CONCLUSION

Economists, more and more, conform more to the school of thought which promotes the use of MBIs for industrial pollution control. Command and control techniques for pollution control have given way to MBIs even in developing nations. Policies evolve in keeping with the need of the hour. They change to accommodate the changing problems as they become more complex with economic development. Substantial evidence suggests that development gives rise to structural transformation in the produces of an economy. Societies have shown remarkable ingenuity in harnessing new technologies to conserve scarce resources. In principle, the forces leading to change in the composition and techniques of production may be sufficiently strong to more than offset the adverse effects of increased economic activity on the environment. Pollution poses a problem and even from casual observation it is clear that the current level of emission is higher than it would be if the polluters had to bear all of the costs of their activities. It is the mechanism of the market that puts a value on resources that society has at its disposal.

Economic policies are the result of changes brought over existing policies to make them more efficient and fair. Lender liability is one such step in the continuous process of development of existing policies for environmental pollution control. This thesis has been an attempt to view the effectiveness of lender-liability as a tool for pollution control. In evaluating the potential for lender liability, a number of claims regarding its impact have been made. Some highlight its benefits while others emphasise its negative implications. The main benefit from including lenders in the pool of potential responsible parties is the incentive that such a policy creates for lenders to do what is within their power to reduce the risks of hazardous waste contamination. Lender liability creates an incentive for lenders to perform a “gatekeeping” role whereby the lender could induce appropriate hazardous-waste management by tying its financial support to act as private regulators. In addition, Dinan and Johnson argue that lenders would be better gatekeepers because of their
"deep pockets". Private gate-keeping incentives will only be efficient if the
gatekeeper has sufficient assets at risk to want to perform the gate-keeping role.

In addition to the gate-keeping function of lender liability, it also ensures a
larger pool of money from which cleanup can be financed, thereby reducing the
amount of public expenditure/money that must be committed. While this may be an
advantage from the perspective of the government authority if its objective is to
maximise the amount of cleanup that can be conducted with limited pool of money, it
is not clear that it is a social advantage of holding lenders liable. Like any other
economic policy, lender liability also has its positive as well as negative aspects.
However, no policy tool can reach its desired goals all by itself. Here, we propose that
lender liability can reach where it aims to, reduction of industrial pollution, along
with an assessment of credit worthiness of borrowing firms and an assessment of their
environmental performance. These aspects have been looked at in great details in the
three sections of this thesis.

We have modelled the problem of lender liability in the first section of the
thesis. The problem of both the borrower and the lender of funds have been modelled
here and the "nash" equilibrium of both the contending parties have been formulated.
The model is an application of Kraakman's (1986, 1989) 'gatekeeper analysis'. A
gatekeeper, according to Kraakman, is a principal who utilises his contractual relation
with an agent to prevent any misconduct by the latter. There are two types of
gatekeeper: 1) "'bouncer", who can disrupt misconduct by excluding wrongdoers
from a particular market' and 2) a "'chaperone'' who can disrupt misconduct in an
unfolding contractual relationship'. In the context of environmental protection, one
regulatory motive for the implementation of lender liability is to induce banks and
other lending institutions to act as gatekeepers vis-à-vis industrial borrowers. Along
with collateral requirements, the interest rate is likely to be the key instrument used
by the bank in performing both its 'bouncing' and 'chaperon-ing' duties because, as
the model shows, how 'r' is set has significant implications both for what projects get
financed and for how carefully those that do get financed carry out the project. The
interest rate performs, in effect, a dual 'efficiency wage' function.
The effect on the cost of capital of extending lender liability has been found to be quite ambiguous. The ambiguity arises from the recognition that there are two classes of asymmetry of information regarding the environmental consequences of projects that exist between lenders and borrowers. Acceptance of the conventional wisdom that the effect will necessarily be positive requires an assumption that adverse selection considerations dominate moral hazard ones (at the margin). There is no clear rationale for adopting such an assumption a priori, either in particular sectors or in aggregate. Indeed, at least in most traditional industrial context, the prevalent view of environmental malpractice is that of 'midnight dumping'. These are a class of operators who try to make profits by cutting corners and acting irresponsibly during the projects execution. In such cases, moral hazard problems are the predominant ones. How the borrower acts after the contract has been signed leads to the borrower taking on the role of either a bouncer or a chaperone, as has been explained.

An important aspect of the model is the inclusion of a parameter variable 's' which has been referred to as the degree of lender liability. Degree of lender liability implies a pivot in the hands of the authorities to decide on whether to impose full or partial lender liability. The value that 's' takes on would denote the degree of lender liability, i.e., if s takes on a value of 1, it would imply that there exists complete lender liability. That is a lender would be held liable for the entire damage that the borrower of funds causes during the process of production. While if 's' is zero then it implies the non-existence of lender liability in any degree. Thus, depending on the value of 's', one can impose the extent to which the lender can be held liable for damages inflicted by the borrower while carrying out his activities. This is an important tool in the hand of the authorities to decide on whether a lender in a particular sector should be made more liable than another in a different sector. This aspect lends versatility to the model as the same model can be applied to different industries depending upon the state of finance of the firms in general in that industry or the anticipated damages that are possible in a given scenario in a particular industry. It might be possible for the government to vary 's' in a particular industry from time to time keeping in mind the changing technical innovations that are ongoing in that sector. The effect of this can show up in the flow of capital to a sector.
and hence provide a signal of the level of technical competence achieved within a sector.

In the traditional models of lender-borrower relationship under moral hazard and adverse selection, it is only those firms with sufficiently risky projects which apply for loans. An increase in \( r \) induces prospective borrowers at the low-risk margin to drop out. Although this appears to contradict the finding here. Only those firms with projects that are sufficiently unrisky will wish to borrow and that an increase in \( r \) serves to exclude borrowers at the high-risk margin. This contradiction is however quite superficial. This is because of the different concept of risk that has being used here. ‘Risk’ here refers to the probability of an undesirable state being realised and changes in it cannot be captured by mean-preserving spreads. Whereas in Stiglitz and Weiss (1982) the financial risk faced by the by the lender is framed in terms of the variability of the return on an investment, with increase in risk being captured by mean-preserving spreads in their distribution. Here the qualitative ambiguity of interest results from the fact that a decrease in \( r \) mitigates the moral hazard problem exacerbates the adverse selection one. In Stiglitz and Weiss’s formulation there is no such trade-off; decrease in \( r \) serves to mitigate both classes of agency problem.

The model represents the real world here in a stylised way. The assumption, for example, that the bank chooses only whether or not to lend and at what rate of interest, is a big one. Another major assumption is that the only thing that the bank knows about a firm that applies for a loan is its wealth. The longer-run implications of the reform of environmental law also merit consideration, particularly the possibility that wholesale extension of lender liability could induce structural reorganisation in the banking industry itself. An incentive would be given to banks to set up low asset subsidiaries to specialise in lending in high risk sectors. This would raise the possibility of lender bankruptcy and in the absence of effective regulatory response, it would reduce the long-run impact of any increase in lender liability.
In spite of these short comings, we believe the analysis presented in the model here is useful. As has been emphasised, there are two distinct informational asymmetries which are likely to exist between lenders and borrowers. They are likely to be of varying degrees of importance in different industrial sectors. The analysis provides further evidence of how a particular policy package may have markedly different effects in different sectors of the economy, suggesting that it is likely to be prudent to adopt a sector by sector approach, depending on the extent of hazard, to the reform of environmental liability.

The other instrument, that a lender should be expected to turn to when face by increasing lender liability, would be assessing the credit worthiness of the borrower firms and their environmental impact assessment --- screening proposals before making lending decisions. These are important from the point of view of the lender since the primary aim of the policy tool of the liability rule is to prevent environmental hazards from occurring during a production process. Assessing the credit worthiness of borrowing firms is important in order to eliminate the financial 'cowboys' from the game-plan. they can be of two types: those who know that they are totally unsound financially and try to go ahead with the project and the others who may be sound financially but are not capable to handling the project on hand as it might be ‘too big’ for their pockets in any possible way. From the lenders’ point of view, both these factors are important since a firm which is not credit worthy is not worth lending to. Again, a firm which is a poor performer on the environment front is also a risk for the lender. Thus it is imperative for the lender to ascertain that the borrower is credit-worthy and performs well environmentally. The lender must check to see that the borrower is both credit worthy and does not cause environmental hazards.

Assessing credit-worthiness of firms in a growth theoretic set-up has been is the next exercise that has been looked at in here. As has been explained that one of the other tool in the hands of the lender is to assess the credit-worthiness of the borrowing firms. As has been discussed in the section, a need is felt to bring credit risk analysis within a theoretical framework. It is argued that such a requirement may
be met by integrating credit risk analysis into the mould of growth models. This integration has been attempted by the use of a multivariate model of firm growth, in which the ability of a firm to pay back the loaned amount is explained by the marginal productivity of loan in terms of the growth in assets.

The exercise has been carried out for two industries, that of fertiliser and pulp and paper industry. The two industries considered here are different in that one, the pulp and paper industry, is one where the main source of pollution is from the raw material and the process involved in the production whereas in the case of the fertiliser industry the main source of pollution is the production process and the end product.

The analysis has been carried out for 174 firms of which 56 are in the fertiliser industry and 118 are in the pulp and paper industry. We have taken data for each of these firms from 1988 to 1998 as has been available. Initially it was intended that the exercise be carried out with 24 variables all of which were thought of as indicators of a firm’s financial health in some form or the other. However, after filtering out variables, pulp and paper industry showed significance for 14 variables and fertiliser industry showed significance for 12 variables. The calculations have carried out using the ‘fixed effect’ model for both the industries. The variables that were found to be important in explaining credit worthiness for firms in each of these industries are quite the same. They are Net profit/Total Asset, Inventory/Total Asset, Retained Profit/Total Asset, Current Asset/Current Liabilities, Long-term Finance, Wages/Sales, Retained Profit/Net Profit, Market Share, Short-Bank Borrowings and Share Prices. The estimated equations for each of the two industries, i.e., Pulp and Paper and Fertiliser, would provide a tool for calculating the growth of firms in these industries and ultimately calculate the credit worthiness of firms, which has been the goal of this exercise. It might be worth its while to furnish a complete list of all the variables that were considered in the study. Net Profit to Total Asset, Return on Capital Employed, Growth of Sales, Turnover Ratio, Capacity Utilisation, Inventory to Total Assets, Growth of Reserves, Retention Ratio, Liquidity, Net worth to Total
Since the aim of the exercise is to find out if a firm is credit-worthy or not, and for this we have calculated ‘γ’ which is the estimated coefficient of the loan variable and is the marginal coefficient of measuring the productivity of loan finance, in terms of the rate of growth in assets. Further, we have calculated ‘Q’ which is the interest payable on one unit of loan. A firm is called credit worthy if the marginal growth in assets due to the additional loan is adequate to cover the interest payment due from that firm; i.e. if \( A / L \cdot \gamma > Q \), we say that the firm is credit worthy. We have also calculated an Index of Creditworthiness ‘C’ as \[ \gamma \cdot (A / L) - Q \]. ‘C’ was calculated for all firms and then this index was used for ranking all firms within each industry. It has been found that of the firms that were considered in the study, 78.6% of the firms in the fertiliser industry were found to be credit-worthy while 86.4% of the firms in the pulp and paper industry were found to be credit worthy. All firms whose calculated ‘C’ were above 1 can safely be called credit worthy but it must be borne in mind that any positive value of ‘C’ would make a firm credit worthy. For the fertiliser industry, about 35.7% of the firms have values above 1 while in the pulp and paper industry the corresponding figure is 81.8%. This exercise of assessing the credit worthiness is an important tool for lenders to assess firms who are prospective borrowers of funds. A firm which is credit worthy is so because of its healthy financial fundamentals. This is a pertinent information for lenders of funds as they would be able to gauge whether the prospective borrower is in a position to pay back the loaned amount.

The main problem in this analysis has been the availability of data on each of the variables which were thought to be important in assessing the credit worthiness of firms. Time-series data for each of the firms that were considered initially were not
available for all the data and hence quite a number of firms had to be left out while carrying out the estimation procedure. However, only those variables were considered which were found to give the best fit while explaining the growth of firms. An important variable, for example, that had to be left out was that of research and development at the firm level.

In the last section of the dissertation, we looked at another tool in the hand of the lender under a regime of environmental liability for the lender of funds. This is a tool aimed at measuring the environmental performance of firms. The aim has been to assess the environmental performance of firms vis-à-vis other firms in a industry and thus act as a benchmark for any firm with regard to its environmental performance. The first and foremost requirement for the construction of an index of environmental performance is that firms disclose the relevant information about their environmental performance to the authorities. This is necessary for such a project to be successful. The methodologies followed by different agencies involved in environmental rating of firms, for whatever reason, differ mainly due the adoption of different factors as the basis of rating. This is precisely the reason why a firm gets rated differently when rated by different rating agencies.

Our attempt here, has been, to consider different criterion that have been chosen to rate firms and the rationale behind the choice of these factors of rating has been rationalised. The main difference in the rating process attempted here is that it takes account of the financial aspects of a firm along with the environmental factors which have not been done in previous attempts made so far in this field. In this exercise the different criterion however, remain fixed for firms across all industries but this has been carried out separately for each industry, i.e., pulp and paper and fertiliser. This has been done to avoid mixing 'oranges and apples'. The attributes considered here are,
A) The ratio of the capacity of the effluent generation plant to the total amount of effluent generated by the plant during the process of production. This gives us an idea of the importance that the firm imparts to its pollution control measures. This ratio is a measure of the firms stress on pollution control and also it gives one an idea about the amount of effluent generated and whether it can be treated by the firm's/plant's in-house treatment plant or not.

B) The second variable is the ratio of the installed capacity of the production plant to the average capacity of the effluent treatment plant. If the plant overshoots its production capacity, then the effluent generation plant will not be able to treat the effluents generated when the plant is operating beyond its installed capacity. This is another criterion by which the pollution level of the plant and consequently the untreated effluent released by the plant can be gauged.

C) The third variable is the ratio of the capital cost of setting up of the effluent treatment plant to the total asset of the firm that it held when the effluent treatment plant was set up. A firm which spends a larger share of its asset on installing an effluent treatment plant with its production system, can be said to lay greater stress on pollution control than a plant which spends less for the purpose. This factor can, again, be thought of as one which is universally true for firms across all industries.

D) The fourth variable is the ratio of the operating cost of the effluent treatment plant to the profit after tax of the firm. This speaks about the operational part of the previous criterion. A plant might have an effluent treatment plant whose capacity is large but does not use it fully. The obvious fallout of it is that a large part of the effluent generated during the production process is released untreated into nature. This variable, thus, is a measure of the actual(in practise) performance of a firm in its pollution control activities.

Most of the variables that are considered here, are calculated from a combination of primary and secondary data sources. The criterion are so designed that the maximum value under a given criterion denotes the best performer in the field and the minimum value denotes the worst performer. We have used three methods for constructing the environmental index. They are the Borda method, the UNDP achievement score( it is actually the method of weighted sum of scores using the
In the BORDA method, all the firms are ranked separately in descending order for each of the criteria that have been used for the purpose. They are then ranked accordingly. The firm with the highest value for the particular criterion is accorded the first rank, the next being assigned the second rank and so on till the last firm is assigned the last rank. The criteria are so designed that a higher value of the same would imply better environmental performance. This is done for all the four criteria that we have considered in our exercise. The Borda score is arrived at by deducting the rank of the firm under that particular criterion from the total number of observations (here, firms).

The procedure of measuring achievement is done in a way where the best performer gets the maximum measure point of one and the worst performer gets a measure point of zero. In order to arrive at the performance measurement point for a particular firm in a given criterion, the first and foremost step involves identifying the maximum and minimum values of the observation across all firms within that criterion. Then, for each firm, for a given criterion of environmental performance measure, the minimum value of the said criterion is deducted from the value of the firm’s value of the criterion. This gives us the numerator of the ratio that is being calculated. The numerator is thus a measure of achievement of the firm over the worst performer in that criterion. The largest value of this difference would determine the best performer in the field under that particular criterion and if this difference is zero then that particular firm/s would be identified as the worst performer since it has the minimum value within that particular criterion. As has already been mentioned that all values for any criterion used as a measure of environmental performance have been so designed that the highest value is accorded to the best performer and the minimum value identifies the worst performer amongst all firms within that criterion. The denominator, which is the same across all firms for a given criterion, is arrived at by deducting the minimum value from the maximum value within the particular criterion. Thus, the denominator gives the scale which provides the base of measurement within a criterion.
The method of Principal Component is an attempt to extract from the matrix 'X' a small number of variables that, in some sense, account for most or all of the variation in X. The highest characteristic vector is chosen and the corresponding Eigen value is considered. This is multiplied with the values that the criterion takes on and are added over all the indicators for a firm to arrive at the index. The firms are then ranked on the basis of these values.

We have calculated the index on the basis of the above criterion using all the three methods described and arrived at the results for firms in each of the two industries. These results have already been discussed in Table - 9.4 and Table - 9.5 before.

Lacunae that remain in this exercise mainly arise from the problem of data insufficiency. Since this exercise involves the combination of both primary and secondary data, only 17 fertiliser firms and just 9 pulp and paper could be considered in the study. The other aspect that is of concern here, is the reliability of data that have been used here. The data that have been used here and which are primary in nature have all been provided by the firms themselves. No firm has provided with data from any one of them can be called as polluting units.

The entire exercise has been carried out to see if a firm is worth lending to for its production process by a lender. The lender, on observing the assets of the borrower decides whether to lend funds or not and if it does decide to lend then it has to decide on what terms to lend. Apart from the rate of interest chargeable, the only tool in the hand of the lender, it also would have to test the credit worthiness of the borrower and check the environmental performance of the firm. It would be foolhardy on the part of the lender not to check these two factors. A sagacious lender would check to see if the firm is credit worthy and a good environmental performer. It might so happen that a firm may be credit worthy, but a bad environmental performer, or vice-versa. Under such circumstances, it would be judicious on the part of the lender not to lend money.
to the firm until it mends it behaviour for which is has been eliminated from sanction of loans.

In our exercise here, we have looked into both the aspects of credit-worthiness of firms as well as their environmental performance. it would remain an incomplete exercise if we do not take cognisance of both these effects together. Once again the problem of data insufficiency plagues us. Though we have a considerable number of firms while making an in-depth study of both the criterion of credit-worthiness and environmental performance of firms separately. However, we have very few firms which overlap in both the exercises. In the pulp and paper industry, we have just three firms for which we have been able to study both the credit-worthiness and their environmental performance. They are Andhra Pradesh Paper Mills Limited, (firm; #P4), Coastal Chemicals Limited (firm; #P17) and Shree Vindhya Paper Mills Limited (firm; #P107). For the fertiliser industry, the corresponding number is four and the firms are; Chambal Fertilisers and Chemicals Limited (firm, #F8), Duncans Limited (firm, #F11), Khaitan Chemicals and Fertilisers Limited (firm, #F36) and National Fertiliser Limited (firm; #F36). Below we present the ranks of the firms on the basis of their credit-worthiness and on their environmental performance using all the three methods of calculation.

Table - 9.1: Rank Of Pulp And Paper Firms On The Basis Of Credit Worthiness And Environmental Performance

<table>
<thead>
<tr>
<th>Firm (paper)</th>
<th>Rank(CW)</th>
<th>Rank - Ach.</th>
<th>Rank - Borda</th>
<th>Rank - PCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. P Paper Mills Ltd.</td>
<td>18</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Shree Vindhya Ltd.</td>
<td>33</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Coastal Chemicals Ltd.</td>
<td>35</td>
<td>6</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

Table - 9.2: Rank Of Fertiliser Firms On The Basis Of Credit Worthiness And Environmental Performance

<table>
<thead>
<tr>
<th>Firm (fertiliser)</th>
<th>Rank(CW)</th>
<th>Rank - Ach.</th>
<th>Rank - Borda</th>
<th>Rank - PCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFL</td>
<td>6</td>
<td>17</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Chambal</td>
<td>15</td>
<td>6</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Duncans</td>
<td>16</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Khaitan</td>
<td>26</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>
We now take a look at the rank correlation matrices of the two industries between the credit-worthiness (CW) rank and the environmental performance ranks. The correlation matrix for the pulp and paper industry is given in Table - 9.3:

Table - 9.3: Rank Correlation Between Credit Worthiness And Environmental Index Of Pulp and Paper Firms

<table>
<thead>
<tr>
<th>Pulp and Paper</th>
<th>Rank(CW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank(CW)</td>
<td>1</td>
</tr>
<tr>
<td>Rank Achievement</td>
<td>0.766899</td>
</tr>
<tr>
<td>Rank-Borda</td>
<td>0.766899</td>
</tr>
<tr>
<td>Rank-PCA</td>
<td>0.944911</td>
</tr>
</tbody>
</table>

The correlation matrix for the fertiliser industry is given in Table - 9.4:

Table - 9.4: Rank Correlation Between Credit Worthiness And Environmental Index Of Fertiliser Firms

<table>
<thead>
<tr>
<th>Fertiliser</th>
<th>Rank(CW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank(CW)</td>
<td>1</td>
</tr>
<tr>
<td>Rank-Achievement</td>
<td>-0.882499</td>
</tr>
<tr>
<td>RANK-Borda</td>
<td>-0.879499</td>
</tr>
<tr>
<td>RANK-PCA</td>
<td>-0.358539</td>
</tr>
</tbody>
</table>

There is no problem for the lender of funds in the pulp and paper industry. The high correlation between the rank in assessing credit worthiness of firms (CW) and the ranks of environmental performance of firms makes it evident that better environmental performers are credit worthy as well. Here, a firm which is highly credit worthy is also a good environmental performer and a credit unworthy firm is a bad performer on the environmental front. If, however, the lender wants to lend funds to a firm who is either not-so-credit-worthy and a not-so-good-environmental-performer then it can ‘pull up’ the concerned firm and ask it to improve its performance on both accounts so as to make itself worthy of availing of loans.

However, in the case of fertiliser industry, there exists a negative correlation between the ranks of firms due to their credit worthiness and their environmental performance. There is thus a clear picture that whatever be the mode of measurement
of environmental performance, they provide an opposite picture than what is painted by their credit worthiness. Under such circumstance, it for the lender to pull up the borrower and ask him to improve his performance in the area where has falls behind others. In this case, the lender would ask NFL to better its environmental performance since it has a credit worthy firm. Similarly, Duncans would have to improve their credit worthiness in order to receive a loan even though it has a good environmental performance. The lender does have an important role here since it has a macro view of the entire industry rather than a micro view of just one firm and thus can provide firms with information it lacks to boost its image as a borrower for environmentally clean business projects.

Till date no policy have been formulated or has been worked out which has been effective in controlling pollution, whatever be its source, completely or effectively. Tietenberg (1989) has argued that liability law is an important and promising tool for dealing with pollution problems. Economic theory, is however, ambivalent about its effects. Firms with limited assets may be sheltered from the economic incentives created by strict liability. There are however, some who feel that when firm assets are limited, the effect of imposing strict liability remains, at best, uncertain. The notion, that, under strict liability the level of care taken by a firm to prevent accidental releases is always increasing in firm wealth, is dispelled. It has been concluded by some that large, wealthy firms may or may not be safer than smaller ones. Firms may even select their asset level or corporate financial structure to minimise payment of damages in the event of an accident. Strict liability, it has been argued, may in fact encourage wealthier forms to spin off into, or subcontract risky operations to smaller judgement-proof companies in hopes of avoiding liability. Finally, the incentives created by liability can be altered by the availability and cost of pollution insurance.

Concerns about lender liability may stem from both fairness and efficiency concerns. In terms of fairness, it is for the lender to decide the best borrower in the sense that the onus is on the lender to eliminate ‘moral hazards’ and avoid ‘adverse selection’ while choosing whom to lend funds and to whom not to. The lender may
obtain some private information about the borrowing firm's environmental behaviour as well as its financial health and may thus gain some ground on the basis of which it can either grant loans or refuse it. On the positive side, liability can increase the pool of private funds available for use as payment for damages. Perhaps for importantly for economic efficiency, they are thought to increase incentives for investment in pollution abatement to reduce the likelihood or magnitude of future contamination.

The conclusion that emerges from the economic literature on lender liability is that none of these efficiency based claims are universally true. The impact of extending lender liability is complex. It depends on a number of factors, including the particular form of liability rule under which the contract would happen between the lender and the borrowing firm (i.e., it is strict or partial), the characteristics of the parties involved (such as their wealth levels, their bargaining power and their credit worthiness), the nature of information structure (including the ability of a lender to monitor a borrower), their performance on the environmental front and the nature of contamination (e.g., continuous or dichotomous). Under certain conditions, an extension of lender liability will be unambiguously welfare improving, while under others it will not be so. Ultimately, it appears that the choice will often hinge on the second-best considerations and a possible trade-off between the different impacts.