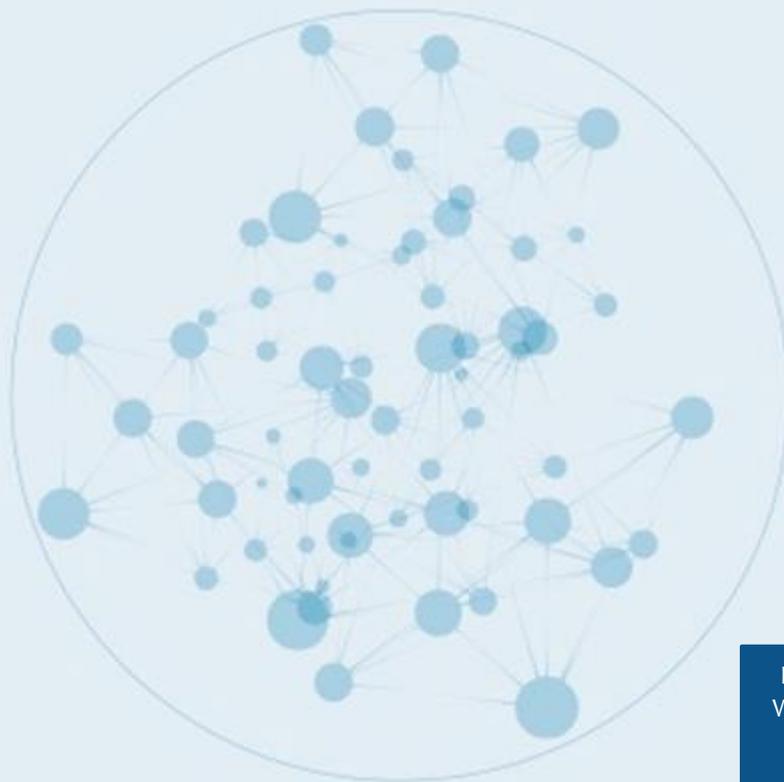




LENDERS AND INVESTORS ENVIRONMENTAL LIABILITY

How Much is Too Much?



INQUIRY
WORKING
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The UNEP Inquiry

The Inquiry into the Design of a Sustainable Financial System has been initiated by the United Nations Environment Programme to advance policy options to improve the financial system's effectiveness in mobilizing capital towards a green and inclusive economy—in other words, sustainable development. Established in January 2014, it published its final report, *The Financial System We Need*, in October 2015 and is currently focused on actions to take forward its findings.

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Abstract

This working paper presents an overview of Lender Environmental Liability (LEL) and Investor Environmental Liability (IEL) regimes and issues. Environmental harm and degradation is often irreparable. Therefore, our assumption is that precaution is the main objective of any international and domestic environmental legal regime. The paper explores the conditions under which LEL/IEL can be effective tool to promote precaution. To illustrate our premise, we created a model based on Nash's game theory in an attempt to universalize some basic concepts in the design of these systems. By using Nash's game theory we aim to answer the question presented in the title of our paper: how much is too much environmental liability for a financial institution to bear?

We argue that full environmental liability (where financial institutions bear unlimited liability) may have the perverse effect of incentivising them to internalize any duty of care, in case they bear full liability.

1 Lender Environmental Liability: an introduction

Over the past two and half decades, the role of financial institutions in promoting sustainable development has emerged as a key focus of debate. Lender Environmental Liability (LEL) is one aspect of such debate. It is seen as a key means to promote stronger compliance and enforcement of environmental regulations, and to harness the role of financial institutions to spread better environmental standards amongst their clients.

LEL translates into the possibility of holding a financial institution accountable for an environmental harm incurred by a borrower client. The challenge is to design an efficient LEL regime which does not undermine the ability and willingness of financial institutions to lend and invest and thereby enable economic growth and social development.

Different legal traditions and systems treat liability differently. Usually, harm, causal relationship and fault (“negligence”) are necessary elements for a legal system to hold an offender liable.¹ However courts often reject the fault-based analysis of negligence in favour of the rule of *strict liability* in environmental cases.² In this case the risk taker has no possible liability defence regarding their conduct.³

Different legal regimes also present diverse grounds for demonstrating a causal relationship. In some cases the mere involvement, even if indirect, with a harm might be enough for a causal relationship to be established. In other countries a close and more direct involvement might be required. When a legal regime aims at targeting financial institutions that are not directly linked to an environmental harm, a more flexible approach to causal relationship must be taken in order for courts to be able to hold lenders accountable for an environmental damage caused by a borrower.

This working paper looks at the legal regime and experience in several countries. By comparing distinct legal traditions and systems, we aim at creating a common ground for a model that could be replicated in any legal tradition or system through minor adjustments in the general liability clause.

2 Overview of legal regimes

We researched different domestic environmental legal regimes and categorized them as follows:

- **Inexistent LEL:** the legal regime does not allow for environmental liability upon lenders and investors (Argentina, Colombia, Peru and Turkey).
- **Full LEL:** the legal regime allows for an interpretation that the financial institution can be held liable for environmental harm caused by the borrower, without limitation (Brazil).
- **Strong-Potential LEL:** the legal regime allows for limited environmental liability upon lenders whenever there is a breach of a duty of care expected from the financial institution (United Kingdom, United States, Portugal, Germany, Mexico, India, South Africa, Costa Rica and Paraguay).

Table 1 describes the legal system of each country.

Countries within the **Inexistent LEL** group are characterized by a lack of environmental law enforcement, which is an obstacle for banks to improve their environmental and social (E&S) risk management. Nonetheless, some initiatives are worth mentioning. In June 2012, the Sustainability Committee of Asobancaria in Colombia, together with the government, signed and adopted a non-binding initiative – the Green Protocol. Many of the banks welcomed it because it does not mandate compliance, but rather encourages banks to develop internal support and to promote sustainable lending and integration of E&S risk management. Peru is another example, where a draft law has been developed, which takes into account international standards on E&S issues set by the IFC Performance Standards and the Equator Principles.⁴

Brazil is currently the only country in the **Full LEL** group, and is considered in more detail in section 2.1

The countries in the **Strong-Potential LEL** group recognize the possibility of considering a financial institution liable for an environmental harm caused by a borrower. They present diverse grounds upon which they understand the lender liability, such as its nature, scale and extension. For instance, LEL in the United States was broadly construed by a judicial opinion in *United States v. Fleet Factors Corp* in 1990. As “owners” of a contaminated site, lenders could fall under the definition of a Potentially Responsible Party (PRP) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). To avoid negative outcomes and high social costs, the US Environmental Protection Agency (EPA) regulated in 1992 the interpretation of CERCLA, setting standards and criteria as a ‘safe harbour’ for lenders. In 1996, after extensive and long debates over how far a lender’s liability could reach, a set of objective criteria were incorporated into law when Congress passed the Asset Conservation, Lender Liability Act (ACLLA).

The United Kingdom and Portugal’s environmental legal system both adopted the EU Directive 2004/35/EC, which presents a broad concept of “operator” and, therefore, of the party responsible for repairing the environmental harm. Under this broad definition, a lender is potentially implicated, considering liability may fall over those “to whom decisive economic power over the technical functioning of such an activity has been delegated”.⁵

South Africa and Turkey, in turn, construe a comprehensive concept for a potentially responsible party. Whereas in Turkey, a limited liability rule linked to a financial institution’s involvement in a project, as an owner or a shareholder, is a condition to implicate the borrower, in South Africa a still limited liability

rule, but more linked to the degree of information the bank holds from a borrower’s activity, is decisive in any attempt to hold a lender liable. Both are limited liability rules, but construed differently.

Mexico’s legal system, rather than presenting a concept of polluter/operator, brings the concept of direct and indirect environmental harm, as well as a hybrid structure of liability (strict and negligence). The strict liability regime linked to the concept of indirect harm can reach the lender. The Association of Mexican Banks (ABM) has already expressly recognized the possibility of ‘joint and several’ liability for banks when granting finance. In response, Mexican financial institutions created a “Sustainability Committee” for the associated banks to align and improve their social and environmental internal practices, mainly in credit analysis.

Table 1: Overview of environmental legal regimes

	Countries	Laws	Comments
Inexistent LEL	Argentina	Law 25675 of 2002 Civil liability: joint and strict regime, excepted in case of exclusive fault of the victim or a third party The law requires the hiring of insurance by the person or entity, public or private, that carries out risk activities, in order to ensure the payment for the damage that eventually cause.	The law does not expressly provide for the liability of the financial institutions. Counselor Héctor Alegria believes that the lack of a rule imposing a specific action to banks exempts them from any liability for damage caused by the financed activity. The lawyer points out that the banks do not have a legal duty to enforce conduct to its customers, unless there is an environmental clause in the credit agreement. As for the contaminated areas, environmental responsibility accompanies the property. Thus, if a financial institution, as a guarantor, became the owner of a contaminated site, it must be liable for its cleanliness.
	Colombia	Law 1333 of 2009 Civil Liability: strict regime	The lender would be deemed responsible for environmental damage if they were deemed to be the controlling entity of the borrower who committed the environmental violation, has decision-making powers or relevant influence over the relevant project, or is deemed part of the management team of the borrower.
	Peru	Law 28611 of 2005 – Environmental General Act Civil Liability: strict and negligence regime	According to a survey conducted by the Business for Social Responsibility (BSR) upon request of the IFC Latin America and Caribbean region team, the majority of Peruvian banks stated that on a local level, there has been no known case of direct negative financial impact from poor E&S oversight. ⁶
	Turkey	Environmental Code 2872 introduces basis for civil liability arising out of actions leading to environmental pollution or disturbance. Civil Liability: strict regime for persons or entities directly or indirectly involved in activities that result in environmental pollution or disturbance.	Generally, lenders will not be held liable in relation to any environmental law matters just because they are providing financing for a specific project. The lender as a mere shareholder will only be liable for unpaid amount of respective share capital. The lender as a board member will participate in the decision-making process and will most likely be held liable with respect to environmental claims against the company.

	Countries	Laws	Comments
Strong-potential LEL	Costa Rica	<p>Environmental Law 7554 of National Banking System Act</p> <p>Civil liability: strict and joint regime. Exclusions: exclusive fault of the victim or a third party, force majeure or 'acts of God'.</p> <p>The law prohibits commercial banks to grant credit where industry promoters do not have the appropriate industrial and technical capacity for effective operation.</p>	<p>The financial institutions, which know and voluntarily assume the risks of financing activities, pollutants or contaminants projects, should be strictly and severely liable for environmental damage caused by the financed activity, being forced jointly with the borrower to restore the environment to its previous baseline.⁷</p> <p>As a notable exception, the Law empowers the state banks, in order to ensure the recovery of their claims, to intervene and help companies that are in a difficult situation to adequately meet their obligations. For this purpose, banks can exercise any supervision, or control of the company and its management.</p> <p>Granting finance without ensuring that the financed activity or project complies with the environmental domestic legislation and keeps the applicable permits or licenses would be considered a failure of the expected duty of care by the financial institution. Therefore, although the environmental liability is strict, if the financial institution demonstrates that it has internalized the expected duty of care, it could be exempted of responding for the damage.</p> <p>Additionally, a lender can become criminally liable by omission – that is, if it learns of an environmental infraction and does not denounce it.⁸</p>
	Germany	<p>The Federal Nature Protection Act requires anyone causing an environmentally-harmful act to take compensatory measures.</p> <p>The Federal Soil Protection Act states that both the person causing damage to the soil and the proprietor of the real property may be held liable for required clean-up measures or for bearing the financial burden of the clean-up.</p> <p>The Environmental Damage Act of 2007 has a limited and subsidiary scope of application, and liability is restricted to the person directly causing the damage.</p>	<p>According to a study:⁹ “A secured party who has received property by way of security can only be held liable if it or its personnel obtains direct possession of or exercises effective control over the secured property. By way of exception, under general public law principles/police powers laws, a secured lender could be held liable if the borrower/operator of the facility cannot be held accountable, for instance because it is insolvent. Such liability would however require that the facility itself and not just the specific operations of the borrower are causing the damage. It seems very unlikely that a secured lender would be held liable under these circumstances, as liability of a proprietor is excluded if the facility no longer constitutes a danger, e.g. in case where a factory has completely ceased to spill dangerous substances.</p> <p>Liability for environmental wrongdoing and/or remediation costs may arise, but only if the lender possesses comprehensive abilities to control the actions of the borrower or is in a position similar to that of a shareholder”.</p>
	India	<p>Indian Constitution</p> <p>National Green Tribunal Act of 2010</p>	<p>According to a legal opinion hired in 2012 by a large financial institution to a law firm, India courts recognize the principle of strict liability and absolute liability. Most</p>

	Countries	Laws	Comments
Strong-potential LEL		Environment Protection Act of 1986 Civil Liability: strict and absolute liability. Any person who has caused damage is held liable to compensate the persons who have suffered damage	environmental actions in India are brought under Articles 32 and 226 of the Constitution, which allows constitutional courts writ jurisdiction to protect the fundamental rights of citizens. Under Articles 32 and 226, the courts have wide powers to mold the relief that may be awarded for the environmental harm caused. In this sense, “lender could possibly be held liable for environmental damage if [they] had knowledge of and control over the prevention or commission of the violation and failed to take steps towards preventing the offense. [The] lender may also be held liable if it has nominees on the board of directors of the borrowing entity”.
	Mexico	Law of 2013 - Environmental Liability Act Civil liability: strict and negligence regime	Some local scholars argue that the widespread strict environmental liability could be counterproductive in encouraging agents not to introduce risk minimization techniques, because once they do they will always be liable. The financial institution can be held liable for the damage caused by a borrower.
	Paraguay	Law 294 of 1993 – Environmental Impact Assessment (EIA) Act The Law provides the obligation to present an Environmental Impact Declaration (EID) as a pre-requisite to obtain credit. As this provision is not duly regulated, it is unclear in which cases the banks shall require this document.	According to the local doctrine, when financing a project, the lender must assess its environmental impacts. The problem arises with respect to the other operations financial institutions carry out in their normal course, such as granting loans for working capital to finance imports, exports, capital goods or guarantees, since no clear rules require the EID for these. In the opinion of Paraguayan jurist Rosa Velázquez de Palacios, important arguments support the thesis that financial institutions are obliged to require the submission of the EID prior to any disbursement of loan or guarantee related to a project likely to have an environmental impact, according to Law 294/93, and that failure to do so may result in civil liability by such entities. ¹⁰ In this regard, she mentions the high relevance of constitutional provisions related to the environment, Paraguay ratifications of the Treaty of MERCOSUR and the Framework Agreement on the Environment of MERCOSUR, EIA Law, the General Principles of Environmental Law and the Declaration on Environment and Development. On the other hand, she concludes that the regulation of the EIA Law is required to explicitly define which credit operations are subject to the EID emission, so that the law does not become an unnecessary obstacle to finance activities that do not require that document.
	Portugal	Decree-law 147 of 2008	Same content as the United Kingdom legislation, which came from Directive 2004/35/EC.

	Countries	Laws	Comments
Strong-potential LEL	South Africa	<p>National Environmental Management Act of 1998</p> <p>National Environmental Management Waste Act of 2008</p> <p>Civil Liability: possible direct liability for portion of damage caused if lender is knowledgeable about actions of borrower, funds the activities of borrower, and fails to act to stop harmful actions.</p>	<p>According to the same 2012 legal opinion mentioned above, the lender may be held liable for the portion of damage caused if it is knowledgeable about actions of the borrower, funds the activities of the borrower, and fails to act to stop harmful actions. In this sense, the lender could be considered to have “control” over an investment if: (i) they have exercised step in rights; (ii) they have foreclosed a securitized asset; (iii) they have a high degree of oversight over the project; (v) they have taken equity in the business as part of the finance package; or (vi) if they have a seat on the board.</p>
	United Kingdom	<p>Environmental Protection Act 1990</p> <p>Environment Act 1995 – Contaminated Land</p> <p>Civil liability: strict and negligence regime. The operator¹¹ shall not be liable if it finds that the damage: a) was caused by a third party and occurred despite the fact that appropriate safety measures taken; or b) resulted from compliance with an order issued by a public authority other than an order resulting from an incident caused by the operator’s activity.</p>	<p>Operators carrying out dangerous activities indicated in the Law fall under strict liability (no need to prove fault). Operators carrying out other occupational activities than those indicated in the Law are liable for fault-based damage.</p> <p>The definition of the “operator” can potentially reach the lender. However, in this case, the law allows the operator to demonstrate that it did not act with negligence.</p> <p>The most common statutory formulation of environmental offences in English legislation prevents the “causing or knowingly permitting” of environmental harm. A lender could commit offences of this type by either: (i) “causing” the harm, meaning that a lender could potentially be liable where the contractual framework provides for a lender to direct the relevant actions of a borrower); and/or; (ii) “knowingly permitting” the harm (where a lender is aware of an environmental risk in a borrower’s business, and has sufficient control in the contractual framework to influence the management of that risk, it would theoretically bear liability for it, along with the borrower or other persons responsible)”. </p>
	United States	<p>Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)</p> <p>Asset Conservation, Lender Liability Act (ACLLA)</p>	<p>One of CERCLA’s main instruments was the definition of a Potentially Responsible Party (PRP), defined in the law as: 1) current owners and operators of contaminated areas; 2) owner and operator of the area at the time of contamination; (iii) the carrier, when selecting the area for disposal of hazardous waste.</p> <p>Financial institutions were not expressly mentioned in the law as PRP. However, LEL became a reality ten years after CERCLA was enacted, in 1990, with the ruling on <i>United States v. Fleet Factors Corp.</i> The court broadly interpreted the definition of PRP by holding the defendant, a textile company, and the funding institution liable for the remediation costs of a contaminated site owned and operated by the former.</p>

	Countries	Laws	Comments
Strong-potential LEL			<p>According to the court’s ruling, “a secured creditor will be liable if its involvement with the management of the facility is sufficiently broad to support the interference that it could affect hazardous waste disposal decisions if it so choose”.</p> <p>In order to mitigate the negative impacts on credit activities, in 1992 the US Environmental Protection Agency (EPA), with the US Department of Justice (DOJ), found a way around their limitation of enacting a regulation over the issue by agreeing not to seek liability against those financial institutions not directly involved in the management activity related to a contaminated site.</p> <p>A more stable environment was possible in 1996 when Congress passed the Asset Conservation, Lender Liability Act (ACLLA). ACLLA stated in plain language which activities did not characterize “participation in the management activity”. In practical terms, a policy was put into place to set objective criteria to allow for a liability defence for financial institutions.</p>

2.1 The Case of Brazil: Full LEL?

The Brazilian National Environmental Policy Act (NEPA) enacted in 1981 formally inaugurated the country’s environmental legal framework. Soon after, the 1988 Constitution (FC/88) of the newly democratic nation devoted a whole chapter dealing with the environment.¹² Ten years later, the Environmental Criminal Act (ECA) completed the prosecutorial enforcement framework.¹³ In addition, a constitutional provision allowing for states and municipalities to legislate over environmental issues started thousands of different rules and regulations nationwide on all aspects of environmental protection.¹⁴

Although Brazil managed to create one of the most comprehensive environmental legal frameworks in the world, bridging the gap between the laws and their effective implementation remains an issue. Poorly structured environmental agencies are an important reason.¹⁵ Without a proper system of enforcement deriving from environmental agencies, public prosecutors and the Judiciary started an active prosecutorial campaign.

Article 12 of NEPA states that public financial institutions and public subsidies entities shall make credit conditional upon a verification of compliance with environmental norms. Article 3, item IV, defines a polluter as anyone who *directly or indirectly* contributes to pollution.¹⁶ While Articles 12 and 3, IV of NEPA do not mention that a lender can be held liable for an environmental harm imputable to a borrower client, public prosecutors started to argue that all financial institutions can be held strictly and jointly liable for an environmental harm. Before that, the possibility of implicating a lender was a topic restricted to few law review articles. This line of academic work and prosecutorial approach led Brazil, in three and a half decades, from a system of no liability upon financial institutions to a possibility of full, strict and joint lender’s environmental liability.

Few cases against financial institutions were trialled in Brazilian regional state and federal circuit courts throughout the 2000s. Those cases involved public owned banks: *Public Prosecutor v. Bank of Brazil*

(2000);¹⁷ *Public Prosecutor v. Caixa Econômica Federal* (2000);¹⁸ *Brigitte Barreto e outros(as) v. Banco Nacional de Desenvolvimento Econômico e Social* (“BNDES”) (2003).¹⁹ On those few occasions, the courts ruled that no causation could be established solely on the grounds of NEPA’s definition of indirect polluter. However, the judicial interpretation of LEL took a significant turn in 2009 when the Superior Court of Justice (STJ) came up with the following *obiter dictum* in a case that did not involve liability of a financial institution: “...For the purpose of determining the existence of a causal link in the urban and environmental damage and possible joint and several liability, anyone who does, who does not do, who does not do when something should be done, who does not care if someone else does, who remains silent instead of denouncing, **who finances for something to be done** or who benefits from what the others do are all equal for the purpose of liability.”²⁰

The STJ’s ruling built its rationale on the NEPA concept of an indirect polluter. Since the law did not define who can be considered indirectly responsible, the Court expanded liability to its full extent to embrace anyone who is involved with a direct polluter, including lenders: each party, borrower or lender, can be independently liable for the full extent of the damages.²¹

Soon after the 2009 precedent, lawsuits started to be filed against financial institutions requiring the Judiciary to impose an obligation upon lenders to not finance borrowers that did not comply with environmental rules and regulation. As of early 2016, except for the STJ precedent, no trend in precedents can be observed. LEL in its full extent as indicated in the 2009 STJ precedent is still speculative.

The development this topic is causing a great deal of uncertainty, with consequences yet to be determined, but credit restriction and a lower level of environmental precaution are probable outcomes.

3 The Economic Model: How Much is too Much?

In this section, we present an economic model and apply it to three different scenarios: 1) Inexistent LEL; 2) Strong Potential LEL; and 3) Full LEL. We use a game theory²² approach to describe the relationship between a financial institution and a borrower firm to evaluate the consequences of a potential liability imposed upon the former in the event of an environmental damage associated with the economic activity of the firm.

Game theory is an approach to studying the strategic decisions of agents.²³ It is largely used in any situation that involves two or more agents, where each one has a set of possible strategies. We are interested in identifying the (Nash) equilibrium that is characterized by adopting the best strategy for each agent. For the purpose of this paper, the agents are the financial institution and the borrower. Our economic environment is a credit market in which a firm that a loan of M monetary units with a financial institution. The interest rate charged by the financial institution is given by r , such that its return is

$$R = rM.$$

The gross profit of the firm due to its production is fixed and given by π . However, this production might cause environmental impact. In particular, we consider that the production of the firm might cause environmental damage with probability p , and might not cause it with complementary probability $(1 - p)$. However, if there is an environmental harm, the impact that needs to be repaired is given by L monetary units, which is defined as the *cost of repair*.

The firm may be of two different types:

- it might choose to closely control its operational risk by internalizing a comprehensive environmental risk management strategy (precautionary measures) and act responsibly, which implies a *compliance cost* of w monetary units.
- it might choose to act in an environmentally irresponsible way by poorly managing its operational risk towards the environment. In this case, the firm does not incur in any cost to avoid an environmental harm.

The type of the firm is common knowledge to everyone in the game: the financial institution can recognize if the firm is responsible or not and charge a lower interest rate if the firm is responsible. Therefore, we will consider that r^r is the interest rate when the firm is more responsible and r^i when the firm is less responsible, with $r^r < r^i$, which immediately implies for the financial institution that $R^r < R^i$.

The probability p of environmental damage is different when the firm is more or less responsible. In this sense, we define that the probability of an environmental harm when the firm is more responsible, p^r , is smaller than the probability when the firm is less responsible, p^i : $p^r < p^i$.

The financial institution may incorporate environmental risk management analysis into its decision process before granting loans and, therefore, act responsibly. As with the responsible firm, the financial institution incurs a *precautionary cost* of c monetary units to inspect the production and try to prevent a possible environmental damage, or may not be careful, in which case it does not incur any cost. Similarly, the type of the financial institution is common knowledge to all the agents and also affects the probability of the environmental harm. If the financial institution opts to take precautionary measures, the probability of damage is given by p_c , which is lower than if it chooses not to adopt them, p_n , regardless of the firm type.²⁴ Formally, it implies that $p_c < p_n$.

It should be highlighted, however, that even though when the firm and/or the financial institution internalize precaution measures and incur costs, environmental damage can still happen. The precautionary measures taken only decrease the likelihood of an environmental harm.

In the first scenario of Inexistent LEL,²⁵ the financial institution that offered the finance cannot be responsible for the environmental damage, and the firm is the only agent that should bear the cost of repair L . Causation cannot be established in order for a financial institution to be held liable and therefore LEL cannot be imposed upon a lender.

The second scenario of Full LEL is that of a lender being fully liable for an environmental harm incurred by a borrower client. Under such a scenario, the financial institution is always facing liability for the finance granted, whether it internalized a duty of care or not. The only country included under this category is Brazil (see Section 3). Therefore, if an environmental damage L is incurred by the borrower, the financial institution has no defence against a 'joint, several and strict' liability claim.

Finally, the third scenario of Strong Potential LEL illustrates an intermediate situation where the financial institution can only be held liable when it fails to demonstrate a duty of care necessary prior to lending the money.²⁶ When a financial institution fails to adopt precautionary measures, it can be held jointly and strictly liable for the environmental damage attributed to the borrower.

Our aim in creating an economic model inspired by game theory is to investigate the difference between the equilibria under these three different scenarios in order to suggest a public policy that maximizes the duty of care (precaution) through all sectors of the economy regardless of the legal system at stake.

3.1 Inexistent LEL

Under this scenario, the financial institution is never liable for the environmental damage and, therefore, the firm is the agent who should bear all the costs of repairing L when an environmental harm happens. Our first point in this analysis is to identify the payoff of the firm and of the financial institution when each may be careful or not.

As each agent has two different strategies (be careful and adopt environmental precautionary measures, or not), four different situations match the combination of these two strategies for each agent. In the first situation, the firm and the financial institution choose the strategy of being cautious, minimizing the probability of an environmental damage, but incurring in the *precautionary cost* c (financial institution) or in the *compliance cost* w (firm). In the second one, only the firm opts to be careful and bears the *compliance cost* w to reduce the probability of an environmental damage. In the third situation, only the financial institution acts with caution and incurs the *precautionary cost* c in order to contribute to avoid an environmental harm. Finally, in the last situation, both agents choose not to act to minimize the probability of an environmental damage and incur no cost.

When the financial institution chooses not to be careful, its payoff is given only by the return R associated with the finance. But when it opts to be careful, its payoff is the return R minus the *precautionary cost* c , that is, $R - c$. Meanwhile, the payoff of the firm when it is careful is given by $\pi - R - w - pL$,²⁷ which is the gross profit π minus the payment made for the financial institution R , the *compliance cost* w , the expected cost of recovering the environmental damage pL , which is the product between the probability p of the environmental harm and the *cost of recovery* L . And the payoff of the firm when it opts to not be careful is only $\pi - R - pL$,²⁸ since under this situation the firm does not incur in the *compliance cost* w .

The financial institution can recognize the type of the firm (and charge a lower interest rate if the firm is more responsible) and the probability p of the environmental harm depends on both agents' types. Since it is a game of complete information, the types of agents are common knowledge and the agents' payoffs are indexed by their types.

Table 2 represents the payoffs of this static game in which the financial institution is never liable for an environmental damage and the firm is the agent that should bear all expected recovery costs due to environmental damage.²⁹

Table 2: Agents' payoffs for the Inexistent LEL scenario

		Firm	
		Environmental precaution	Without environmental precaution
Financial Institution	Environmental precaution	$R^r - c; \pi - [R^r + w + p_c^r L]$	$R^i - c; \pi - [R^i + p_c^i L]$
	Without environmental precaution	$R^r; \pi - [R^r + w + p_n^r L]$	$R^i; \pi - [R^i + p_n^i L]$

Examining the table above we can identify that when the financial institution is never liable for the environmental damage and the firm is the agent who should bear all recovering costs when an environmental harm happens, the financial institution has a dominant strategy,³⁰ which is to be not cautious and act without environmental precaution. No matter the firm's strategy, the financial institution's payoff when does not adopt environmental precaution, R , is always higher than when it does, $R - c$. Formally, it means that regardless the firm type, the financial institution is always better off not incurring the *precautionary cost* c , since

$$R^r > R^r - c \quad \text{and} \quad R^i > R^i - c.$$

In other words, when LEL is inexistent, the financial institution has as a dominant strategy to not undertake precautionary measures.

Meanwhile, the identification of the best strategy for the firm depends on the parameters of the economy. In particular, regardless the financial institution's type, if the expected cost of being careful for the firm is smaller than the expected cost of not being cautious, then the firm chooses to act carefully and adopts environmental precaution. However, if the relation is the opposite, which means that the expected cost of being careful for the firm is higher than the expected cost of not being cautious, then the firm chooses not to be careful.

Therefore, we can conclude that there are two possible Nash-equilibria in this game, but in both equilibria the financial institution always opts to not be cautious since it is its dominant strategy; the only difference between the two equilibria is the optimal strategy chosen by the firm. If the economic parameters are such that the expected net profit of the firm is higher when it takes precautionary measures than of when it does not adopt,³¹ which is equivalent to

$$R^r + w + p_c^r L < R^i + p_c^i L \quad \text{and} \quad R^r + w + p_n^r L < R^i + p_n^i L,$$

or alternatively, if the *compliance cost* w is such that³²

$$w < \min\{(R^i - R^r) + (p_c^i - p_c^r)L; (R^i - R^r) + (p_n^i - p_n^r)L\},$$

then the Nash equilibrium is the financial institution adopting the strategy of not being cautious and the firm adopting the strategy of being careful and incurring on the *compliance cost*.

But if the expected net profit of the firm is lower when it takes environmental precaution, that is, if the expected cost of being careful for the firm is higher than the expected cost of not being cautious,

$$R^r + w + p_c^rL > R^i + p_c^iL \quad \text{and} \quad R^r + w + p_n^rL > R^i + p_n^iL,$$

or alternatively, if the *compliance cost* is such that³³

$$w > \max\{(R^i - R^r) + (p_c^i - p_c^r)L; (R^i - R^r) + (p_n^i - p_n^r)L\},$$

then the Nash equilibrium is characterized by both the financial institution and the firm adopting the strategy of not being cautious and do not bearing any cost.

However, in both equilibria the financial institution has a dominant strategy of not being cautious: a system of no liability whatsoever for the financial institution does not create a strong incentive for the lender to increase the degree of environmental precaution. However, this might change when the environmental risk of the borrower (as part of the firm's operational risk) might create a concrete and real credit risk for the financial institution. But modelling such a scenario falls outside of the scope of this paper and is recognized as a topic that should be further elaborated.

3.2 Full LEL

Under this scenario the financial institution is strictly and jointly liable for an environmental harm incurred by the borrower, regardless if the lender adopts or not precautionary measures. This situation can be interpreted as a strong public policy that transfers all liability for the financial institution. In practical terms, that works similarly as an insurance policy for the firm.

The set of possible strategies is the same as the previous scenario: each agent has two possible strategies (be careful and adopt environmental precautionary measures, or not), which characterizes the same four different situations. The definition of the payoffs are similar to the first case, the main difference being that the expected cost of environmental recovery, pL , must be always incurred by the financial institution rather than by the firm (see Table 3).³⁴

Table 3: Agents' payoffs and strategies for the Full LEL scenario

		Firm	
		Environmental precaution	Without environmental precaution
Financial Institution	Environmental precaution	$R^r - [c + p_c^rL]; \pi - [R^r + w]$	$R^i - [c + p_c^iL]; \pi - R^i$
	Without environmental precaution	$R^r - p_n^rL; \pi - [R^r + w]$	$R^i - p_n^iL; \pi - R^i$

Similarly, analysing the table above, it is possible to identify that now the best strategy for the financial institution also depends on the parameters of the economy. Regardless of the firm type, if the total expected cost of being cautious [$c + p_c L$] is lower than the expected cost of not being cautious [$p_n L$], that is, if

$$c + p_c^r L < p_n^r L \quad \text{and} \quad c + p_c^i L < p_n^i L,$$

then the financial institution opts to be careful and acts with environmental precaution since its payoff is higher under this circumstance, that is,

$$R^r - [c + p_c^r L] > R^r - p_n^r L \quad \text{and} \quad R^i - [c + p_c^i L] > R^i - p_n^i L.$$

These conditions might also be rewritten as

$$c < (p_n^r - p_c^r)L \quad \text{and} \quad c < (p_n^i - p_c^i)L,$$

or alternatively

$$c < \min\{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\},$$

which means that if the *precautionary cost* c is lower than the difference of the expected cost of recovering the environmental damage when the financial institution is not careful and when it is, then the financial institution chooses the strategy of adopting precautionary measures.³⁵ Otherwise, if

$$c > \max\{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\},$$

the financial institution chooses to do not take precautionary measures since it is extremely costly.³⁶ However, the central question is: how likely is that to happen?

Notice that $(p_n - p_c)$ is a difference of probabilities,³⁷ which tends to be very small,³⁸ because the financial institution is not responsible for managing the firm's operational risk. Indeed, the financial institution sets standards in an attempt to influence the borrower into increasing control over its operational risks related to the socioenvironmental aspects of its activities. Therefore, on the one hand, whether or not the financial institution internalizes an obligation to review the firm's operational risk management strategy tends to have an indirect impact on reducing the socioenvironmental risk. But, on the other hand, by adopting such a duty of care, the financial institution tends to create a strong incentive for the firm to internalize the same duty of care, reducing the socioenvironmental risk of its activities. This is why the difference of probabilities in directly reducing the socioenvironmental risk when the financial institution adopts and does not adopt precaution tends to be very small.

Therefore, the financial institution will choose to be cautious if (and only if) the *precautionary cost* c is small or if the *cost of repair* L is high. In this sense, it could be argued that, to create incentives for the financial institution to be cautious under Full LEL, it is sufficient that a regulator sets an extremely high *cost of repair* L so as to ensure that the condition $c < \min\{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\}$ is always satisfied. However, if L is extremely high, it prevents the activity of the financial institution because its payoff becomes negative under both strategies (adopting precaution or not). Therefore, this leads us to believe that under Full LEL, the financial institution tends to choose not to take precautionary measures.

To evaluate the firm's best strategy, let us recall that the financial institution can recognize if the firm acts environmental responsibly or not, and charge a lower interest rate if the firm is responsible. Therefore, the identification of the optimal strategy for the firm depends again on the economic parameters. In particular, if

$$w + R^r < R^i,$$

that is, if the expected cost of being careful for the firm, $w + R^r$, is lower than the expected cost of not being careful, R^i , then the firm chooses to act carefully and adopts environmental precaution.³⁹ But if the relation is the opposite, the firm chooses not to be careful.

This allows us to conclude that there are four possible Nash-equilibria (in pure strategies) in the game, depending on the parameters of the economy.⁴⁰ If the net profits of the firm and of the financial institution are higher when they adopt environmental precaution, which means if

$$w < R^i - R^r \quad \text{and} \quad c < \min \{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\},$$

then the Nash equilibrium is given by both agents adopting the strategy of being cautious.

However, regardless of the type of the firm, we believe, as stated above, that the financial institution tends to adopt the strategy of not being careful, which means

$$c > \max \{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\}.$$

Under this situation, if the parameters associated with the best strategy for the firm are such that

$$w + R^r > R^i,$$

or alternatively, if *compliance cost* w is higher than the difference between the return paid for the financial institution, that is,

$$w > R^i - R^r,$$

then the Nash equilibrium is characterized by the financial institution and the firm adopting the strategy of not being careful.

But even in this situation where it is hard to defend that the *cost of precaution* c is smaller than the difference of the expected cost of repairing the environmental damage when the financial institution is not careful and when it is careful (which means that the financial institution tends to adopt the strategy of not being careful), if the parameters associated with the best strategy for the firm are such that

$$w + R^r < R^i,$$

then the Nash equilibrium is characterized by the financial institution adopting the strategy of not being careful and the firm choosing to be careful.

Finally, the last Nash equilibrium (in pure strategies) is when the firm chooses to not take precautionary measures and the financial institution chooses to adopt since the economy parameters are such that

$$w > R^i - R^r \quad \text{and} \quad c < \min \{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\}.$$

Comparing the characterization of the equilibrium between the first and the second scenario, and in particular comparing the constraints that define the optimal strategies of the firm in the two scenarios, we identify that in this second scenario the constraints are more restrictive, creating a disincentive for the firm to be careful.⁴¹ Transferring all the liability to the financial institution will only create incentives for it to adopt precautionary measures in a situation that is very unlikely to occur. In order to avoid that undesirable situation, one way to create incentives for the financial institution to adopt precautionary measures would be to develop an accurate remediation regulation based on the cost of recovery.

3.3 Strong Potential LEL

The third scenario illustrates an intermediate situation in which the financial institution is only liable when it does not adopt precautionary measures: it only bears the expected cost of recovery if it does not incur in the *precautionary cost c*. By identifying the effects on the equilibrium the intention is to analyse the prescription of a public policy that recommends imposing liability upon the financial institution only if it does not internalize the demanded duty of care.

Again, each agent has two possible strategies (be careful and adopt environmental precaution, or not), which characterizes the same four situations already described. The payoffs are also quite similar to the previous cases, but the main difference is that the expected environmental recovery cost, pL , is incurred by the financial institution only if it opts to not be cautious and does not bear the *precautionary cost c*. Otherwise, if the financial institution adopts environmental precaution, then the firm shall bear the environmental recovery costs, regardless if the firm has been cautious or not (see Table 4).

Table 4: Agents' payoffs and strategies for the Strong Potential LEL scenario

		Firm	
		Environmental precaution	Without environmental precaution
Financial Institution	Environmental precaution	$R^r - c; \pi - [R^r + w + p_c^r L]$	$R^i - c; \pi - [R^i + p_c^i L]$
	Without environmental precaution	$R^r - p_n^r L; \pi - [R^r + w]$	$R^i - p_n^i L; \pi - R^i$

It would always be better for the firm if the financial institution were not cautious, because in this circumstance the firm payoff would be higher since the financial institution would play the role of insurance as it would be liable if any environmental harm occurred.⁴² However, unlike the previous scenarios, there is now no straight dominant strategy for the financial institution, and its optimal strategy also depends on the parameters of the economy. If the firm is careful⁴³ and the *precautionary cost c* is lower than the expected cost of repairing the environmental damage ($p_n^r L$), that is, if

$$c < p_n^r L,$$

then it is better for the financial institution to be careful and adopt environmental precaution. But if the *precautionary cost c* of the financial institution is higher than the expected cost of repair, $p_n^r L$, when the firm is careful, then the financial institution chooses not to be cautious.⁴⁴

Similarly, if the firm is not cautious, it is optimum for the financial institution to be careful if and only if the *precautionary cost c* is lower than the expected cost of repairing the environmental damage, $p_n^i L$, that is, if⁴⁵

$$c < p_n^i L.$$

Otherwise, it is better for the financial institution to not adopt precautionary measures. The difference between the two conditions described above is just the probability of environmental damage that is defined by the type of the firm. Thus, we can conclude that, regardless the firm type, if

$$c < \min\{p_n^r L, p_n^i L\},$$

it is better for the financial institution to be cautious and to adopt environmental precaution. While, if

$$c > \max\{p_n^r L, p_n^i L\},$$

it is better for the financial institution to not adopt precautionary measures, regardless the firm type.

Considering the two conditions above, we highlight, however, that if policymakers increase the cost of recovery L by, for instance, adding fines, *precautionary cost* c tends to be lower than the expected cost of repair pL . It means that under this public policy that transfers limited liability to the financial institution (limited to those cases of lack of precaution), a regulator that imposes a high cost of *repair* L creates the right incentive for the lender to choose as best strategy the adoption of environmental precautionary measures. This policy is aligned with one of the main objectives of any environmental protection and conservation legal regimes, which is to increase and promote precaution on all sectors of the economy.

To examine the firm's strategy, it is worth noticing that when the financial institution internalizes a duty of care prior to lending the money, it transfers the full liability to the firm, regardless of the firm being cautious or not. Thus, under this assumption, if the financial institution is careful, the firm also opts to be careful if

$$w + R^r + p_c^r L < R^i + p_c^i L,$$

or alternatively, if

$$w < (R^i - R^r) + (p_c^i - p_c^r)L,$$

which is exactly the same condition of the first scenario where the firm has the liability to repair environmental harm. But if the financial institution is cautious and

$$w + R^r + p_c^r L > R^i + p_c^i L,$$

then the firm opts for the strategy of not being cautious.

But if the financial institution is not careful and does not bear the *precautionary cost* c , it faces liability for environmental recovery costs, regardless of the firm's behaviour. Therefore, when the expected cost to be careful is lower than the expected cost of not being careful, that is, when

$$w + R^r < R^i,$$

or alternatively, if $w < R^i - R^r$, the firm opts to be responsible and incurs the *compliance cost* w even if the financial institution is not careful. But if the relation is the opposite, then the firm chooses not to be careful.

Comparing the conditions $w < (R^i - R^r) + (p_c^i - p_c^r)L$ and $w < (R^i - R^r)$, we conclude that, regardless the financial institution type, if

$$w < (R^i - R^r),$$

the firm will always adopt precautionary measures. While if

$$w > (R^i - R^r) + (p_c^i - p_c^r)L,$$

the firm opts not to be cautious.

The above analysis allows us to conclude that there are again four possible Nash-equilibria (in pure strategies) in the game, depending on the parameters of the economy. If the net profits of the firm and the financial institution are higher when they adopt environmental precaution, which means if

$$w < R^i - R^r \quad \text{and} \quad c < \min\{p_n^r L, p_n^i L\},$$

then the Nash equilibrium is given by both agents adopting the strategy of being cautious.⁴⁶

Another possible equilibrium is when the parameters are such that

$$w < R^i - R^r \quad \text{and} \quad c > \max\{p_n^r L, p_n^i L\}.$$

Under this situation the Nash equilibrium is given by the firm adopting the strategy of being cautious and the financial institution opting not to be cautious.

The third equilibrium is when the firm opts not to adopt precautionary measures but the financial institution adopts, which is represented by the following conditions

$$w > (R^i - R^r) + (p_c^i - p_c^r)L \quad \text{and} \quad c < \min\{p_n^r L, p_n^i L\}.$$

The last equilibrium is when both agents opt not to be cautious. This equilibrium happens when the parameters are such that

$$w > (R^i - R^r) + (p_c^i - p_c^r)L \quad \text{and} \quad c > \max\{p_n^r L, p_n^i L\}.$$

Given these four possible equilibria, if the regulator imposes a very high cost of repair L and if the interest rate that financial institutions charge to the irresponsible firm is considerably higher than the interest rate when it is responsible, then the equilibrium is when both agents adopt precautionary measures. In other terms, if the intention is to implement a public policy to encourage both agents to adopt precautionary measures, it is just necessary that these two conditions are met.^{47,48}

4 Extending LEL to Investors

From a policy perspective, extending liability to investors might promote a duty of care similar to the case of a lender. The rationale is similar and may include, in addition, an administrator or a manager of an investment fund. As with the policy of LEL, an investor's (or an administrator's, or a manager's) environmental liability must be construed carefully. A general and simplified approach of holding any investment agent⁴⁹ liable can be responsible for overwhelming social costs as 'investment agent' is a category that fits many different types of people and institutions.

One connecting element to start building a liability policy is information. Policymakers must ask how much information is available or should be readily available in an investment operation. Or, to follow the recently enacted Brazilian Central Bank regulation, a policymaker must consider in general terms whether it is proportional (or relevant) to require a duty of care in any given investment operation. Such a broad and subjective assessment confers flexibility for a case-by-case analysis. Discretion in this case can be limited by the element of information mentioned. The level of information available can vary according to the type of the investment fund. As an example, private equity⁵⁰ allows access to a greater level of information on the investee company and its projects than a mutual fund.⁵¹

As a general policy, we recommend that the general "investor" be divided in three different categories: high-qualified investors, qualified investors and low-qualified investor. The first category, which includes institutional investors, comprises organizations that invest large sums of money and generally exercise a great degree of influence in management decisions. Whenever a qualified investor is involved, a careful analysis must be done and the nature of the activity upon which the investment is underwritten examined to assess the degree of environmental risk analysis required before the operation.

Investments over US\$10 million (to match the Equator Principles guideline), an asset giving the investment fund decision-making power on the investee company, or an environmentally risky activity all call for a duty of care that must be met for the investor to avoid liability. The US\$10 million threshold in the Equator Principles is a sound criterion and sets a standard to strengthen a duty of care in environmental risk analysis. Below this threshold, the investment tends to have less potential to cause irreparable environmental degradation. This might not always be the case, but, in general terms, the greater the amount of money, the greater the environmental risk of a project. If the investment fund exercises control or influence over the investee company's affairs, it owes special duties and must look out with special care to the company's environmental aspects and implications. The sector of the activity upon which the investment is underwritten is an element, which, if taken into account in the E&S analysis conducted by the investment fund, may bring more risk-adjusted returns to its portfolio. A large Brazilian financial institution created an E&S analysis methodology to investment operations. It sets eight dimensions – the most recurrent in various economic sectors – that can affect the value of investee companies: climate change; biodiversity and land use; water, energy and materials; waste management; clients; communities; suppliers; and employees.⁵² During the E&S analysis, the dimensions are adapted to the reality of the activity sector of the investee company. For example, the steel industry has large greenhouse gas emissions and creates two different types of risk: operational (associated with material losses caused by the intensification of extreme weather events); and regulatory (with respect to future legislation about the subject). If the sector is classified as high-risk, and if the investee company has a satisfactory E&S management, its "investment rating" is improved. Therefore, a riskier activity sector of the investee company calls for the investment fund to adopt a greater the duty of care.

Under the second category, “qualified investors”, the same criteria apply, but the duty of care required must be proportional to the operation. In practical terms, a requirement on the investor to require a written declaration or a contractual obligation that the project or activity is (or will be) in compliance with all social and environmental legal requirements will be sufficient. A contractual clause requiring notification of any non-compliance incurred is an important element to keep the qualified investor informed. A minimum duty of care on qualified investors is enough to serve as a liability waiver.

For “low-qualified investors”, encompassing those with little (or no) information regarding the project, any legal duty of care would carry significant social costs incompatible with the degree of risk these investors pose to the environment. This category of investors is often investing through an administrator or a manager. A liability provision under this scenario for low-qualified investors is not proportional.

A different situation arises when an investment fund administrator or manager acts on behalf of an investor. In that case, the liability clause does not reach the qualified and low-qualified investor, but may reach administrators, managers and high-qualified investors. The rationale is similar to that applicable to lenders. Investment administrators and managers own (or should own) a great deal of information regarding the project subject to the investment. They also hold decision-making power to invest in projects and activities. Often, this decision is already taken in the rules and requirements of the investment portfolio offered to the clients of an investment administrator and/or manager.

High-qualified investors are the only ones capable of influencing the decision of an investment administrator or manager. If an investor invests the amount of money capable of providing him with bargaining power over an investment administrator’s or manager’s decision, then this investor is subject to a similar duty of care in conducting an environmental risk analysis.

To support our rationale on investors’ liability we could apply the same game theory model used for lenders in the previous section. In that sense, a high-qualified, a qualified investor (the latter limited to the criteria presented above) and an investment administrator are comparable to the lender in the model. Likewise, the individual (or corporation) benefiting from the investment is comparable to the firm in this same economic model inspired by Nash’s theory. Therefore, the results presented in each scenario (inexistent LEL, full LEL and strong potential LEL) are replicated to an investor.

Last but not least, when an investor or an investment fund holds the majority of the available stocks (or shares) of the project invested, liability applies in its full extent. Under this scenario, the investor or the investment fund incorporates the status of project owner. They are directly liable for any environmental harm as they hold decision-making power due to their principal shareholder position. If such a position is temporary due to any particular circumstance, then a case-by-case analysis might indicate a different direction and bring back the investor or the investment fund to their original status and subject them to the liability policy described above.

5 Institutional Arrangement

Having established the principle that environmental liability is a useful tool, if designed to spread a generalized duty of care throughout all sectors of the economy, the question of what the proper institutional arrangement should be arises. Few, non-exclusive, possibilities exist: a LEL policy might be the result of judicial interpretation; it might come from statutory law and regulation from environmental regulatory authorities; or the monetary regulatory authority might impose upon the financial sector environmental due diligence requirements. A fundamental precondition though is that the legal system has either a general liability clause or an environmental liability built in, allowing for a broader reach of the causal relationship requirement to include indirect polluters in the chain of potentially responsible parties.

In many countries, courts are bound by the strict limits of the cases brought before them without any consideration to any unintended consequences of their rulings. In addition, judges, prosecutors and attorneys lack the necessary expertise to conduct cost-benefit analysis to construe a policy through judicial (or case law) interpretation. Quite often, the result is that, although embedded with the ideal of justice, courts do not come up with the most efficient policy.

The Brazilian current scenario of LEL is a good example. Pushing for a strong LEL doctrine is unlikely to result in more environmental precaution. On the contrary, our model demonstrates that a plausible outcome is a policy that reduces in all sectors of the economy the incentive to internalize a duty of care and environmental precaution.

An alternative would be to have a regulatory LEL policy specifying a general liability rule coming from an environmental regulator. At first sight, this might seem the best institutional arrangement. However, environmental authorities are rarely well equipped for financial regulation. Multiple and diversified operations and institutions constitute a special feature of the financial system. The importance of such a sector for the economy is only matched by the systemic risk an inefficient or poorly designed regulation poses to the entire economy. A proper and well-balanced regulation to manage such risks is thus required from a more suitable regulating agency.

This is how we come to understand that the best institutional arrangement to include the LEL policy into the portfolio of tools necessary for a sustainable financial system is a general environmental liability clause supplemented by specific rules and regulations coming from the monetary authority. Controlling environmental risks is a big part of managing credit risk. If a LEL is in place and a financial institution can be held liable for the money made available, this is a relevant loss that must be accounted for. Depending on the operation and the information regarding how the money is to be spent, an environmental harm incurred by the borrower can represent a credit risk of default and also cause a significant loss due to the potential liability apportioned on a financial institution.

Which financial institutions are required to conduct an environmental risk analysis, how any loss is accounted for and what kind of financial institutions must internalize (and to what extent) an environmental duty of care are questions for the financial regulatory agency to define. Contributions from different governmental bodies are welcomed, but in the end, a regulation from the regulatory body of the financial sector is the most efficient way to lay down specific and objective due diligence criteria. Brazil chose this direction with Central Bank Resolution n. 4.327/2014 imposing on all financial institutions in the country a duty to conduct environmental risk assessment analysis before any financial operation. If

no action is required, financial institutions must justify that an environmental risk assessment is neither relevant to the operation at stake nor proportional to the financial institution's core business.

Some flexibility in the implementation aspect of such a change in paradigm seems to be a wise policy to accommodate the financial system's heterogeneity. This would allow the threat of LEL to support a learning-by-doing approach to shifting practices and management culture across a sector. This seems the most appropriate institutional arrangement in designing a lender's and investor's liability clause.

6 Conclusion and Recommendation

Our work attempted to demonstrate that LEL is a useful policy to increase and promote environmental precaution. Such a potential is proportionally bigger in emerging economies struggling with compliance and enforcement mechanisms. Stable economies with strong environmental agencies tend to benefit less from a LEL policy. Still, holding lenders (and investors) liable for irresponsible resource allocation decisions is a major step towards increasing precaution throughout all sectors of the economy.

In this paper, we used a game theory model to illustrate that a LEL must be carefully construed to effectively increase precaution throughout the economy. Our model suggests that a strong potential liability regime is appropriate. Under such a regime, a lender must demonstrate compliance with environmental risk analysis requirements to avoid responding for a harm incurred by a borrower's activity. Whenever that is the case, the lender has an incentive to promote environmental risk analysis, and so does the borrower to avoid incurring liability costs alone.

This general summary of our analysis for lenders can be replicated to a wider spectrum of stakeholders beyond just banks, such as investors or a manager or an administrator of an investment fund. In expanding LEL to different stakeholders, the same degree of care must be in place in construing the policy so that it can achieve its main purpose: increase and promote a duty of care towards environmental precaution throughout all sectors of the economy.

In an attempt to translate our academic analysis into a more policy-oriented work, we address below a list of practical questions summing up our main conclusions and presenting some recommendations:

- 1) **LEL should not be limited to banks.** Environmental liability should apply to all stakeholders involved directly or indirectly in a polluting activity. The legal criteria applied to those involved indirectly are distinct from the ones applied to those directly involved in an environmental harm. The rationale of a liability policy to reach those indirect polluters is to increase the degree of environmental precaution throughout all sector of the economy. Our economic model suggests that this is better achieved when the indirect polluter can waive liability by demonstrating compliance with environmental risk analysis requirements imposed by legislation and detailed by a regulator. In that case, the direct polluter tends to have a greater incentive to control its environmental risks to avoid responding for environmental liability alone, without a third party (an indirect polluter) having to bear part or all of the remediation costs. Therefore, the general rule lies with the degree of information (and therefore involvement) an indirect party has (or should have) about the project or activity of the direct or party with which the indirect party develops a commercial relationship. This commercial relationship is not limited to lender-borrower. It must include a wide range of indirect parties such as investors, managers and administrators of investment funds, or even enterprises exercising leverage power over their supply chain. If carefully implemented, LEL can and will be comprehensively applied.
- 2) **LEL should apply across all financial asset classes.** The question is not so much whether LEL applies generally but how it should be applied. Different financial operations and activities require different degrees of duty of care. Environmental risk analysis presents different degrees of complexity and, therefore, costs. Requiring a thorough duty of care in operations of low risk is an unnecessary and inefficient policy to increase precaution. The potential benefits do not justify the social costs involved in such a policy. Using the Equator Principles' criterion of US\$10 million, therefore, adjusts the degree of environmental precaution. Environmental liability still applies to

those investments under that amount; the difference is on the degree of care imposed upon investment operations below the US\$10 million threshold. Under such an amount a general presumption of low environmental risk applies. Lower environmental precautionary measures, therefore, with lower social costs, are more proportional.

- 3) **The system of “strong-potential LEL” maximizes precautionary measures by financial institutions and among borrowers.** Failure to comply with environmental risk assessment requirements prior to any lending or investment contract can trigger liability for the lender or investor or any third party exercising contractual leverage power over a potentially polluting activity or project. We believe a system of full liability does not promote environmental precautionary measures. High social costs and a potential for a moral hazard problem for the borrower are challenges for a successful implementation and operation of a full liability regime. On the flip side, our model supports our understanding that a low-potential liability regime does not enhance financial institutions’ accountability towards increasing environmental due diligence standards prior to any lending and/or investment operation. Without the possibility of being included in the legal causation chain for a potential environmental harm caused by a borrowing firm, a financial institution has no clear incentive (other than managing credit risk) to enhance precautionary standards for environmental risk assessment.
- 4) **Implementing a “strong-potential” liability regime requires an institutional framework led by a financial regulator.** Contributions from environmental agencies and ministries are welcomed but should defer to the monetary authority. Precautionary standards and requirements in every financial institution’s activity and operation must be set by a regulation that differentiates the environmental risk among each financial institution’s core business and among the different products and services offered within a single financial institution. The Brazilian example is quite promising. A Central Bank regulation allows for each financial institution to justify its precautionary measures and standards set to each operation and activity in a first phase of compliance. Therefore, a single certificate from the relevant environmental authority is insufficient for the most complex and risky financial operations like project finance. A valid environmental permit, periodic compliance reports and external and independent environmental audits are examples of strong precautionary standards that can be imposed by regulation upon financial institutions. If, however, this process of setting and enforcing due diligence standards is flawed or corrupted, the Judiciary can play a major role in differentiating those cases where there has been a failure to adopt precautionary measures.
- 5) **A temporal element adds complexity to the duty of care imposed on financial institutions.** A pre-lending due diligence requirement is the first step for the most complex financial operations. A simple credit operation not linked to a specific project or activity, for instance, will be subject to normal precautionary standards. But complex financial operations, with the potential to generate greater environmental risks, must start with a pre-lending due diligence. For instance, if a financial institution agrees to a five-year disbursement plan to fund a particular project, the flow of money is a source of environmental risk that must be accounted for. Therefore, the financial institution maintains a duty of care throughout the life cycle of the disbursement plan. As soon as the disbursement is over, having internalized all appropriate precautionary measures, the financial institution is no longer accountable. If the financial institution complied with the required duty of care before and during the disbursement period, once the money stops flowing, the financial institution is no longer a source of environmental risk. The environmental risk, in

turn, becomes solely a matter of the operational risk of the borrower's activity and, therefore, must be controlled by the relevant environmental authorities entitled to exercise the police power over potentially polluting activities.

- 6) **General precautionary requirements may be supported by specific guidance.** Land contamination calls for specific precautionary measures different from air and water contamination. Likewise, a possible biodiversity threat requires a different due diligence standard than a climate change threat. Some activities may be classified as restricted from a financial institution's environmental risk assessment department. For some environmental outcomes, for example climate change, establishing causation from a single source to the worldwide problem is quite complicated, if not impossible. Other factors must be weighted. An investment in a coal power plant in a developing country that contributes little to the global levels of greenhouse gas (GHG) emissions and with energy needs should be treated differently than the same investment in a developed country with significant levels of GHG emissions. For environmental problems of a different nature, like water, soil and air contamination, causation is simpler and, therefore, standards of care should follow the same pattern. Whether the borrower holds all the environmental permits, whether it is complying with legal environmental requirements and even external audits are examples of how a duty of care can be construed and imposed upon financial institutions.
- 7) **An alternative to LEL, or an addition to, is a system that allows for administrative penalties.** Failure to comply with the precautionary measures imposed by regulation should trigger fines and other administrative penalties such as a ban on engaging in similar financial operations for a specified period of time, for instance. For the former, environmental authorities can be well equipped. For the later, a monetary regulatory authority must participate. Nevertheless, our understanding is that a monetary authority will often be better equipped and more suited to impose administrative sanctions on financial institutions for failures to comply with environmental precautionary requirements. Dealing with the financial sector requires a special expertise not usually found in environmental authorities. In order to engage a country's monetary authority, the first step is to build the understanding that environmental harm can pose a significant risk for the financial institution and therefore a country's entire economy when financial institutions are too big to fail. The regulator should be aware that environmental harm is increasingly becoming a relevant credit risk as borrowers progressively face more liability. When remediation costs compromise a borrower's ability to pay back the bank, a real and concrete default risk arises. The sooner monetary authorities understand this, the sooner countries will experience more stringent regulatory environmental due diligence requirements.

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¹ Cooter and Ulen (2004), p. 311, “Three elements must be present for recovery by the plaintiff under the traditional theory of torts: 1. the plaintiff must have suffered *harm*; 2. the defendant’s act or failure to act must *cause* the harm; and 3. the defendant’s act or failure to act must constitute the *breach of a duty* owed to the plaintiff by the defendant.”

² Cole and Grossman (2005), p. 228, “For certain kinds of torts, courts reject the fault-based analysis of negligence law in favor of the rule of strict liability, which holds defendants liable for the harm their actions cause plaintiffs no matter how many precautions the defendants took.”

³ Harrison (2002), p. 380, “As an economic matter, strict liability and negligence are distinct in a number of important ways. First, the decision of a court that one has acted negligently means that the harm could have been avoided at a lower cost than the harm itself. In strict liability, this comparison is not made by the court. Second, under negligence, if the harm was avoidable at a relatively low cost, the party causing the harm is required to internalize the cost of the harm or the cost of the avoiding. In strict liability, the issue of internalization does not hinge on whether the party could have avoided the harm. In other words, strict liability focuses on the activity itself and classifies some of the results of that activity as costs that must be internalized without regard for whether the firm could have reasonably avoided those costs. The firm is then left with the harm decision of whether to avoid the harm to others or to pay for the harm. At this stage, something like the Hand formula is applied but only in the context of the firm deciding what is in its profit-maximizing interest. From an economic perspective, the critical judicial process is one of determining what is an externality that should be internalized.”

⁴ BSR Brief: Environmental & Social Risk Management Program for Financial Institutions (FIs) in the Latin American and Caribbean Region (LAC) – Executive Summary, September 2014.

⁵ According to EU Directive 2004/35/CE, operator means “any natural or legal, private or public person who operates or controls the occupational activity or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of such an activity has been delegated, including the holder of a permit or authorisation for such an activity or the person registering or notifying such an activity”.

⁶ See note 4.

⁷ Peña Chacón, M. (n.d.) Responsabilidad por Daño Ambiental de las Entidades Financieras.

⁸ Comparing environmental laws in Latin America, <http://www.iadb.org>, November 2003.

⁹ Lenders’ environmental liability under German and English law, Charlotte Sluka, March 2015.

¹⁰ Velázquez de Palacios, Rosa, Thesis for the degree of Master in Environmental and Urban Planning at the University of Limoges and Catholic University of Paraguay.

¹¹ According to the Environmental Protection Act 1990, the operator is any person or entity, public or private, that operates or controls the occupational activity or, where the national legislation so provides, has been delegated decisive economic power over the technical functioning of this activity.

¹² The Brazilian Constitutions were enacted as follows: 25 March 1824; 24 February 1891; 16 July 1934; 10 November 1937; 18 September 1946; 1 January 1967 and 5 October 1988. See generally da Silva (2008) for details on the political and constitutional history and evolution in Brazil. The FC/88 was the first one in the Brazilian constitutional history to mention the expression “environment” and, consequently, the first one to devote one whole chapter to the issue. The constitutional text entrusted all with the right to an ecologic and balanced environment, an asset of common good for present and future generations. See also Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, the official Brazilian Executive Power website, which provides a Portuguese version of all Constitutions, http://www.planalto.gov.br/ccivil_03/Constituicao/principal.htm. For an unofficial English version of the 1988 Brazilian Constitution, see *Political Database of the Americas*, Georgetown Univ., <http://pdba.georgetown.edu/Constitutions/Brazil/english96.html>.

¹³ See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 9,605 (1998), http://www.planalto.gov.br/ccivil_03/leis/l9605.htm. See Antonio de Aguiar Patriota, An Introduction to Brazilian Environmental Law, *The George Washington International Law Review*, Volume 40, Number 3, (2008 - 2009), p. 612. “With the approval of the Environmental Crimes Law, the legal regulation of the environment became all encompassing, given that it was to be enforced through administrative, civil, and criminal law”.

¹⁴ The Federal Government enjoys concurrent authority with States and Municipal Governments to legislate over environmental matters and common authority to control pollution related problems. See C.F art. 23 and 24 III (Braz.) (1988). An English translation of the 1988 Brazilian Constitution is available at <http://pdba.georgetown.edu/Constitutions/Brazil/english96.html>. See Antonio de Aguiar Patriota, An Introduction to Brazilian Environmental Law, *The George Washington International Law Review*, Volume 40, Number 3, (2008 - 2009), p. 613. “Article 24, in turn, provides the legal authority to legislate on the environment, establishing the concurrent jurisdiction of the federal government, the states, the federal district, and local governments. It is worth emphasizing that, although Article 23 refers to law enforcement, Article 24 establishes the power to adopt laws, decrees, resolutions, ministerial directives, etc. By establishing concurrent jurisdiction, the Constitution establishes that the preparation of broad, overarching statutes is a federal-government responsibility, while it falls upon the states and the federal district to create specific statutes of particular interest to the state that creates it. If the federal government does not establish overarching statutes, the states and the federal district enjoy full constitutional authority to legislate until federal law on the topic appears”.

¹⁵ McAllister (2008). “In Brazil and many other such countries, compliance is not widespread and the governmental environmental agencies charged with enforcing environmental laws have very different profiles than those in industrialized countries (see, e.g., Mumme 1998; Nef 1995). They are often underfunded, resulting in a lack of personnel as well as operating resources. They are routinely overpowered or influenced by other governmental actors and agencies that have a mandate more

closely aligned with economic development objectives. And environmental agencies often do not have strong constituencies within civil society to support their activities and ensure that they fulfill their mandates.”

¹⁶ See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 6,938 (1981), http://www.planalto.gov.br/ccivil_03/Leis/L6938.htm.

¹⁷ One of the first precedents dates back to 2000. A public civil action brought by the public prosecutor’s office in the State of Mato Grosso sought a court order to impose upon the Bank of Brazil (a public owned bank) the obligation to require proof of environmental compliance with forestry law prior to lending money to state farmers. The State’s Supreme Court overruled the district court’s ruling on behalf of the plaintiff, holding that the Brazilian legal regime lack a provision requiring the bank to oversee and monitor its clients’ environmental compliance practices. TJMT, *Apelação Cível*, 0029116-74.2000.8.11.0000 - 29116 / 2000, DES. Benedito Pereira do Nascimento, heard on 17/04/2001, published 04/06/2001.

¹⁸ Also in 2000, the Federal Circuit Court for the First Region (Brasília) held that *Caixa Econômica Federal* (“CEF”, another public owned bank) could not be held liable for damages arising out of real estate projects financed with FGTS (Government Severance Indemnity Fund for Employees, administered by CEF). The court ruled that “as a mere financial agent of public works, and being responsible neither for construction nor for the project, CEF is not supposed to be held liable for any environmental damage arising out of the performance of the works.” TRF, 1st Region, 2nd Judging Panel, AG No. 1997.01.00.064333-4, invited Rep. Judge Anthony Savio O. Chaves, j. Nov/7/2000.

¹⁹ In 2003, the same Circuit Court when analyzing a lawsuit to impose environmental liability upon BNDES - *Banco Nacional de Desenvolvimento Econômico e Social* (also a public owned bank) made it clear that the mere act of financing activities that cause subsequent environmental damage does not constitute a causal relationship capable of holding the lender accountable for the damage. This time, however, the rationale was slightly different. Instead of rejecting causal relationship between the lender and a borrower’s environmental damage, the court accepted that a financial institution can be held liable for failure in conducting a due diligence analysis prior to granting credit or, whenever a funding contract is in place, when the financial institution identifies a borrowers’ practice that is not in compliance with the environmental legal regime. Such a lack of duty could become grounds for a liability case against a lender for an environmental harm caused by the borrower. TRF 1st Region, 5th Judging Panel, AG No. 2002.01.00.036329-1 Appellate Judge Fagundes de Deus, j. Dec/15/2003.

²⁰ S.T.J.-T2, REsp 650728, Relator: Min. Benjamin Herman, 23.10.2007, Revista do Superior Tribunal de Justiça [R.S.T.J.], 02.12.2009 (Braz.).

²¹ Zambão (2010). “In 2009, the Superior Court of Justice, Brazil’s highest federal court of appeals on non-constitutional matters, issued alarming decisions in lawsuits related to environmental damage. These decisions imply that lenders can be considered indirect polluters under a strict, joint and several liability scheme, even before foreclosure.”

²² For more information about game theory, see Kreps (1990) and Mas-Colell, Whinston and Green (1995). But, as mentioned by Kreps (1990), p. 6, “Game theory by itself is not meant to improve anyone’s understanding of economic phenomena. Game theory (...) is a tool of economic analysis, and the proper test is whether economic analyses that use the concepts and language of game theory have improved our understanding.”

²³ Myerson (1991), p.1, presents that game theory is “the study of mathematical models of conflict and cooperation between intelligent rational decision-makers”.

²⁴ It means that, fixing the firm type, it is defined that $p_n^r > p_c^r$ and that $p_n^i > p_c^i$. And similarly, fixing the financial institution type, it is defined that $p_n^i > p_n^r$ and $p_c^i > p_c^r$.

²⁵ This scenario represents the legal regime of Argentina, Colombia, Peru and Turkey.

²⁶ This scenario represents the legal regime of Costa Rica, Germany, India, Mexico, Paraguay, Portugal, South Africa, the United Kingdom and the United States.

²⁷ Note that this payoff is the expected utility of the firm due to the following logic: there are two states of nature, in the first one there is an environmental harm with probability p , while in the opposite one there is no environmental harm and it happens with probability $(1 - p)$. If there is an environmental impact, the payoff of the firm is $\pi - R - w - L$; but if there is no environmental harm, the payoff of the firm is $\pi - R - w$. Thus, the total expected utility is

$$p(\pi - R - w - L) + (1 - p)(\pi - R - w),$$

which may be simplified and rewritten as $\pi - R - w - pL$.

²⁸ The explanation of this payoff follows exactly the same logic presented in the previous case, with the only difference that now there is not the compliance cost w .

²⁹ The values in the table represent the payoffs of each agent, or the expected result for each situation, depending on the strategy chosen by the two agents. Lines represent the strategies of the financial institution, and the columns, of the firm. Following the usual convention of game theory, the values are arranged as follows: before each semicolon is the payoff of the financial institution, and after each semicolon, the payoff of the firm. Thus, we may interpret the first cell as follows: when the financial institution chooses to be cautious and the firm also chooses to be cautious, the payoff of the financial institution is $R^f - c$ and that of the firm is $\pi - R^f - w - p_c^f L$.

³⁰ For a better understanding of the concepts and definitions related to game theory approach, in particular definition of a dominant strategy and Nash equilibrium concept, see Varian (2012) and Mas-Colell, Whinston and Green (1995). But in general, a strategy is considered dominant when it is the best strategy (the highest payoff) for the agent, regardless of the strategy adopted by the(s) other(s) agent(s).

³¹ In other words, this situation can also be interpreted as when the expected cost of being careful for the firm is lower than the expected cost of not being cautious.

³² This expression might be interpreted as the *compliance cost* w being lower than the difference over the return, when the firm is not cautious and when it is, plus the difference of the expected cost of environmental recovery when the firm is not cautious and when it is.

³³ This expression might be interpreted as the *compliance cost* w being greater than the difference over the return, when the firm is not cautious and when it is, plus the difference of the expected cost of environmental recovery when the firm is not cautious and when it is.

³⁴ The analysis about the payoffs in this section is similar to what was presented in the previous one. In particular, as the financial institution is strictly and jointly liable for an environmental harm, its payoff is the expected under the two states of nature. Thus, if the financial institution incurs the *precautionary cost* c , the payoff is

$$p(R - c - L) + (1 - p)(R - c) = R - c - pL,$$

otherwise, the payoff is

$$p(R - L) + (1 - p)(R) = R - pL.$$

For the payoff of the firm, the analysis is also similar, but just recall that under our second scenario the cost of environmental recovery is the financial institution's responsibility. In this sense, if the firm incurs on the *compliance cost* w , its payoff is given by $\pi - R - w$, but if the firm opts to do not adopt environmental precaution, the payoff is just $\pi - R$.

³⁵ Note that that the conditions $c < \min\{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\}$ will strongly depend on the size of the cost of repair L , which in turn is correlated with the size of the environmental impact.

³⁶ It should be mentioned that all our analysis has been done on the basis of Nash equilibrium in pure strategies. In this sense, when $\min\{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\} < c < \max\{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\}$, there is not a Nash equilibrium in pure strategies, only in mixed strategies. However, this analysis is beyond the scope of this work.

³⁷ A difference of probabilities of occurrence of an environmental damage when the financial institution chooses to not be cautious and when it chooses to be.

³⁸ At least, smaller than the isolated probability p , and obviously smaller than 1.

³⁹ It might also be rewritten as $w < R^i - R^r$.

⁴⁰ They would be: when both agents adopt precautionary measures, when both do not adopt, or when one agent adopt and the other does not.

⁴¹ This conclusion comes straight from the comparison between the constraint $w < (R^i - R^r) + (p^i - p^r)L$, when the firm is responsible for the repair of the environmental harm, and $w < (R^i - R^r)$, when the financial institution is the agent responsible for repairing the environmental damage. Notice that when the *compliance cost* w is in the range given by $(R^i - R^r) < w < (R^i - R^r) + (p^i - p^r)L$, in the first scenario the firm chooses to be cautious, while in the second scenario the firm chooses not to be. This comparison reflects that this policy to transfer the liability to the financial institution does not change its strategy, while it potentially discourages the firm to adopt precautionary measures.

⁴² While outside the scope of this paper, insurance might involve the moral hazard problem.

⁴³ The type of the firm is associated with the probability to cause an environmental damage, so that when the firm is careful, it implies that the probability of an environmental harm happens is p^r , while when the firm is not cautious, this probability is p^i , such that $p^r < p^i$.

⁴⁴ If the regulator has the intention to encourage the financial institution to be cautious, it is possible to achieve this goal only by (controlling and) imposing a very high *cost of repair*. It would be a very effective public policy. In other words, if the cost of repair is determined by a regulator, it is just necessary that remediation costs is sufficiently high enough in order to create incentive to the financial institution choose to act cautiously.

⁴⁵ The same observation could be done: to create incentives for the financial institution to adopt precautionary measures would be developing an accurate remediation rule that allows a regulator to define a high cost of recovery.

⁴⁶ Comparing this equilibrium with the equilibrium under our second scenario when $w < R^i - R^r$ and $c < \min\{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\}$, it is possible to identify that under this third scenario it is easier to satisfy the necessary conditions for the equilibrium to be that both the firm and the financial institution adopt precautionary measures.

⁴⁷ These conditions will ensure that $w < R^i - R^r$ and $c < \min\{p_n^r L, p_n^i L\}$.

⁴⁸ It is outside the scope of our work to analyse aspects of reputation of the agents.

⁴⁹ An investment fund has three main agents: the administrator, the manager and the shareholders. The administrator constitutes the fund, approves its regulations and disseminates information on investment to shareholders. The manager buys and sells the fund's assets, according to the investment policy and its regulation. The shareholder is the investor, who owns (or has rights to) the assets and associated income. When investing in a fund, the shareholder accepts its operating rules.

⁵⁰ "Private equity consists of investors and funds that make investments directly into private companies or conduct buyouts of public companies that result in a delisting of public equity. Capital for private equity is raised from retail and institutional investors, and can be used to fund new technologies, expand working capital within an owned company, make acquisitions, or to strengthen a balance sheet" (<http://www.investopedia.com/terms/p/privateequity.asp>)

⁵¹ "An investment vehicle that is made up of a pool of funds collected from many investors for the purpose of investing in securities such as stocks, bonds, money market instruments and similar assets. Mutual funds are operated by money managers, who invest the fund's capital and attempt to produce capital gains and income for the fund's investors". (<http://www.investopedia.com/terms/m/mutualfund.asp>)

⁵² Integration of ESG Aspects in the Companies Assessment, Itaú Asset Management.



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