1 - g)^2 + 0.35]^2 \quad (22)$$

Now consider the welfare of owners given the above assumptions about the distributions of  $b$  and  $m$ . The probability that there will be an attempt to steal a particular owner's good is  $\rho = m^*$ , so that an owner suffers an actual theft with probability  $pm^*$ . If this occurs, the good is returned with probability  $r = \frac{qf-g}{1-q}$ . Moreover, if the good is not returned it is retrieved with a probability  $q$ . Hence, substituting  $r = \frac{qf-g}{1-q}$  in (12) an owner's expected utility if the article is stolen is

$$u_s = \frac{(qf - g)[(1 - \delta)(1 - q) + g - qf] + (1 - q)q(1 - \delta + f)}{1 - q} \quad (23)$$

so that

$$V_o = 1 - pm^* + pm^* \left( \frac{(qf - g)[(1 - \delta)(1 - q) + g - qf] + (1 - q)q(1 - \delta + f)}{1 - q} \right) \quad (24)$$

In our example,  $f = 1$ ,  $q = 0.1$ . Adding the assumption that  $\delta = 0.1$  we obtain:

$$V_o = 1 - p^2(0.160g - 0.726g - 0.253g^3 - 0.617g^4) \quad (25)$$

Hence, if we set  $p = 1$ , a thief's and an owner's utility are given by

$$V_t = \frac{1}{2}[0.5556(0.1 - g)^2 + 0.35]^2 \quad (26)$$

and

$$V_o = 0.740 - 0.160g - 0.726g^2 - 0.253g^3 - 0.617g^4 \quad (27)$$

respectively.

### Figure 1

Given our parameter values, the condition that  $1 > b^* > 0$ , (which can be written as  $1 > \frac{qf-g}{1-q} > 0$ ), implies that  $0.1 > g > -0.8$ . Moreover, the condition that the owner prefers a voluntary return to an apprehension,  $(1 - q)(1 - \delta) + (g - qf) > 0$ , implies that  $g > -0.71$ .<sup>21</sup> Hence the relevant range of  $g$  is  $(-0.71, 0.1)$ . Clearly, in this range,  $V_t$  declines as  $g$  rises. A thief is always better off with a smaller fine on returned stolen items. In addition, though the owners' utility is a fourth order polynomial in  $g$ , it has a single turning point in this range. As is shown in Figure 1,  $V_o$  first rises and then falls in  $g$  for  $0.1 > g > -0.71$ , reaching its maximum at  $g = -0.114$ . It is clear that, in this case, the owner's average utility is maximized if a confessed thief is offered a reward.

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<sup>21</sup>The condition that the owner does not prefer a theft to a non-theft,  $1 - u_s > 0$ , requires that  $g > -0.884$ , which is subsumed in this inequality.

Let social welfare,  $W$ , be a linear combination of  $V_t$  and  $V_o$

$$W = (1 - \alpha)V_t + \alpha V_o \quad (28)$$

such that  $1 \geq \alpha \geq 0$ . For our parameter values the owners' welfare is maximized for a negative  $g$ , and the welfare of thieves declines with  $g$ . It therefore follows that maximizing social welfare requires that a reward be paid to the confessed thief. In **Figure 1**  $W$  is plotted for  $\alpha = 0.8$ , achieving its maximum at  $g = -0.132$ . As expected, if the thieves' welfare is taken into account, the optimum requires a lower fine (a greater reward) than the if only owners' welfare is considered.

From this example as well as from our general analysis it is clear that, depending on parameter values, the solution to

$$\max_g (1 - \alpha)V_t + \alpha V_o \quad (29)$$

can be  $g < 0$ . A reward to confessed thieves may increase welfare. Of course, the optimal  $g$  may be positive (though smaller than  $f$ ), and it may also be zero. However, the likelihood that the solving the complicated optimization problem in (29) just happens to yield  $g = 0$  is small. A law that provides for a complete amnesty with no reward is likely to reflect wider considerations.

## 4 Efficiency and Amnesty

It is clear from the above analysis that many combinations of the relevant parameters ( $q, f, \delta, \alpha$  and  $p$ ) may yield the result that a reward to thieves is efficient, in the sense that it maximizes owners' utility and social welfare. Figure 2 uses the assumptions made in the last section regarding  $h(b)$  and  $k(m)$  as well as the assumptions that  $\delta = 0.1, p = 1$  and  $\alpha = 0.9$ , to plot the combinations of  $q$  and  $f$  for which the optimal reward is zero. The optimal value of  $g$  is negative for all combinations of  $f$  and  $q$  that are in the area below the curve.



## Figure 2

Despite the fact that a negative fine may be socially optimal, Jewish law almost never offers a reward to thieves. The best deal that is generally offered is a complete amnesty with no reward. It seems that even if the above optimization problem were to yield a negative  $g$ , i.e. a reward,  $g$  is set equal to zero. This may be due to the fact that Jewish criminal law follows the edict that ‘the sinner should not be rewarded’ -*she’lo yiheye hachoteh niscar*. At first glance, the motivation for edict appears to be an ethical/moral. The Torah has decreed that it is a sin to steal, and individuals should not be rewarded for sinning.

However, we suggest that, at least in the case of theft, this edict reflects a wider view of the social optimization problem. Indeed, the edict that ‘the sinner should not be rewarded’ may be viewed as reflecting the recognition by Jewish law of the central role played by property rights within the economic system. Weakening property rights may have a major negative impact on the economy. The edict therefore exhorts society to avoid granting legitimacy to abuses of property rights by rewarding their perpetrators. In other words, the edict suggests that setting  $g < 0$  is detrimental to the whole notion of property rights, even if the absolute value of  $g$  is small. A movement from  $g = 0$  to a negative  $g$  therefore implies a host of costs that are absent as long as  $g \geq 0$ . Hence, economy-wide welfare is kinked at  $g = 0$ .

Of course, there may be special circumstances where the achievement of specific social goals may outweigh a potential weakening of property rights. Indeed, notwithstanding the above, ancient Jewish Law explicitly permits the payment of a reward to usurpers of property rights in two cases. The first is known as the *sicaricon* law, and relates to purchase of stolen land. The second, *pidyon shvuim*, relates to the redemption of hostages/captives. In the discussion below we suggest that these two cases are the exceptions that prove the rule.

*The Sicaricon Law:* The seventh decade of the first century A.D. was a tumultuous time in the land of Israel, which was occupied by the Romans who faced on-going resistance from parts of the local Jewish population. There was little legal protection of property rights. This resulted in the *sicaricon* phenomenon, in which armed individuals (*sicae* is the Latin word for a knife or a small sword) took over land belonging to Jews and resold it. The rabbinical authorities had to determine whether a person who bought land from a *sicaricon* possessed full property rights over the land and whether he was required to compensate its original owner. The *talmud* (Tractate *Gitin*, page 55b) recounts the evolution of the (Jewish) law regarding this issue. Initially, in the seventh decade of the first century, the rabbis ruled that no compensation to original owners was payable, and that the buyer is the new legal owner. The implication of this was that the *sicaricon* got a good price for the land they stole. This ruling should be viewed against the backdrop of the anarchy in the land of Israel in this period. The probability,  $q$ , that usurped land could be retrieved by its original owner through the courts was negligible. Law enforcement became more effective after the conquest of Jerusalem by the Romans in 70 A.D. In response, Jewish law swung the other way. The land's original owner was declared maintained his property rights over the land. This meant that no one other than the original owner could acquire property rights over the land. This ruling may have been too harsh, since the *sicaricon* could still sell land to non-Jews. As a result the law was changed again. Any Jew could buy land from a *sicaricon*, but had to pay 25% of his profit (which was estimated to be the difference between the market value of the land and the price paid to the *sicaricon*) to the original owner.

*pidyon shvaim:* After the conquest of the land of Israel by the Syrians in 175 B.C., roaming bands began to capture Jews and sell them into slavery. This phenomenon intensified under the rule of the Romans in the first century A.D. Rabbinical authorities viewed the payment of a ransom to obtain the release of captives as a major duty of Jewish communities. Indeed, they the

payment of such ransom to be a community-wide obligation, which was often financed by the public purse. Clearly, the probability of release without the payment of a ransom,  $q$ , was effectively zero. It is interesting to note however, that the rabbis did not permit the ransom to exceed the market price of the individual i.e. his price if sold into slavery. This limitation was in effect even in cases where an individual was willing to pay an higher amount . As the *talmud* explicitly recognizes (Tractate *Gitin*, page 45a) this restriction on ransom payments ensured that kidnappers do not make a special investment in capturing Jews. Given that kidnappers only obtain the market price of a slave, they will find the kidnapping of Jews will be no more profitable than the capturing of others. In view of this kidnappers would not specifically target Jews, thereby reducing the burden on the Jewish community.<sup>22</sup>

It is clear from the above examples that ancient Jewish Law recognized the social costs and benefits of rewarding thieves. However, in normal circumstances the edict that ‘the sinner should not be rewarded’ was viewed as binding. In particular, in the case of theft, maximizing efficiency subject to this edict yielded a complete amnesty with no reward.

## 5 Concluding Comments

This paper explains the existence of theft amnesties by viewing them as a way of minimizing the social costs related infractions of property rights. Clearly, any case where the penalty imposed on confessed thieves is lower than that imposed on non-confessed thieves, constitutes an effective amnesty. An amnesty is therefore defined by  $f > g$  , where  $g$  may be positive, zero or negative. The optimal size of  $g$  is determined by considering its costs and benefits. An amnesty carries with it the benefit that it encourages thieves

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<sup>22</sup>In the cases *sicaricon* and hostage taking the crimes (sins) were committed by non-Jews. A possible interpretation fact that a reward to these crimes is permitted, is that it did not encourage Jews to participate in such crimes.

to return stolen items to their rightful owners. At the same time, however, it carries the cost that it encourages theft. The tension between these two effects of an amnesty determines whether it should be offered and, if it is, what the extent of the amnesty should be.

These issues appear to have been considered in ancient times, and our analysis is shown to be directly applicable to biblical times. It appears that biblical law struck the balance between encouraging theft and encouraging returns by waiving the fine but offering no reward for confessed theft. However, while the discussion was motivated by the biblical law of theft, the model presented may be of use in several modern contexts. For example, it may shed light on laws relating to negotiations with kidnappers, or whether insurance companies should be allowed to negotiate with car thieves for the return of stolen cars.

Indeed, the principle upon which the Biblical law of theft seems to be based is commonly employed in the legal system. Courts frequently offer leniency to confessed offenders, though they seldom if ever offer rewards. One possible interpretation of such leniency may be couched in terms of the publicly-borne costs of achieving a conviction. We offer an alternative explanation that hinges on restitution.

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Figure 1

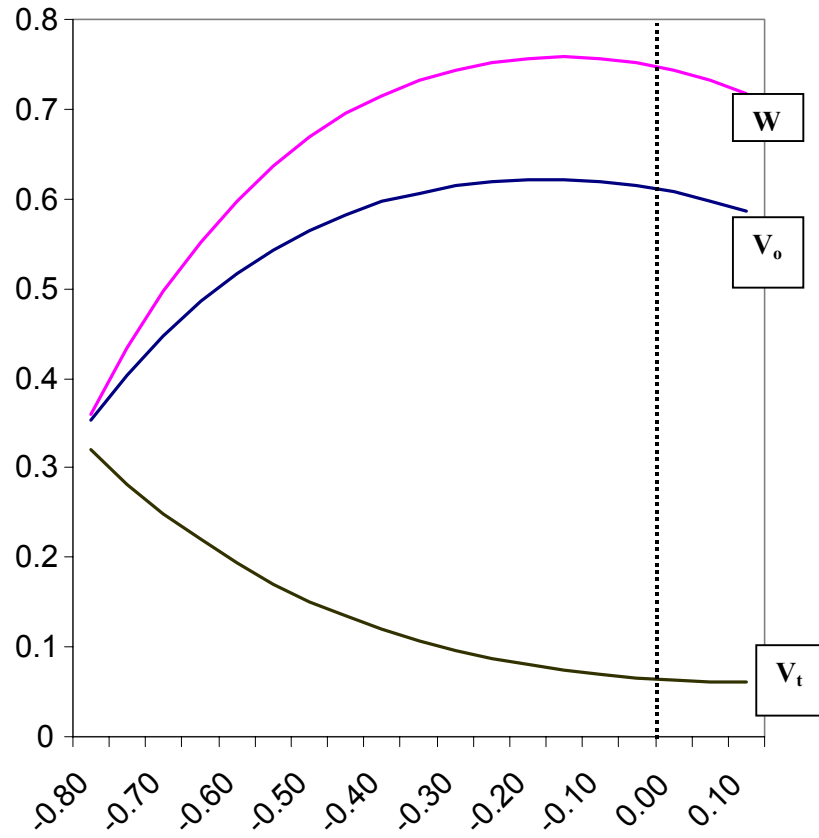


Figure 2

