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Crime Against Women: Desirability of Cognizance Level Punishment in presence of Judicial Errors

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ABSTRACT

Following the rape of a student on 16th December, 2012 in Delhi, the government constituted an expert committee under Justice J S Verma to look into the existing law and strengthen it. One of the recommendations of the committee was to disqualify a public servant from contesting elections if the court took cognizance of a CAW (Crime Against Women) case against him. The present paper analyses this specific recommendation by looking at its effect on two kinds of legal errors - the Error of Exclusion (the probability of acquitting a guilty person) and the Error of Inclusion (the probability of wrongfully convicting an innocent person). The paper finds that introducing a cognizance-level punishment makes it optimal for some individuals to pose as victims and exert positive effort in supplying evidence for a fake case. While introducing punishment at cognizance level might have adverse impact on legal errors, improving law enforcement is found to be unambiguously beneficial in reducing the same.

Keywords: crime, women, legal errors, cognizance, enforcement

INTRODUCTION

The Delhi gang rape of 16th December 2012 has had a lasting effect on the nation, and rightly so. The barbaric incident prompted widespread agitation and discussion on all aspects of safety of women - existing laws on crime against women (CAW), law enforcement and public mentality. There were strong demands for death penalty for rapists, lowering the juvenile age and taking strict action on repeat offenders. In response to public outrage, the Government set up a review committee under Justice J.S. Verma in December to suggest amendments to existing laws. One of the key recommendations of this Committee was punishment at cognizance level for CAW. The provision stated that if a public servant was accused in a CAW incident and the case was taken cognizance of, he would be disqualified from elections (1). On 1st February 2013, the Government passed an ordinance that strengthened the Verma

Committee recommendations on some counts, but left out the provision for cognizance level punishment. Even the recently implemented Criminal Law (Amendment) Act 2013 avoided this provision.

One can understand that creating a law that has a direct negative effect on politicians is unlikely to find favour with lawmakers. But, would it have been a good provision? Viewed through an economic lens, the provision is much like making punishment for crime more severe. There is a lot of discussion in the literature on whether severe punishments ultimately make society better off. Often Social welfare is evaluated in terms of legal errors of exclusion and inclusion. There are varying opinions on how an inclusion error is viewed relative to one of exclusion. This paper seeks to analyze how a provision for punishment at cognizance level would affect these two errors.

CAW – The Numbers

Crimes against women are classified under the Indian Penal Code and Special & Local laws. IPC crimes include rape (Sec 376), kidnapping & abduction (Sec 363-373), homicide for dowry (Sec 302/304-B), torture (Sec 498-A), molestation (Sec 354), sexual harassment (Sec 509) and importation of girls (Sec 366-B). Provisions under SLL include Immoral Traffic (Prevention) Act (1956), Dowry Prohibition Act (1961), Indecent Representation of Women (prevention Act (1986) and Sati Prevention Act (1987).

According to the National Crime Records Bureau (NCRB) report on Crime in India (2013), there were 3,09,546 cases of CAW during 2013 while the number was 2,44,270 in 2012 – an increase of 26.7%. Also, in 2013 of the total 2,95,896 cognizable crimes under IPC,33,707 were rape cases. Of the total CAW in 2013, rape accounted for 10.9%, molestation for 22.9%, kidnapping & abduction for 16.8%, cruelty by husband & relatives for 38.4%, dowry cases for 6.1%, trafficking for 0.8% and sexual harassment for 4.1%.

The NCRB also noted that 53,464 cases of crime against women were reported from 53 mega cities with over 10 lakh population in 2013 as compared to 36,622 in 2012. Delhi topped the list accounting for 21.4% cases followed by Mumbai, Bengaluru, Ahmedabad and Kolkata.

Proposed Changes to the Law

There are three main legal documents that we will discuss in this section – Justice Verma Committee report, the Ordinance based on the report and the amended anti-rape bill (Criminal Law (Amendment) Act 2013).

On the issue of punishment for rape, the Verma Committee suggested 20 years imprisonment for gang rape and life imprisonment for rape and murder. The Ordinance specifies a minimum of 20 years imprisonment for rapists and goes a step further by allowing for death penalty in extreme cases. The Committee also recommended reviewing the Armed Forces Special Powers Act (AFSPA), criminalizing marital rape and holding senior police and army officers responsible for sexual offences committed by juniors. The Ordinance rejected all of these. Another recommendation that was rejected by the Ordinance required restricting politicians charged with sexual offences from contesting elections. In addition, the Ordinance changed the Committee's call for mandatory videography of victims' statements and made it optional (2).

The amended anti-rape bill strengthens punishment for gang rape, repeat offenders, stalking, voyeurism, disrobing and sexual harassment. It widens the definition of rape and raises the age of consent to 18 years. Marital rape is not recognized and cognizance level punishment is not considered. The bill also mentions death penalty in cases where rape leaves a woman in a persistent vegetative state or causes death. This is a marked departure from previous legislations that steered clear of mentioning capital punishment (3).

Although punishment has been made more severe for most offences, strict implementation is perhaps the weakest link in the chain for justice.

THEORETICAL MODEL

Basic Model

The following notations are used in the paper:

x = cost of efforts for prosecution

y = cost of efforts for defence

S = punishment level/true intensity of crime

p(x, y) = probability of conviction

$\bar{S}$ = cognizance level punishment (fixed)

γ = parameter representing increased probability of conviction if crime actually committed

In addition to these, in the Two Stage Game following variables are also used:

x_1 = efforts exerted by the prosecution at the cognizance level

x_2 = efforts exerted by the prosecution at the final verdict level

δ = discount factor

$\tilde{S}$= intensity of crime as alleged by prosecution

γ_1 = parameter analogous to γ except that it corresponds to the conviction probability at the cognizance level

γ_2 = parameter analogous to γ_1 except that it corresponds to the conviction probability at the final verdict level

EE = error of exclusion

EI = error of inclusion

Effort choices can be 0 or positive. The same is true for S. In contrast, $\tilde{S}$, must always be positive. This makes sense because if the allegation is 0 then there is no case anyway. We assume $\bar{S}$ to be positive. The probabilities as always between 0 and 1 (This includes EE and EI which are also probabilities). The discount factor and γ values are positive and bounded above by 1.

Let us first consider representations without errors in assessment of crime intensity.

Single stage game

Consider two parties - a prosecution and a defence. In our context, the prosecution would be a woman who is a victim of crime of intensity S committed by the defence. In order to make the allegation, the prosecution has to incur some cost of collecting and presenting evidence and the defence has to incur cost to prove innocence, $\frac{x^2}{2}$ and $\frac{y^2}{2}$, respectively.

For any choice of effort by the two parties, there is a chance that the ruling is in favour of the prosecution. This is captured by p(x, y). So, the defendant gets punishment S with probability p(x, y) and is acquitted with probability (1- p(x, y)).

The prosecution faces the following optimization problem:

$$\max_x S\, p(x,y) - \frac{x^2}{2} \qquad [1]$$

Similarly, the defendant faces:

$$\min_y S\, p(x,y) - \frac{y^2}{2} \qquad [2]$$

Suppose $p(x, y) = \frac{ax}{ax+by}$, where *a, b*> 0. As the prosecution exerts higher effort in presenting evidence, the probability of conviction goes up. The opposite happens when the defence increases effort. The parameters *a* , *b* represent the effectiveness of the party's efforts in affecting conviction probabilities.

In equilibrium, both parties choose

$$x^* = y^* = \frac{\sqrt{Sab}}{a+b} \qquad [3]$$

This simple result illustrates the point that both parties have to exert higher efforts to prove/disprove a stronger allegation. Moreover, optimal effort choices are 0 when no crime is committed.

Two stage game: cognizance & final verdict

Consider a two stage litigation process consisting of a cognizance level and a final verdict level. At the cognizance level, preliminary evidence is submitted by the prosecution to put forth the allegation. On the basis of this evidence, the judge decides whether or not to accept the case for further hearing. If the case reaches the final verdict level, supplementary evidence is submitted and a decision is reached.

Let $\bar{S}$ be the fixed punishment given at the cognizance level if the case is accepted. Now the prosecution has to decide how much effort to exert at each of the two levels, x_1, x_2. The defendant, however, is given a chance to present his case only at the final verdict level by exerting y. The case is accepted at the cognizance level with probability $p(x_1)$ which increases as x_1 increases.[1]

For the prosecution:

$$\max_{x_1,x_2} \bar{S}\, p(x_1) - \frac{x_1^2}{2} + \delta \left[S\, p(x,y) - \frac{x_2^2}{2}\right] \qquad [4]$$

where $x = x_1 + x_2$ and δ is the discount factor.

The FOCs (First Order Conditions) are:

$$\bar{S}\frac{dp(x_1)}{dx_1} + \delta S \frac{dp(x,y)}{dx_1} = x_1^* \qquad [5]$$

$$S \frac{dp(x,y)}{dx_2} = x_2^* \qquad (6)$$

For the defence:

$$\min_{y} \bar{S}\, p(x_1) + \delta \left[S\, p(x,y) + \frac{y^2}{2}\right] \qquad [7]$$

The FOC is:

$$-S \frac{dp(x,y)}{dy} = y^* \qquad [8]$$

[1] $p(X_1) > 0$ for all values of X_1.

Proposition 1: *Introducing a cognizance level induces the prosecution to exert positive effort even for a frivolous complaint.*

If no crime is committed, S = 0, then the optimal effort choice at the cognizance level is

$$\bar{S}\,\frac{dp(x_1)}{dx_1} = x_1{}^* \qquad [9]$$

If $\bar{S} > 0$ then $(x_1)^* > 0$. So in the presence of a cognizance level punishment, there is an incentive to lodge frivolous complaints.

Further, it is clear from [7] that with S > 0, $(x_1)^*$ would have been even higher. More effort is exerted in case of a genuine complaint.

To be realistic, let us assume a minimum $\bar{y}$ has to be exerted by the defendant even when S = 0, to prove innocence.

The above subsections are mainly for exposition purposes and bring out the possible effects of introducing a cognizance level. We now consider a situation where there are errors in assessment of the crime intensity.

Legal Errors: Single Stage Game

(Figure I) represents the game tree for the single stage game. The defendant decides whether or not to commit the crime based on the optimal action that will be taken by the prosecution in each situation. The Court punishes the defendant with a probability dependent on the effort choices of the two parties and on the occurrence of the crime.

The decision to commit a crime is based on the costs and benefits associated with it. Suppose an individual derives a constant benefit B from committing a crime. Further say, the probability of being punished is $\gamma\, p(x; y) = \gamma \frac{ax}{ax+by}$, where $\gamma = 1$ if S > 0 and $\gamma < 1$ if S = 0.

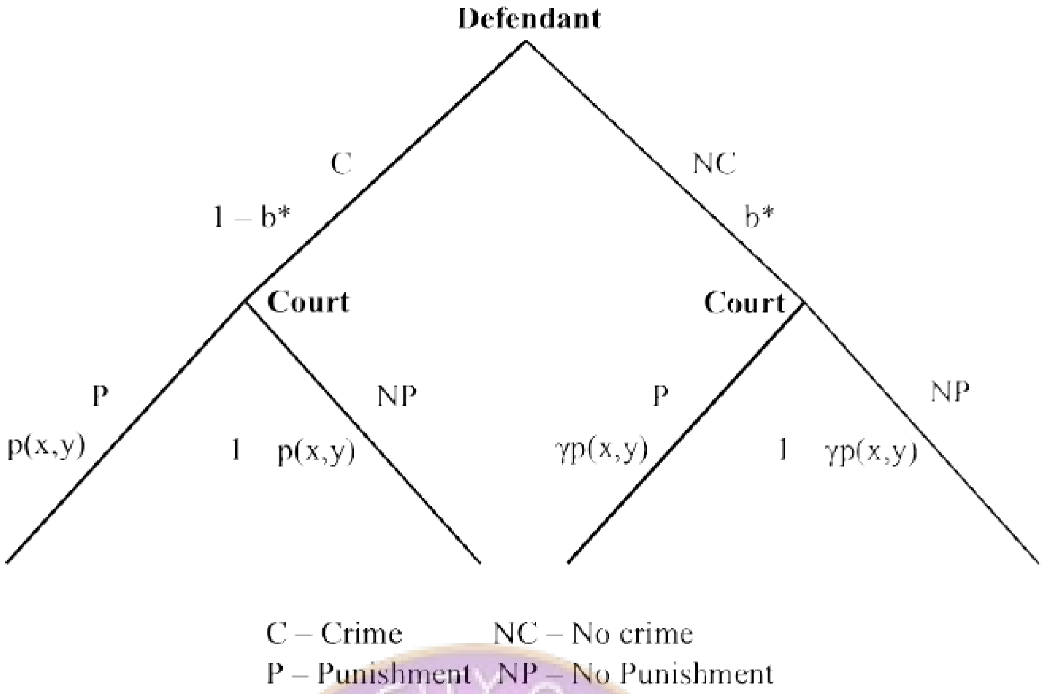

Figure I – Single Stage Game

Now, the prosecution faces the following optimization problem:

$$\max_{x} \tilde{S}\ \gamma\, p(x,y) - \frac{x^2}{2} \qquad [10]$$

where $\tilde{S}$ is the punishment level based on allegation charges. Further we assume, $\tilde{S}$ = S + F, where F can be interpreted as an upward bias in making allegations on the part of the prosecutor (i,e, F> 0)[2]. Since $\tilde{S}$ differs from S, this is an added source of error.

And the defendant faces:

$$\min_{y} \tilde{S}\ \gamma\, p(x,y) + \frac{y^2}{2} - B \qquad [11]$$

The optimal effort choice of both the parties is

$$x^* = y^* = \frac{\sqrt{\tilde{S}\gamma ab}}{a+b} \qquad [12]$$

If the crime is actually committed, then

[2] Theoretically F can be a choice variable for the prosecution. For simplicity we assume a fixed upward bias.

$$x_C * = y_C * = \frac{\sqrt{\tilde{S}ab}}{a+b} = \frac{\sqrt{(S+F)ab}}{a+b}$$

And if the crime is not committed, then

$$x_{NC} * = y_{NC} * = \frac{\sqrt{\tilde{S}\gamma ab}}{a+b} = \frac{\sqrt{F\gamma ab}}{a+b}$$

since S = 0. Therefore, both parties exert lower efforts for frivolous complaints (This is true because $F\gamma < F \leq F + S$).

An individual chooses to commit a crime if the expected payoff from doing so is higher than from not committing a crime. Therefore, crime is committed if E(C) > E(NC), which is given by

$$\tilde{S}_C p(x_C *, y_C *) + \frac{y_C *^2}{2} - B \leq \tilde{S}_{NC} p(x_{NC} *, y_{NC} *) + \frac{y_{NC} *^2}{2}$$

Putting $p(x_c^*, y_c^*) = p(x_{Nc}^*, y_{Nc}^*) = \frac{a}{a+b}$ in above equation enables us to get a threshold value of B[*Proof1; in appendix*] above which individuals will opt to commit a crime, which is

$$B \geq B^* = \frac{(2a+3b)a}{2(a+b)} [S + (1-\gamma)F] \qquad [13]$$

We assume that B follows a continuous distribution ϕ. So the fraction of population that will not commit a crime is $\Phi(B^*) = \Pr(B \leq B^*) = \beta^*$.

In this model, the error of exclusion (EE) is the probability of acquitting a guilty person, which is given by $(1-\beta^*)(1-p(x_c^*, y_c^*))$, the probability of committing a crime times the probability of escaping conviction. Similarly, error of inclusion (EI) is the probability of wrongfully convicting an innocent person, which is given by $\gamma\, p(x_{Nc}^*, y_{Nc}^*)\beta^*$. Because x* and y* turn out to be same in equilibrium, therefore, $p(x^*, y^*) = \frac{a}{a+b}$. Hence EE is given by, $(1-\beta^*)\frac{b}{a+b}$ and EI is given by $\gamma\beta^*\frac{a}{a+b}$.

Therefore, changes in γ or β^* will affect both EE and EI.

Proposition 2: *EE falls and EI rises as intensity of allegation, $\tilde{S}$, goes up. This could result from a rise in S or increase in F.*

$$\frac{d(EE)}{d\tilde{S}} = -\frac{d\beta^*}{d\tilde{S}}\frac{b}{a+b}$$

Similarly,

$$\frac{d(EI)}{d\tilde{S}} = \gamma \frac{d\beta^*}{d\tilde{S}} \frac{a}{a+b}$$

From the expression for B*, we can conclude that $\frac{dB^*}{dS}$, $\frac{dB^*}{dF}$ > 0 which implies that $\frac{d\beta^*}{d\tilde{S}} > 0$, a smaller proportion of people choose to commit crimes of high intensity. This, in turn, implies that error of exclusion will go down and error of inclusion will rise for a higher $\tilde{S}$.

Proposition 3: *EE rises and EI is affected ambiguously as* γ *rises.*

$$\frac{d(EE)}{d\gamma} = -\frac{d\beta^*}{d\gamma} \frac{b}{a+b}$$

Since $\frac{dB^*}{d\gamma} < 0$ implying that $\frac{d\beta^*}{d\gamma} < 0$, if the likelihood of conviction for innocent people becomes as high as that for guilty people, the benefit from not committing a crime goes down. Hence more people choose to commit crime and EE increases.

For inclusion error, there are two opposing effects as seen through:

$$\frac{d(EI)}{d\gamma} = \gamma \frac{d\beta^*}{d\gamma} \frac{a}{a+b} + \beta^* \frac{a}{a+b}$$

Since less people choose not to commit crime the probability of a wrongful conviction goes down, thereby depressing EI. While, on the other hand, holding β^* constant, a higher γ means that innocent people are as likely to be convicted as guilty people, increasing EI. The net effect is, therefore, ambiguous.

Proposition 4: *EE falls and EI rises as the prosecution's evidence becomes more effective, i.e. a goes up.*

$$\frac{d(EE)}{da} = (1- \beta^*)(-\frac{b}{(a+b)^2}) + \frac{b}{a+b}(-\frac{d\beta^*}{da})$$

And, $\frac{dB^*}{da} = (\frac{S+(1-\gamma)F}{2})(\frac{(a+3b)b}{(a+b)^3}) > 0$. Therefore, both the terms in the above expression are negative, implying thereby that $\frac{d(EE)}{da} < 0$.

There are two effects to consider - if the judge puts more weight on the evidences presented by the prosecution, the probability of acquittal of a guilty person goes down, holding the criminal population constant. Higher conviction rate acts as a deterrent for others, thereby lowering the proportion of criminals.

Similarly, for EI:

$$\frac{d(EI)}{da} = \beta^*(\frac{b}{(a+b)^2}) + \frac{a}{a+b}\gamma(\frac{d\beta^*}{da}) > 0$$

Because probability of conviction has gone up and at the same time, proportion of criminals has fallen, the EI rises.

By the same token, if *b* increases, i.e., the judge puts more weight on the evidences presented by the defence, the rate of conviction (for both guilty and innocent people) falls which leads to increase in the fraction of population committing crime. Both these factors cause EE to rise and EI to fall, as can be seen from the following expressions:

$$\frac{d(EE)}{db} = (1-\beta^*)(\frac{a}{(a+b)^2}) + \frac{b}{a+b}(-\frac{d\beta^*}{db}) > 0$$

And,

$$\frac{d(EI)}{db} = \gamma\ \beta^*(-\frac{a}{(a+b)^2}) + \frac{a}{a+b}\gamma(\frac{d\beta^*}{db}) < 0$$

Since, $\frac{dB^*}{db} = (\frac{S+(1-\gamma)F}{2})(-\frac{(a+3b)a}{(a+b)^3}) < 0$

These parameters can be interpreted as indicators of wealth or influence of the two parties. Huge inequalities in these can explain how rich, guilty defendants often escape punishment.

Legal Errors: Two Stage Game

The above framework can be interpreted as a universal cognizance regime.

Let us extend this to allow for a probability that a case can be rejected at the cognizance level. (Figure II) represents the game tree for this set-up. Here again, the defendant chooses whether or not to commit a crime accounting for the subsequent choices made by the prosecution. The Court acts at two nodes by accepting or rejecting the case and then later by convicting or acquitting the accused.

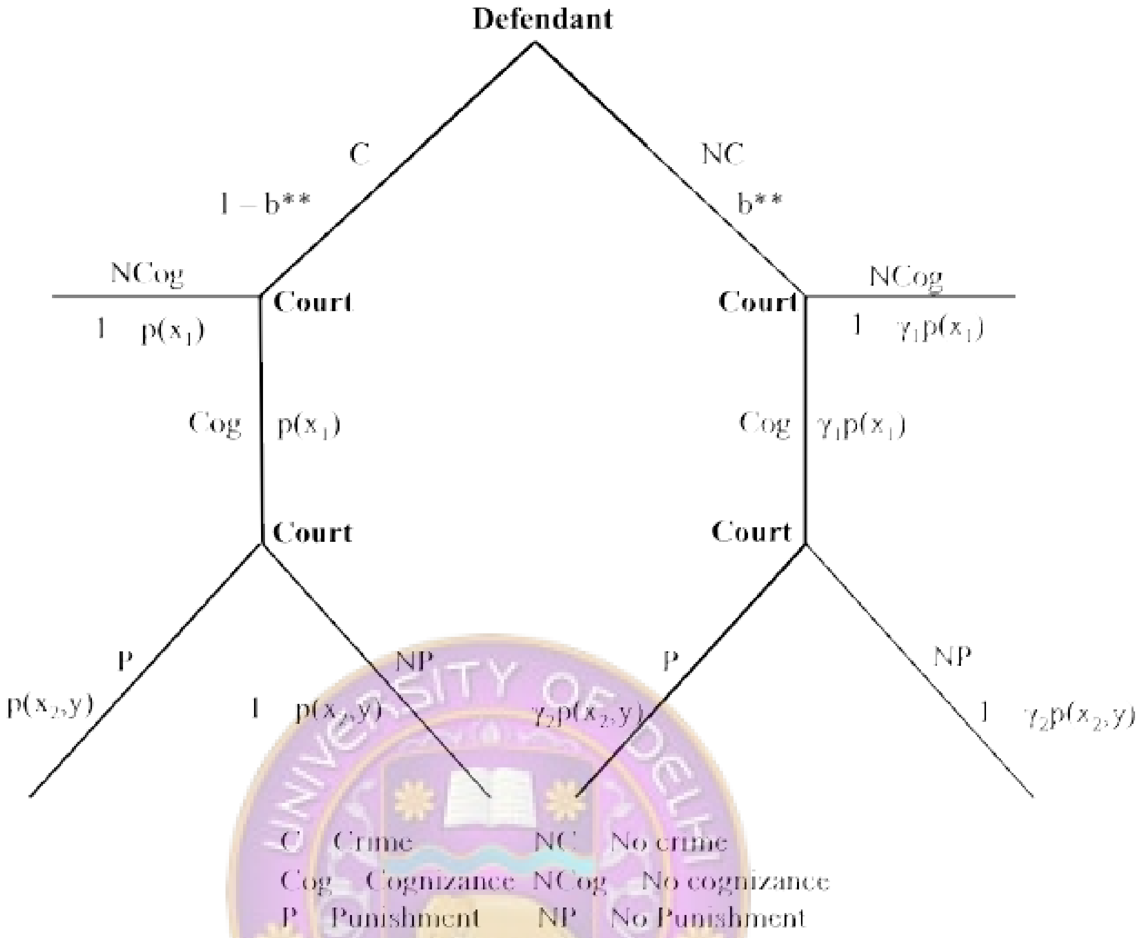

Figure II – Two Stage Game

We assume that the probability that a case is accepted at cognizance level is γ_1 p(x_1). As before, γ_1 is equal to 1 if the crime has actually taken place and is less than one otherwise.

We consider p(x_1) = $\tilde{S}$ x_1 so that the probability of a case being accepted increases as the prosecutor exerts more effort and as the severity of allegation $\tilde{S}$ goes up. We hypothesize a positive relation between $\tilde{S}$ and p(x_1) to illustrate that a rape allegation is less likely to be rejected as compared to one of eve-teasing. We again assume that $\tilde{S}$ = S + F.

As above, we say probability of conviction is γ_2 p(x_2, y), where p(x_2, y) = $\frac{ax_2}{ax_2 + by}$.

γ_2 has the same interpretation as γ_1. Although, x_1 is part of the total evidence submitted by the prosecution, we assume it has a negligible effect on the probability of conviction[3]

The decision problem faced by the prosecutor is:

$$\max_{x_1,x_2} \bar{S}\gamma_1 p(x_1) - \frac{x_1^2}{2} + \delta[\tilde{S}\gamma_2 p(x_2,y) - \frac{x_2^2}{2}] \qquad [14]$$

And that faced by the defendant is:

$$\min_{y} \bar{S}\gamma_1 p(x_1) + \delta[\tilde{S}\gamma_2 p(x_2,y) + \frac{y^2}{2}] - B \qquad [15]$$

The optimal effort choices are:

$$x_1^{**} = \bar{S}\tilde{S}\gamma_1 \qquad [16]$$

$$x_2^{**} = y^{**} = \frac{\sqrt{\tilde{S}\gamma_2 ab}}{a+b} \qquad [17]$$

As before, $x_{1C}^{**} = \bar{S}\tilde{S} = \bar{S}(S+F)$ and $x_{2C}^{**} = y_C^{**} = \frac{\sqrt{\tilde{S}ab}}{a+b} = \frac{\sqrt{(S+F)ab}}{a+b}$.

Similarly, $x_{1NC}^{**} = \bar{S}\tilde{S}\gamma_1 = \bar{S}F\gamma_1$ and $x_{2NC}^{**} = y_{NC}^{**} = \frac{\sqrt{\tilde{S}\gamma_2 ab}}{a+b} = \frac{\sqrt{F\gamma_2 ab}}{a+b}$.

Notice that $x_{1C}^{**} > x_{1NC}^{**}$ and likewise for x_2 and y. The parties exert less effort in a frivolous case vis-a-vis a genuine one and this is true even for the defence.

Now an individual will choose to commit a crime if E(C) > E(NC), which is given by

$$\bar{S} p(x_{1C}^{**}) + \delta[\tilde{S}_C p(x_{2C}^{**}, y_C^{**}) + \frac{y_C^{**2}}{2}] - B \leq$$

$$\bar{S}\gamma_1 p(x_{1NC}^{**}) + \delta[\gamma_2 \tilde{S}_{NC} p(x_{2NC}^{**}, y_{NC}^{**}) + \frac{y_{NC}^{**2}}{2}]$$

This enables us to find the threshold value of B [Proof2; in appendix]:

$$B \geq B^{**} = \bar{S}^2[S + F - (\gamma_1 F)^2] + \delta\frac{(2a+3b)a}{2(a+b)^2}[S+F-(\gamma_1 F)^2] \qquad [18]$$

Let Φ(B**)= Pr(B $\leq$B**) = β^{**} be the fraction of population that does not commit crime.

Errors at final verdict level

In a Two Stage game, we can talk about legal errors at both levels. Let us first consider the final verdict stage. EE is $p(x_{1C}^{**})(1 - p(x_{2C}^{**}, y_C^{**}))(1-\beta^{**}) = \bar{S}\tilde{S}^2$

[3] In Section 4.2 we considered final verdict stage conviction probability to depend on total evidence submitted. Here, for mathematical convenience we consider on x_2 and y.

$(1-\beta^{**})\frac{b}{a+b} = \bar{S}\ (S+F)^2(1-\beta^{**})\frac{b}{a+b}$. This is a composite of the probability of committing a crime, the court taking cognizance of the case and subsequent acquittal.

Similarly, EI is $[\gamma_1 p(x_{1NC}**)][\gamma_2\ p(x_{2NC}**, y_{NC}**)]\beta^{**} = \bar{S}\ \tilde{S}^2\gamma_1{}^2\gamma_2\ \beta^{**}\frac{a}{a+b} =$ $\bar{S}\ F^2\gamma_1{}^2\gamma_2\ \beta^{**}\frac{a}{a+b}$.

Proposition 5: *EE is affected ambiguously and EI rises as $\tilde{S}$ (due to increase in S or F) or $\bar{S}$ rise.*

$$\frac{d(EE)}{d\tilde{S}} = 2\bar{S}\ \tilde{S}\ (1-\beta^{**})\frac{b}{a+b} + \bar{S}\ \tilde{S}^2\ (-\frac{d\beta^{**}}{d\tilde{S}})\frac{b}{a+b}$$

Similarly, for cognizance level punishment, we have

$$\frac{d(EE)}{d\bar{S}} = \tilde{S}^2\ (1-\beta^{**})\frac{b}{a+b} + \bar{S}\ \tilde{S}^2(-\frac{d\beta^{**}}{d\bar{S}})\frac{b}{a+b}$$

While the first term in both expressions is positive, the second term is negative (because $\frac{d\beta^{**}}{d\tilde{S}}$ and $\frac{d\beta^{**}}{d\bar{S}}>0$). The latter is true because $\frac{d\beta^{**}}{dS}>0$ and $\frac{d\beta^{**}}{dF} > 0$). Hence, we cannot unambiguously infer the direction of change.

We can repeat this exercise for EI as well:

$$\frac{d(EI)}{d\tilde{S}} = 2\bar{S}\ \tilde{S}\ \ \gamma_1{}^2\gamma_2\ \ \beta^{**}\frac{a}{a+b} + \bar{S}\ \tilde{S}^2\gamma_1{}^2\gamma_2\ (\frac{d\beta^{**}}{d\tilde{S}})\frac{a}{a+b}$$

And

$$\frac{d(EI)}{d\bar{S}} = \tilde{S}^2\gamma_1{}^2\gamma_2\ \ \beta^{**}\frac{a}{a+b} + \bar{S}\ \tilde{S}^2\gamma_1{}^2\gamma_2\ (\frac{d\beta^{**}}{d\bar{S}})\frac{a}{a+b}$$

In case of EI, both the terms in the derivatives are positive.

A higher $\tilde{S}$ has two effects on error probabilities. One, it decreases the proportion of people who choose to commit crime; two, it raises the probability of a case being accepted at the cognizance level. Both these factors work to raise EI. For EE, these factors work in opposite directions making the net effect unclear.

Similarly, increasing cognizance level punishment will certainly raise EI but may or may not decrease EE.

Proposition 6: *EE falls and EI rises as δ rises.*

$$\frac{d(EE)}{d\delta} = \bar{S}\ \tilde{S}^2\ (-\frac{d\beta^{**}}{d\delta})\frac{b}{a+b}$$

And,

$$\frac{d(EI)}{d\delta} = \bar{S}\ \tilde{S}^2\ \gamma_1^{\ 2}\ \gamma_2\ (\frac{d\beta^{**}}{d\delta})\frac{a}{a+b}$$

As the future becomes more important, the potential punishment from crime has more effect on utility. Therefore, the fraction of people choosing to commit crime falls ($\frac{dB^{**}}{d\delta} > 0$). Hence, EE falls and EI rises.

Note 1: A higher γ as before, raises EE and has an ambiguous effect on EI for the same reasons.

This can be seen from the following expressions.

$$\frac{d(EE)}{d\gamma_1} = \bar{S}\ \tilde{S}^2\ (-\frac{d\beta^{**}}{d\gamma_1})\frac{b}{a+b} > 0$$

Because $\frac{d\beta^{**}}{d\gamma_1} < 0$.

$$\frac{d(EI)}{d\gamma_1} = 2\bar{S}\ \tilde{S}^2\ \beta^{**}\ \gamma_1\ \ \gamma_2\ \frac{a}{a+b} + \bar{S}\ \tilde{S}^2\ \gamma_1^{\ 2}\ \gamma_2\ (\frac{d\beta^{**}}{d\gamma_1})\frac{a}{a+b}$$

Now the two terms have opposite signs, hence the net effect is ambiguous.

For γ_2, $\frac{d\beta^{**}}{d\gamma_2}$ <0, so the effect of a rise in γ_2 is to raise EE. Its effect on EI is ambiguous, as illustrated below:

$$\frac{d(EE)}{d\gamma_2} = \bar{S}\ \tilde{S}^2\ (-\frac{d\beta^{**}}{d\gamma_2})\frac{b}{a+b} > 0$$

And,

$$\frac{d(EI)}{d\gamma_2} = \bar{S}\ \tilde{S}^2\ \beta^{**}\ \gamma_1^{\ 2}\ \frac{a}{a+b} + \bar{S}\ \tilde{S}^2\ \gamma_1^{\ 2}\ \gamma_2\ (\frac{d\beta^{**}}{d\gamma_2})\frac{a}{a+b}$$

Note 2: An increase in *a* or *b* produce the same results as in the single stage game.

Errors at cognizance level

At this level, EEs occur when courts do not take cognizance of a genuine case. This is given by [1-p(x_{1C} **)](1- β^{**}) = (1- $\bar{S}\ \tilde{S}^2$)(1- β^{**})= (1- $\bar{S}\ (S+F)^2$)(1- β^{**}).

Similarly, EIs occur when courts accept fake cases. This is given by γ_1 p(x_{1NC} **) β^{**} $= \bar{S}\ \gamma_1^{\ 2}\ F^2\ \beta^{**}$.

Proposition 7: *EE falls and EI rises as $\tilde{S}$ or $\bar{S}$ rise.*

$$\frac{d(EE)}{d\tilde{S}} = -2\bar{S}\ \tilde{S}\ (1-\beta^{**})+(1-\bar{S}\ \tilde{S}^2)\ (-\frac{d\beta^{**}}{d\tilde{S}}) < 0$$

Because $\frac{d\beta^{**}}{d\tilde{S}} > 0$

$$\frac{d(EE)}{d\bar{S}} = -\tilde{S}^2\ (1-\beta^{**})+(1-\bar{S}\ \tilde{S}^2)(-\frac{d\beta^{**}}{d\bar{S}}) < 0$$

Because $\frac{d\beta^{**}}{d\bar{S}} > 0$

Similarly, for EI:

$$\frac{d(EI)}{d\tilde{S}} = 2\bar{S}\ \tilde{S}\ \ \gamma_1^{\ 2}\ \ \beta^{**} > 0$$

And, $\frac{d(EI)}{d\bar{S}} = \tilde{S}^2\ \gamma_1^{\ 2}\ \ \beta^{**} > 0$

An increase in $\bar{S}$ or $\tilde{S}$ can decrease the proportion of criminals and/or increase the probability of the case being accepted by the court. Both these factors cause EE to fall and EI to rise. While the number of criminals goes down, more cases are accepted by the court. The chances of a criminal escaping conviction are lower. This also means that the share of fakes amongst accepted cases rises.

Proposition 8: *EE rises and EI is affected ambiguously as γ_1 rises.*

$$\frac{d(EE)}{d\gamma_1} = (1-\bar{S}\ \tilde{S}^2)\ (-\frac{d\beta^{**}}{d\gamma_1}) > 0$$

Since $\frac{d\beta^{**}}{d\gamma_1} < 0$

$$\frac{d(EI)}{d\gamma_1} = 2\bar{S}\ \tilde{S}^2\ \beta^{**}\ \gamma_1\ + \bar{S}\ \tilde{S}^2\ \gamma_1^{\ 2}\ (\frac{d\beta^{**}}{d\gamma_1})$$

While the second term on RHS is negative (because $\frac{d\beta^{**}}{d\gamma_1} < 0$) , the first term is positive, so the net effect is ambiguous.

An increase in γ_1 reduces B** so that more people choose to commit crime. This raises EE.

Since B** falls, there are higher chances of meeting a genuine criminal. This reduces the possibility of wrongful conviction. However, an increase in γ_1 directly enhances the probability of accepting even false complaints, hence raising the EI.

Similar results are obtained in case of γ_2 . EE goes up in response to increase in γ_2 , while EI falls.

$$\frac{d(EE)}{d\gamma_2} = (1-\bar{S}\ \tilde{S}^2)\ (-\frac{d\beta^{**}}{d\gamma_2})>0$$

Since $\frac{d\beta^{**}}{d\gamma_2} < 0$

$$\frac{d(EI)}{d\gamma_2} = \bar{S}\ \tilde{S}^2\ \gamma_1^{\ 2}\ (\frac{d\beta^{**}}{d\gamma_2}) < 0$$

In considering total errors of the two stage game we have to be a little careful. Although we can add EE from the two stages, we should consider only the final level EI. This becomes obvious when we look at the game tree. Cognizance level EI is contained within the error that manifests at the final verdict level. Therefore it would be incorrect to account for both the values.

Note: We can consider γ as a function of S - all else remaining the same, conviction is more likely for heinous crimes. This only strengthens the results of our paper.

CONCLUSION

The present paper analyses the effect of introducing cognizance level punishment in CAW cases. On the face of it, cognizance level punishment seems like a good idea. However, this theoretical model shows the complexities associated with such a move.

In Section 4, we presented a simple model to see how the defendant and prosecution strategically choose their effort levels, with (Two-stage game) and without (single stage game) cognizance level punishment. As seen in Section 4.2, introducing this punishment makes it optimal for some individuals to pose as victims and exert positive effort in supplying evidence for a fake case. This was not optimal in the one stage game (i.e., without a cognizance level).However, this is probably a result of no penal consequences being imposed on the prosecution in the event of a fake allegation. The analysis will most likely change if we build this into the model. This highlights the importance of careful framing of the legal mechanism to prevent misuse.

Sections 5 and 6 built a framework to analyze the impact of cognizance-level punishment on two kinds of legal errors - the Error of Exclusion (the probability of acquitting a guilty person) and the Error of Inclusion (the probability of wrongfully convicting an innocent person). Various factors that can affect these two errors include - the severity of allegation (by increasing the cost of committing a crime by way of a more severe punishment), the ability of judiciary to distinguish between an innocent and a criminal (by influencing the chances of being caught) and the influence that the defendant and prosecution can exert on judiciary.

Even without cognizance level punishment, high intensity crimes see lower Error of Exclusion and more Error of Inclusion. This happens because a lower proportion of people find it worth their while to indulge in heinous crimes. In our model this feature is brought in by assuming that final stage punishment is at least as high as the true intensity of crime. Increasing cognizance level fixed punishment has a similar effect on Error of Inclusion at both stages by increasing the cost of crime. Although, higher punishment causes Error of Exclusion to fall at the cognizance level there are opposing effects at the final stage. If the higher probability of the case being accepted is overweighed by the fall in the number of criminals then Error of Exclusion will fall later as well.

This simple model also brings out the effect of power and wealth in securing a favourable verdict. More influential parties can often get away with crime because evidence submitted by them is given more weightage by courts. This could manifest in bribing judges/witnesses directly or by influencing the defence lawyer to put up a poor case.

One of the most important things to note from this analysis is the effect of judicial ability to distinguish between guilty and innocent people. When this ability is blunted, Error of Exclusion rises in both specifications. Error of Inclusion rises if the increase in number of criminals is overweighed by blunted judicial ability. This is an extremely relevant point in the Indian context today. If innocent people are as likely to be convicted as guilty people then both types of judicial errors can rise. This can be interpreted as a failure of the law enforcement machinery. Indeed, if we can tackle this basic problem, then legal errors could be controlled to a large extent.

A key take-away from this paper is that while introducing punishment at cognizance level might have adverse impact on legal errors, improving law enforcement is unambiguously beneficial. This can be explored for further policy discussion.

An extension of this paper could involve making F (frivolity of a complaint)a choice variable for the prosecution. Further, in this paper we have only considered individuals who always file cases. We could alternatively formulate a decision problem for potential prosecutors as well. A distribution of benefits from litigation could be hypothesized to arrive at the proportion of people who would file cases of different crime intensities.

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APPENDIX

Proof 1:

$$\tilde{S}_C\, p(x_C^*, y_C^*) + \frac{{y_C^*}^2}{2} - B \leq \tilde{S}_{NC}\, p(x_{NC}^*, y_{NC}^*) + \frac{{y_{NC}^*}^2}{2}$$

Putting p(x_c^*, y_c^*) = p(x_{Nc}^*, y_{Nc}^*) = $\frac{a}{a+b}$ in above equation gives us

$$\frac{\tilde{S}_C a}{a+b} + \frac{\tilde{S}_C ab}{2(a+b)^2} - B \le \frac{\tilde{S}_{NC} a\gamma}{a+b} + \frac{\tilde{S}_{NC} ab\gamma}{2(a+b)^2}$$

$$\Rightarrow \frac{(S+F)a}{a+b} + \frac{(S+F)ab}{2(a+b)^2} - B \le \frac{Fa\gamma}{a+b} + \frac{Fab\gamma}{2(a+b)^2}$$

$$\Rightarrow \frac{Sa}{a+b} + \frac{Fa}{a+b} + \frac{Sab}{2(a+b)^2} + \frac{Fab}{2(a+b)^2} - B \le \frac{Fa\gamma}{a+b} + \frac{Fab\gamma}{2(a+b)^2}$$

$$\Rightarrow B \ge (\frac{Sa}{a+b})(\frac{(2a+3b)a}{2(a+b)}) + (1-\gamma)(\frac{Fa}{a+b})(\frac{(2a+3b)a}{2(a+b)})$$

This gives us a threshold value of B above which individuals will opt to commit a crime, which is

$$B \ge B^* = \frac{(2a+3b)a}{2(a+b)} [S + (1-\gamma)F]$$

Proof 2:

$$\bar{S}\, p(x_{1C}**) + \delta [\tilde{S}_C\, p(x_{2C}**, y_C**) + \frac{y_C**^2}{2}] - B \le$$

$$\bar{S}\, \gamma_1\, p(x_{1NC}**) + \delta\ [\gamma_2\, \tilde{S}_{NC}\, p(x_{2NC}**, y_{NC}**) + \frac{y_{NC}**^2}{2}]$$

$$\Rightarrow \bar{S}\, \tilde{S}_C\, x_{1C}** + \delta [\tilde{S}_C\, p(x_{2C}**, y_C**) + \frac{\tilde{S}_C ab}{2(a+b)^2}] - B \le$$

$$\bar{S}\, \gamma_1\, \tilde{S}_{NC}\, x_{1NC}** + \delta\ [\gamma_2\, \tilde{S}_{NC}\, p(x_{2NC}**, y_{NC}**) + \frac{\gamma_2 \tilde{S}_{NC} ab}{2(a+b)^2}]$$

Putting $p(x_{2NC}**, y_{NC}**) = p(x_{2C}**, y_C**) = \frac{a}{a+b}$,

$$\Rightarrow (\bar{S}(S+F))^2 + \delta [(S+F) \frac{a}{a+b} + \frac{(S+F)ab}{2(a+b)^2}] - B \le$$

$$(\bar{S}\gamma_1 F)^2 + \delta [F\gamma_2 \frac{a}{a+b} + \frac{F\gamma_2 ab}{2(a+b)^2}]$$

$$\Rightarrow B \ge (\bar{S})^2 ((S+F)^2 - (\bar{S}\gamma_1 F)^2 +$$

$$\delta [S \frac{a}{a+b} + (1-\gamma_2)F \frac{a}{a+b} + \frac{Sab}{2(a+b)^2} + (1-\gamma_2)\frac{Fab}{2(a+b)^2}$$

This gives us the threshold value of B:

$$B \ge B** = \bar{S}^2 [S + F - (\gamma_1 F)^2] + \delta \frac{(2a+3b)a}{2(a+b)^2} [S+F- (\gamma_1 F)^2]$$

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