

**EC337 – Economic Analysis of Legal Issues
Spring 2013, Boston University**

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Third Mid-term Test – Solutions

Thursday, April 18, 2013

This is a 38-minute test. There is a total of 38 points allocated across two questions. Use the number of points allocated to each part as a suggestion for how long to spend on that part. I recommend that you attempt all parts before using more time than is suggested for any one part. If you complete some parts in less than the suggested time, use your extra time to revisit parts you may have had trouble with the first time through and to check your work.

Please read the questions carefully and write your answers in the blue booklets provided. Please follow my instructions at all times.

You only need to identify yourself with your BU ID on the blue booklets. You may keep this question sheet when the exam is over.

1. [24 points total, 5 parts] Suppose that drinks manufacturers use glass bottles to package their products. Occasionally, glass bottles become damaged during shipping, in which case tiny glass shards can become mixed with the drink. If a purchaser consumes a drink from such a damaged container, she will sustain an injury from the glass shards. Assume that 5% of drink bottles contain glass shards, so that, if neither party takes care, there is a 5% probability that a purchaser will be injured. The true damage suffered from such an injury would be \$6000. Purchasers/Plaintiffs (P) can reduce the probability of an injury occurring to zero if they always pour their drinks through a filter before consuming them, at a cost of \$200 (in time and effort). Drinks manufacturers/Defendants (D) can reduce the probability of an injury occurring to zero if they use stronger bottles, at a cost of \$100 (in increased production costs). All parties know this information with certainty.

a) [3 points] What is the efficient level of prevention, and what is the associated outcome? Explain briefly.

answer:

social loss if neither invests = $0.05 \times 6000 = 300$

social loss if only D invests = 100

social loss if only P invests = 200

The efficient level of prevention is therefore for only D to take care, since this minimizes the total social loss. The associated outcome is for there to be no injuries.

b) [5 points] Will efficiency be achieved if everyone knows that courts always apply the original Hand Rule when determining which party is at fault? Explain.

answer:

Under the original Hand Rule, D must pay full damages if D's burden of prevention is less than the expected harm. In this case, $100 < 300$, so D will be found negligent and ordered to pay 6000 if there is an injury.

P's private loss if she invests in prevention is 200. P's private net loss if she doesn't invest in prevention is 0. So P will not invest, since this minimizes her private loss.

D's private loss if he invests in prevention is 100. D's private expected loss if he doesn't invest is 300. So D will invest, since this minimizes his private loss.

Therefore, D will choose to invest and P will not. So, yes, efficiency will be achieved.

c) [5 points] Will efficiency be achieved if everyone knows that courts always apply the contributory negligence standard when determining which party is at fault? Explain.

answer:

Under contributory negligence, P will receive zero compensation if D's burden of prevention is less than expected harm and P's burden of prevention is also less than expected harm. In this case, $100 < 300$ and $200 < 300$, so P will receive zero compensation if there is an injury.

D's private loss if he invests in prevention is 100. D's expected private loss if he doesn't invest in prevention is 0. So D will not invest, because this minimizes his private loss.

P's private loss if she invests in prevention is 200. P's expected private loss if she doesn't invest in prevention is 300. So P will invest, since this minimizes her private loss.

Therefore, P will choose to invest and D will not. So, no, efficiency will not be achieved.

d) [5 points] Will efficiency be achieved if everyone knows that courts always apply the pure comparative negligence standard when determining which party is at fault? Explain.

answer:

Under the pure comparative negligence standard, if both D and P have a burden of prevention less than expected harm, D will have to pay the fraction $\left(1 - \frac{B_D}{B_D + B_P}\right)$ of damages. In this case, $100 < 300$ and $200 < 300$, so D will have to pay $(1 - 100/300) \times 6000 = 12000/3 = 4000$ to P if there is an injury.

P's private loss if she invests in prevention is 200. P's maximum expected private loss if she doesn't invest is 100 $[(6000 - 4000) \times 0.05]$. So P will not invest, since this minimizes her private loss.

D's private loss if he invests in prevention is 100. D's expected private loss if he doesn't invest in prevention is 200 $[4000 \times 0.05]$. So D will invest, because this minimizes his private loss.

Therefore, D will choose to invest and P will not. So, yes, efficiency will be achieved.

e) [6 points] Suppose that courts always apply the contributory negligence standard when determining which party is at fault. However, suppose that all drinks manufacturers and all purchasers believe that courts always apply the original Hand Rule for this purpose. Will efficiency be achieved in the short run? In the long run? Explain.

answer:

Both D and P will behave as they did in part b). Therefore, D will choose to invest and P will not. So, yes, efficiency will be achieved in the short run.

Since the outcome in the short run will hence be for no accidents to occur, there is no mechanism by which either party will learn of their mistaken belief. That is, no case of this nature will ever

go to court, so nobody will ever realize that courts would apply the contributory negligence standard if one did make it to court. Therefore, neither D nor P will have any reason to change their behavior. So, yes, efficiency will be achieved in the long run as well.

[So the contributory negligence standard does not achieve efficiency in this case if people expect it, as in part c), but it can achieve efficiency if people expect something else. The threat to drinks manufacturers of being found liable – even though imaginary – is enough to induce them to take care. So it is false beliefs which are really the source of efficiency being achieved here. In the long run, those false beliefs will persist – but that turns out to be good from an efficiency perspective!]

2. [14 points total, 3 parts] Consider a hypothetical accident involving a driver and a pedestrian. If neither party takes care, the probability of an accident occurring at any given location at any given time is 10%. In the event that an accident occurs, the pedestrian/plaintiff (P) will suffer true damages in the amount of \$1000, while the driver/defendant (D) will suffer no damages. Suppose that, to independently reduce the probability of an accident to zero, drivers would have to install a sensor on their cars at a cost of \$500 each. Also suppose that, to independently reduce the probability of an accident to zero, pedestrians would have to buy special running shoes at a cost of \$400 each. Assume for now that all parties know this information with certainty.

a) [3 points] What is the efficient level of prevention, and what is the associated outcome? Explain briefly.

answer:

social loss if neither invests = $0.1 \times 1000 = 100$

social loss if only D invests = 500

social loss if only P invests = 400

The efficient level of prevention is therefore for neither to take care, since this minimizes the total social loss. The associated outcome is for accidents to continue to occur with 10% probability.

b) [5 points] Will efficiency be achieved if everyone knows that courts always apply the original Hand Rule when determining which party is at fault? Explain.

answer:

Under the original Hand Rule, D must pay full damages if D's burden of prevention is less than the expected harm. In this case, $500 > 100$, so D will not be found negligent and will never have to pay if there is an accident.

D's private loss if he invests in prevention is 500. D's expected private loss if he doesn't invest in prevention is 0 [because he will never be found negligent]. So D will not invest, because this minimizes his private loss.

P's private loss if she invests in prevention is 400. P's expected private loss if she doesn't invest in prevention is 100 [i.e. the expected harm, since she knows that D will neither invest nor be found negligent, and that she will therefore have to suffer the 1000 loss with 10% probability if she doesn't invest either]. So P will not invest, since this minimizes her private loss.

Therefore, neither D nor P will choose to invest. So, yes, efficiency will be achieved.

c) [6 points] Now suppose that drivers and pedestrians are fully aware that true damages from an accident are \$1000, but that both also know with certainty that pedestrians will be able to convince the court that the harm they have suffered as the result of an accident is \$6300. Will efficiency be achieved if everyone knows that courts always apply the pure comparative negligence standard when determining which party is at fault? Explain.

answer:

Under the pure comparative negligence standard, if both D and P have a burden of prevention less than expected harm, D will have to pay the fraction $\left(1 - \frac{B_D}{B_D + B_P}\right)$ of damages. The court, by assumption, will be convinced that the loss suffered is 6300 (and therefore that the expected loss was 630, still using the unchanged 10% accident probability). So, in this case, they will find that $500 < 630$ and $400 < 630$, and will therefore order D to pay $(1 - 500/900) \times 6300 = 4 \times 6300/9 = 4 \times 700 = 2800$ to P if there is an injury.

D's private loss if he invests in prevention is 500. D's expected private loss if he doesn't invest in prevention is 280 [2800×0.1] if P doesn't invest, or 0 if P does invest. So D will not invest, because this minimizes his private loss regardless of what P will do.

P's private loss if she invests in prevention is 400. P's expected private loss if she doesn't invest is -180 [$(1000 - 2800) \times 0.1$] if D doesn't invest, or 0 if D does invest. So P will not invest, since this minimizes her private loss regardless of what D will do. [A negative loss means that P actually comes out ahead if neither invests. This makes sense – and it makes sense that both parties will expect this – because P is knowingly exaggerating the harm from the accident.]

Therefore, neither D nor P will choose to invest. So, yes, efficiency will be achieved.

[P's lie does not affect efficiency being achieved in this particular case, because both parties will still find it privately optimal to not invest in preventing accidents. But there is a big distributional effect: D pays much more than he would if courts used an accurate estimate of harm, and P is so over-compensated for the damage that she suffers that she actually comes out ahead. Or in other words, the total social loss is still 100, but the court's decision acts as a big cash transfer from D to P, such that the social loss ends up comprising a very large private loss to D but a large private gain to P. One could perhaps argue that, in the long run, drivers might react having this private loss forced upon them by driving less, which could lead to an efficiency loss more broadly; but we would need a more detailed model to show that explicitly.]