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# Transaction Costs and Optimal Liability Rule in the Context of Hadley v Baxendale (1854)

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## ABSTRACT

This paper uses a signaling game model to address the debate between limited liability rule and unlimited liability rule in the context of the case of Hadley v Baxendale (1854). This paper compares the levels of net social surplus obtained by the two legal rules under different sets of parameter values. The parameters investigated are the level of transaction cost in communicating the private information regarding the valuation of the contract, the proportion of low valuation versus high valuation promisees, the extra cost of achieving a high performance of contract relative to a low performance by promisors and, the gap between high valuation and low valuation of contract performance. The paper finds that the optimal liability rule depends on the parameter values. When there are many low valuation promisees and transaction cost is low, limited liability rule is better. When there are many low valuation promisees and transaction cost is high, both rules perform equally well. When there are many high valuation promisees, unlimited rule is better irrespective of the level of transaction cost. Finally, when there is high valuation differential relative to performance cost differential, the set of parameter values under which the unlimited rule performs better becomes larger.

**Keywords:** Transaction cost, liability rule, Hadley Rule, signaling game

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## Introduction

Hadley v Baxendale (1854) is one of the most famous cases in the law of contract.[1] In that case, Hadley's mill shaft was damaged and unable to work. Hadley contracted with Baxendale to have Baxendale transport Hadley's mill shaft immediately to Greenwich to be duplicated. Baxendale promised to deliver it the next day. However, Baxendale did not know that Hadley's mill would shut down without the new shaft. Consequently, Baxendale failed to transport the mill shaft the next day and Hadley's mill was shut down for additional five days and suffered great losses. Hadley sued Baxendale for damages due to lost profits and the court awarded him. However, Baxendale appealed and the higher court reversed the ruling. The higher court's decision was grounded on the reason that the injured party can only recover those damages that are foreseeable and in the contemplation of both parties at the time of contract and that the damage must be a probable result of the breach. This limitation of liability in the event of a breach of contract to the usual, ordinary and foreseeable losses, unless the promisee (Hadley) has informed the promisor (Baxendale) otherwise is known as the Hadley Rule.

The Hadley Rule has been extensively studied. Ayres and Gertner (1989) first developed a model of Hadley v Baxendale (1854) (which was further discussed in Adler (1999)). Ayres and Gertner (1989) suggested that whether there will be a separation or pooling equilibrium depends on the level of transaction cost. For example, where there is low transaction cost, the high valuation buyer will contract around the Hadley Rule (or the limited liability rule) and thus separating themselves from the low valuation buyers despite having to pay higher contract prices. By transaction cost, Ayres and Gertner (1989) means legal fees, cost of printing and other communication costs. Bebchuck and Shavel (1991) first modelled the case of Hadley and Baxendale in the sequential game framework.

Johnston (1990) argued that the choice of default rule can affect contractual equilibrium even when there is zero transaction cost. In contrast, Ayres and Gertner (1992) argued that the selection of default rule has no impact on contractual equilibrium and efficiency through a model. Their model assumed that the default rule is common knowledge to both parties and that there is no transaction cost.

Many legal scholars disagree with the Hadley Rule. They argue that the unlimited liability rule is the right measure of damages should there be a breach of contract. For instance, Schwartz (1993) commented that the Hadley Rule puts an unrealistically high information burden on the courts. The Hadley Rule requires extremely strict standard of foreseeability. Furthermore, losses must be a probable result of the breach for awarding damages. Therefore, Eisenberg (1992) argued that it lacks space to accommodate changes with respect to circumstances which might happen after contract formation. He further argued that the rule does not consider the nature of interest invaded such as when there is a wrongful breach. Besides, the Hadley Rule diverges from the expectation damages rule which is likely to be more efficient. Due to these reasons, he claimed that the Hadley Rule is inefficient. O'Gorman (2016) argues that the Hadley Rule is not suitable for long-shot contracts where the principal purpose is to enable the plaintiff to obtain an opportunity for an unlikely profit or to avoid an unlikely loss, and the defendant's breach causes the plaintiff to lose the unlikely profit or suffer the unlikely loss.

While law scholars generally agree that the legal rule in place should be efficient, they however have different concepts of efficiency. Ayres and Gertner (1989) argued that the legal rule is

[1] Refer to Edelman (2016) for a history of the Hadley rule and Barnes (2005) for the civil law origin of the Hadley rule.

efficient if it induces informed parties to reveal information about their type while contracting around the default rule, even at the expense of increasing transaction cost. For instance, if the high valuation buyers fail to disclose their private information, then seller cannot take optimal precaution and therefore the default rule can cause inefficiency. This view was also supported by Johnston (1990) who argued that the rule is efficient if it facilitates optimal precautions against breach of contract. He referred to it as 'information-forcing' theory which was then formalized by Bebchuck and Shavel (1991).

Eisenberg (1992) proposes another view on efficiency. He suggests comparing the damages awarded to the terms that would have reached if the parties have bargained. That is, interpreting terms by what the parties would like to have. This is the 'would-have-wanted approach'. Eisenberg (1992) argued for using the regime of proximate cost as the tool for foreseeability when awarding damages. This regime measures damages at the time of wrong and does not require that the damages were the probable result of the breach (and therefore differs from the Hadley Rule). Johnston (1990) does not share the approach of Eisenberg (1992). Johnston (1990) points out that it is not sufficient to ask the parties what they want and set the default rule, as default rule influences strategic incentive the parties have when contracting. Ayres and Gertner (1989) highlight the disadvantages of the approach of Eisenberg (1992). An example is that the approach fails to consider the possible different costs of contracting.

Another way to view efficiency is to measure the net social surplus of contracting. Net social surplus is defined as the expected value of the sum of profits of the different parties involved. Ayres and Gertner (1992) points out that one of the potential sources of inefficiency is strategic bargaining. They argued that even if seller can induce separation, the buyer strategic reluctance can make the separation process inefficient by failing to maximize net social surplus. Thus, the strategic bargaining under asymmetric information could lead to either inefficient pooling or separation. Ayres and Gertner (1992) built on the argument of Johnston (1990) and showed that the magnitude of market power could contribute to inefficiency due to strategic behavior. Inefficiency could persist even if there are zero transaction cost when parties contract around a default rule. Besides, transaction cost could worsen the inefficiency of strategic bargaining. However, inefficiency could disappear if buyer instead of seller has the power to make 'take it or leave it' offers. Ayres and Gertner (1992) demonstrated that inefficient menus still could persist through the offering a menu of contracts even with zero transaction cost. In other words, asymmetric information could give rise to inefficiency. This happens because an informed party who lacks market power is reluctant to reveal the information. Doing so might put him at a disadvantage and thus contributes to inefficiency. In sum, Ayres and Gertner (1992) suggest that denying consequential damages might promote efficiency.

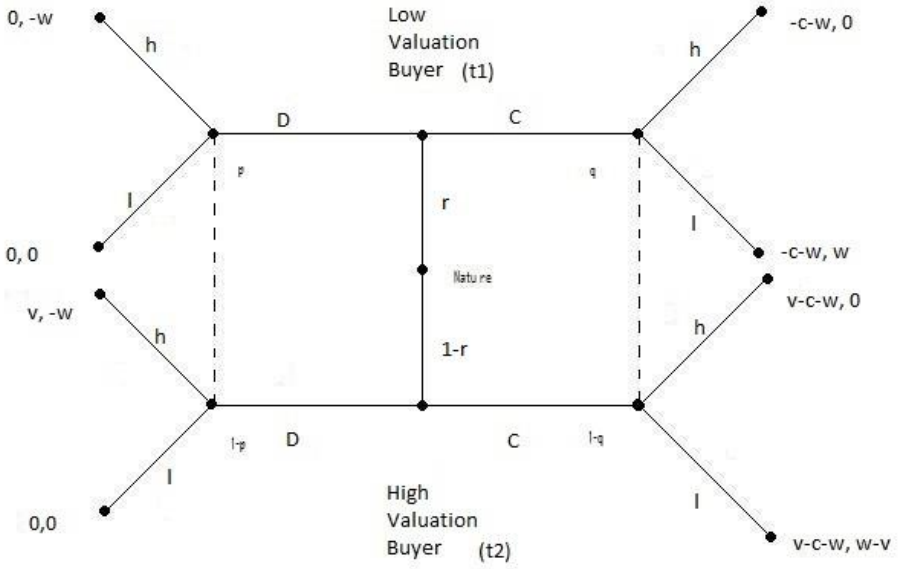
Despite the many arguments for and against the Hadley Rule and the various propositions about which legal rule would be more efficient, none has extended the debate into a formal modelling framework to compare the efficiency of the limited liability rule and the unlimited liability rule. [2] This paper compares the levels of net social surplus of the two legal rues under different sets of parameter values and ensuing equilibriums. The gist of the conclusions of this paper is that which legal rule is optimal depends on several factors of which the transaction costs of communicating is one. The other three key factors studied in this paper are the proportion of

[2] Siah (2013) has a formal model of signaling game with numerically specific parameter values comparing the Hadley rule and the unlimited liability rule.

low valuation versus high valuation senders, the extra cost of achieving a high performance of contract relative to a low performance by the receiver and, the gap between high valuation and low valuation of contract performance.

## A Signaling Game Model of the Hadley Rule

Figure 1 gives the extensive form representation of the Hadley Rule game.




There are two players in this game, the sender (the buyer) and the receiver (the seller). The legal rule in effect, the limited liability rule, is common knowledge to both sender and receiver. The first mover, the sender, is the informed party: the sender has private information that the receiver, the second mover, does not know. The sender knows his own true valuation of the contract performance which the receiver has no knowledge of. The receiver draws inference on the evaluation of the sender on contract performance after observing the move of the sender. Then the receiver decides whether to make a high or low performance of the contracted task.

The sender has two types. Type one (t1) has low valuation on contract performance and type two (t2) has high valuation on contract performance. The probability of type one sender is r and the probability of type two sender is 1-r. The sender moves first by choosing either to accept the default legal rule (by choosing D) as it is or to communicate his true evaluation of contract performance to receiver (by choosing C) and opts for an unlimited liability rule contract. Both types of sender must decide whether to communicate or not.

Upon observing the move of the sender, the receiver infers about the probability of the sender being the low valuation type or high valuation type. P is the probability that the sender is the low valuation type given that D is observed and q is the probability that the sender is the low valuation type given that C is observed. The receiver could make either high performance (h) or low performance (l) of contracted task after the sender has moved. Low valuation sender's profit is the same whether the receiver has chosen low performance or high performance. High valuation sender has a higher profit if the receiver makes high performance. The high valuation sender's profit is the same as the low valuation sender if the receiver chooses low performance. The low valuation sender's profit level is used as bench mark and set to zero. v denotes the difference between it and the high valuation sender's profit when the receiver chooses high performance.

Under the limited liability rule, the liability of the receiver is limited to the level of profit of the low valuation sender unless the sender

communicated that he is of the high valuation type. Therefore, whether low valuation sender communicated or not, receiver's profit from playing l is always higher than playing h since his liability is limited. We use the profit level of the receiver when choosing l given that it is the low valuation sender as benchmark and set it as 0. Denote the lower profit of choosing h in this scenario as –w. w refers to the extra costs that the receiver incurred in choosing high performance. Therefore, when the sender communicates his intention for an unlimited liability rule contract, he pays an extra cost of w to receiver for the contract. This is on top of the transaction costs involved in communication. If high valuation sender communicates, then receiver will suffer an extra damage payment of v if he chooses low performance.

Throughout, it is assumed that v>w. The maximum that a sender is willing to pay extra for a higher performance service is v. The extra cost of providing a higher performance service by the receiver is w. v>w is necessary for profitable exchanges. The maximum net social surplus attainable is therefore r(v-w).

First, please note that under the limited liability rule, the low valuation sender always chooses D. The profit of the low valuation sender is negative should he communicate due to the transaction cost and extra effort cost of contract performance.

Given the values of the parameters, the pure strategy equilibriums are:

1. v>w+c

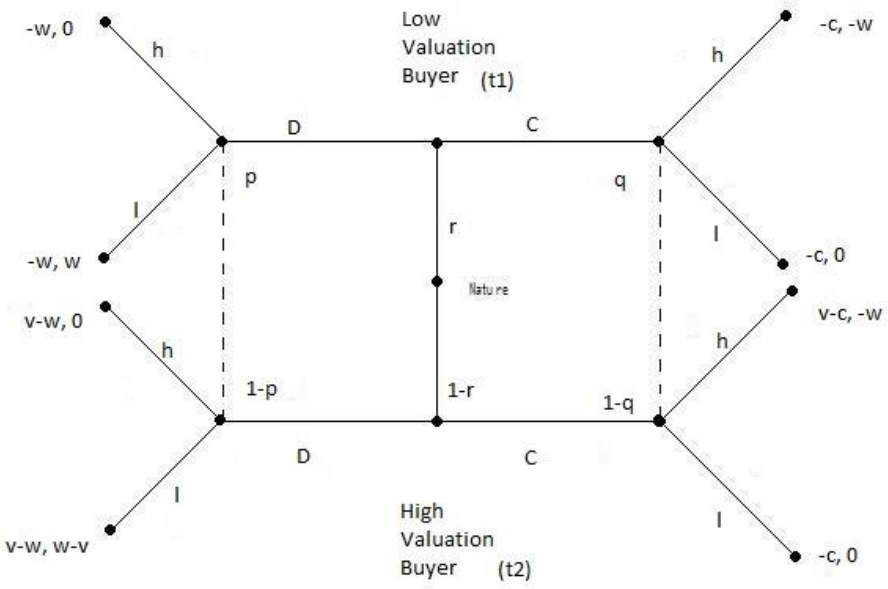
The difference in high and low valuations is greater than the transaction cost of communicating plus the cost differential of high and low contract performance. The high valuation sender therefore chooses C to differentiate himself from the low valuation sender and opts for high contract performance. Upon observing D, the receiver plays l and upon observing C, the receiver plays h. Net social surplus is (1-r)(v-w-c).

2. v<w+c

The difference in high and low valuation is smaller than the transaction cost of communicating plus the cost differential of high and low contract performance. The high valuation sender's profit would be negative should he communicates. The high valuation sender therefore chooses D. As both law and high valuation senders choose D, it is a pooling equilibrium. Upon observing D, the receiver plays l. Net social surplus is 0.

**A Signaling Game Model of Unlimited Liability Rule**

Figure 2 gives the extensive form representation of the unlimited liability rule game:



Under the unlimited liability rule, unless sender communicates, receiver is liable for damages that are beyond the ordinary losses. The receiver therefore charges the sender an extra w if the sender does not communicate. If the sender communicates and opts for a limited liability contract, then he pays less by w but incurs c for the transaction cost of communication.

Given the values of the parameters, the pure strategy equilibriums are:

1. w>c

Given w>c, low valuation sender chooses C and opts for the limited liability contract. He suffers the communication cost of c but avoids paying w. Given that low valuation sender chooses C, upon observing C, receiver chooses low contract performances, that is, l. High valuation sender chooses D and stays with the unlimited liability contract. Upon observing D, receiver plays h. It is a separating equilibrium. Net social surplus is -rc+(1-r)(v-w).

Case 2 and 3 below have w<c. The transaction cost of communication is higher that the differential effort cost of contract performance. Given that w<c, low valuation sender chooses D to avoid paying c and stays with the unlimited liability contract and pays w. Given that w<c, the high valuation sender also chooses D as his profit from choosing D is always higher than his profit from playing C, whatever the action of the receiver. Both case 2 and 3 are pooling equilibrium.

2. w<c, rw+(1-r)(w-v)>0 (or r/(1-r)>(v-w)/w)

There are relatively more low valuation senders. Consequently, upon observing D, the receiver plays l. (Upon observing C, the receiver plays l.) Net social surplus is 0.

3. w<c, rw+(1-r)(w-v)<0 (or r/(1-r)<(v-w)/w)

There are relatively less low valuation senders. Consequently, upon observing D, the receiver plays h. (Upon observing C, the receiver plays l.) Net social surplus is (1-r)v-w.

**Net social surplus Comparisons**

This section compares the levels of net social surplus under limited liability rule and unlimited liability rule given the different parameter values. Y(L) denotes the level of net social surplus under the limited liability rule as and Y(L) denotes the level of net social surplus under the unlimited liability rule.

1. w>c, v-w>c

Y(L)-Y(U)=(2r-1)c

Both rules result in separating equilibrium. Under limited rule the high type sender communicates and under unlimited rule the low type sender communicates. The difference in net social surplus depends on the transaction costs involved. If there are more (less) low valuation type 1 senders, then limited liability rule is better (worse) than unlimited liability rule.

In Diagram 1 and 2, this region is denoted as 1a (for r>1/2) and 1b (for r<1/2).

2. w>c, v-w<c

Y(L)-Y(U)=rc-(1-r)(v-w)

Under Hadley Rule it is a pooling equilibrium where both types of senders do not communicate. Under the unlimited liability rule it is a separating equilibrium where low type sender communicates (and receiver chooses low performance) and high type sender does not communicates (and receiver chooses high performance). Hadley Rule saves on transaction cost since both high valuation type and low valuation type senders are not communicating. The Unlimited liability rule increases the profit of the high valuation type sender. If the increase in profit of the high valuation type sender is greater (smaller) than the transaction cost of the low valuation type sender communicating under unlimited liability rule, then unlimited (limited) liability rule is better.

In Diagram 2, this region is denoted as 2a (for r>(v-w)/(v-w+c)) and 2b (for r<(v-w)/(v-w+c)).

3. w<c, rw+(1-r)(w-v)>0; v-w>c

Y(L)-Y(U)=(1-r)(v-c-w)>0

Under the Hadley Rule it is a separating equilibrium. High valuation sender

communicates and opts for an unlimited liability contract and receiver chooses high performance when communication is observed and chooses low performance when there is no communication. Under the unlimited liability rule it is a pooling equilibrium where neither type of sender communicates and the receiver chooses low performance. The Hadley Rule is better for the increased in the profit of high value type sender more than compensates for the transaction cost of communication and the effort cost of the receiver for high performance of contract.

In Diagram 1, this region is denoted as 3.

4. w<c, rw+(1-r)(w-v)>0; v-w<c

Y(L)-Y(U)=0

Both rules result in the same pooling equilibrium where neither type of sender communicates and the receiver chooses low performance. Net social surplus is the same.

In Diagram 1 and 2, this region is denoted as 4.

5. w<c, rw+(1-r)(w-v)<0; v-w>c

Y(L)-Y(U)=rw-(1-r)c

Under the Hadley Rule it is a separating equilibrium where high valuation sender communicates and opts for an unlimited liability contract and receiver chooses high performance when communication is observed and chooses low performance when there is no communication. Under the unlimited liability rule it is a pooling equilibrium where neither type of sender communicates and the receiver chooses low performance. Hadley Rule saves on the effort of the receiver as he performs l with probability r but incurs transaction costs with probability (1-r) as the high valuation type sender communicates. Therefore, if the saving on effort cost of the receiver is greater (smaller) than the transaction cost, then limited (unlimited) rule is better.

In Diagram 1, this region is denoted as 5a (for r>c/(w+c) and 5b (for r<c/(w+c)).

6. w<c; rw+(1-r)(w-v)=w-(1-r)v<0; v-w<c

Y(L)-Y(U)= w-(1-r)v<0

Both rules result in pooling equilibrium where neither type of sender communicates. However, under the Hadley Rule the receiver chooses low performance whereas under the unlimited liability rule the receiver chooses high performance. The unlimited rule is better for the probability of high valuation sender is relatively larger under this set of parameter values. The expected value of saving on effort cost of the receiver under the limited liability rule is smaller than the expected value of increase in profit of the high valuation type sender under the unlimited liability rule.

In Diagram 61 and 2, this region is denoted as 6.

Diagrams 1 and 2 sum up the results of net social surplus comparison between the two liability rules under different parameter values. Diagram 1 depicts the case where v-w>w and diagram 2 depicts the case where v-w<w.

There are three major regions in both diagrams. The darkly shaded region (of area 1a, 5a and 3 in Diagram 1 and area 1a and 2a in Diagram 2) has the limited liability rule outperforms the unlimited liability rule. In Diagram 1, this is the area where $r > \frac{1}{2}$ for $0 \le c < w$ and $r > \frac{c}{w+c}$ for $< c < v - w$ . In Diagram 2, this is the area where $r > \frac{1}{2}$ for $0 \le c < v - w$ and $r > \frac{v-w}{v-w+c}$ for $v - w < c < w$.

The lightly shaded region (of area 4) has the two rules perform equally well. In Diagram 1, this is the area where $r > \frac{v-w}{v}$ for $c > v - w$ . In Diagram 2, this is the area where $r > \frac{v-w}{v}$ for $>$ $w$ .

The unshaded region (of area 1b, 5b and 6 in Diagram 1 and 1b, 2b and 6 in Diagram 2) has the unlimited liability rule outperforms the limited liability rule. In Diagram 1, this is the area where $r < \frac{1}{2}$ for $0 \le c < w$ , and $r < \frac{c}{w+c}$ for $w < c <$ $v - w$ and $r < \frac{v-w}{v}$ for $c > v - w$. In Diagram 2, this is the area where $r < \frac{1}{2}$ for $0 \le c < v - w$ and $r < \frac{v-w}{v-w+c}$ for $v - w < c < w$ and $r < \frac{v-w}{v}$ for $c > w$.

Please note that the unlimited liability rule could be better even if $r > \frac{1}{2}$. In fact, if w is relatively small compare to v and therefore $\frac{v-w}{v}$ is significantly larger than ½ (or even close to 1), then the unlimited rule liability rule still outperforms the limited rule for $c > w$ and r<c/(w+c) and r<(v-w)/v.

Please also note that the limited liability rule could be better even if $r < \frac{1}{2}$. In fact, if w is close to v and therefore $\frac{v-w}{v}$ is close to zero, then the limited liability rule still outperforms the unlimited rule for $c < w$ and $r > \frac{v-w}{v-w+c}$ for $v - w < c < w$.

In general, the limited liability rule is better when r is large and the communication cost is low. On the other hand, the unlimited liability rule is better when r is small. When r is large and the communication cost is high, the two rules perform equally well. A comparison of Diagram 1 and Diagram 2 reveals that when the difference between v and w is larger, the region where the unlimited liability rule performs better becomes larger.

Diagram 1

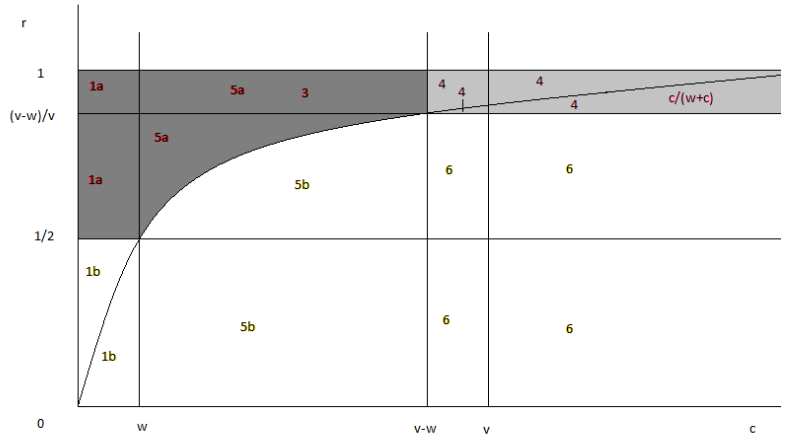
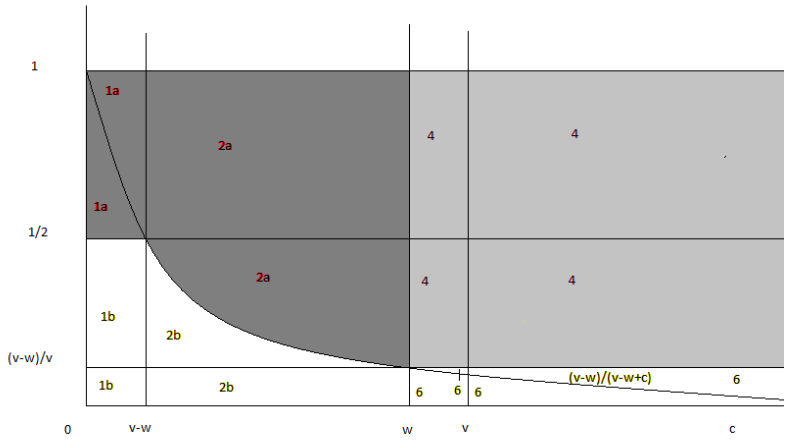



Diagram 2




## Conclusions

This paper analyzes the legal case of Hadley v Baxendale (1854) using the framework of a signaling game. The results of formal modelling show that depending on the level of transaction costs, the difference between high and low valuations by the senders, the difference in effort cost for high and low contract performance by

the receiver and, the proportion of low versus high valuation type senders, there are two possible types of equilibriums under the limited liability rule and three possible types of equilibriums under the unlimited liability rule. Consequently, there are six different combinations of equilibriums for net social surplus comparison between the two liability rules.

Out of the six equilibriums, net social surplus is higher under limited liability rule than unlimited liability rule in one case. They are the same in one case and unlimited liability rule performs better in another. For the remaining three cases, which liability rule performs better in term of net social surplus depends on the values of the parameters. Therefore, this paper agrees with the arguments of some legal scholars that which default rule is better depends on the valuation distribution, the cost of revealing information and other factors. In other words, while this paper partially agrees with the argument that the limited liability rule is a better default rule by Bebchuk and Shavell (1991) based on the issue of transaction cost, it also lends some support to the argument of Eisenberg (1992) that the unlimited rule is better. In sum, this paper agrees with the argument of Diamond and Foss (1994) that there is no a single liability rule that is optimal for all contractual situations.

Most important, this paper finds out that the default legal rule matters for net social surplus. Net social surplus is the same for the two rules only under one set of parameter values out of six. When majority of senders are of low valuation type and transaction cost is low relative to valuation differential and performance cost differential, limited liability rule is better as it economizes on the transaction costs of communicating. However, if transaction cost of communication is higher than both the performance cost differential and the valuation differential, then even with high probability of having low valuation senders, the two liability rules perform the same. If the probability of high valuation senders is high, then unlimited liability rule performs better whatever the relationship between transaction cost, performance cost differential and valuation differential.

## References


1. Edelman, J. 2016. “Hadley v Baxendale”, Paper presented to University of Cambridge, Obligations VIII, Revolutions in Private Law, 19–22 July 2016. <http://www.fedcourt.gov.au/publications/judges-speeches/justice-edelman/edelman-j-20160725#_Toc457208632>.

2. Barnes, W. 2005. “Hadley v. Baxendale and other Common Law Borrowings from the Civil Law”, *Texas Wesleyan Law Review* 11, 627-648.

3. Ayres, I., and Gertner, R. 1989. “Filling gaps in incomplete contracts: An economic theory of default rules”, *Yale Law Journal* 99, 87-130.

4. Adler, B. E. 1999. “The Questionable Ascent of Hadley v. Baxendale”, *Stanford Law Review*, 1547-1589.

5. Bebchuk, L. A. and Shavell, S. 1991. “Information and the Scope of Liability for Breach of Contract: The Rule of Hadley v. Baxendale”, *The Journal of Law, Economics and Organization* V7 N2, 284-312.

6. Johnston, J. 1990. “Strategic Bargaining and the Economic Theory of Contract Default Rules”, *Yale Law Journal* 100, 615-664, Chapter 4.

7. Ayres, I., and Gertner, R. 1992. “Strategic contractual inefficiency and the optimal choice of legal rules”, *Yale Law Journal* 101, 729-773.

8. Schwartz, A. 1993. “Default Rule Paradigm and the Limits of Contract Law”, *The Southern California Interdisciplinary Law Journal* 3, 389-419.

9. Eisenberg, M. A. 1992. “The Principle of Hadley v. Baxendale”, *California Law Review*, 563-613.

10. O’Gorman, D. P. 2016. “When Lightning Strikes: Hadley v. Baxendale’s Probability Standard Applied to Long-Shot Contracts”, *Loyola University Chicago Law Journal* 47, 859-906.

11. Siah, E. S. Y. 2013. “A Signaling Game Analysis of Hadley v Baxendale (1854)”, unpublished thesis, the University of Nottingham Malaysia Campus, School of Economics.

12. Diamond, T. A. and Foss, H. 1994. “Consequential Damages for Commercial Losses: An Alternative to Hadley v Baxendale”, *Fordham Law Review* 63, 665-714.