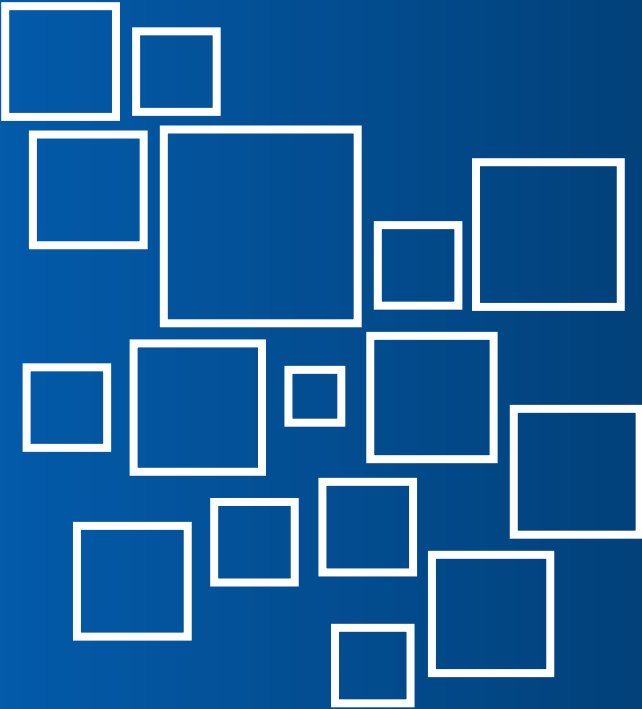


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# ECONOMIC ANALYSIS OF LAW REVIEW

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# Economic Analysis of Law Review

## Lender's Environmental Liability in Brazil: How Much is Too Much?

*Responsabilidade civil ambiental das Instituições Financeiras e dos Investidores: quanto é demais?*

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### RESUMO

Este artigo tem por finalidade analisar a responsabilidade civil ambiental no caso brasileiro e compará-lo ao modelo americano que tem por base a Lei de Responsabilidade, Compensação e Resposta Ambiental Abrangente ("CERCLA"). Através deste trabalho pretende-se demonstrar que a alocação da responsabilidade de modo estratégico pode ser uma ferramenta eficaz para os agentes financeiros agirem preventivamente em empreendimentos de todos os setores econômicos. Para ilustrar esta tese, foi proposto um modelo, baseado na Teoria dos Jogos, no intuito de universalizar alguns conceitos básicos, independentemente do modo como o sistema de responsabilidade ambiental está construído. Considerando que por vezes é impossível a reparação da área degradada, as ações de fomento à prevenção dos danos devem ser o principal objetivo de qualquer regramento jurídico, tanto nacional como internacional. Então, por meio da Teoria dos Jogos aqui desenvolvida, pretendeu-se responder a questão posta no título deste artigo.

**Palavras-chave:** Responsabilidade civil ambiental. Equilíbrio de Nash.

**JEL:** K0, K41

### ABSTRACT

This manuscript takes the Brazilian example and compares it to the U.S example with the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") to demonstrate that when the right incentive is in place, Lender's Environmental Liability ("LEL") can be an effective tool to promote precaution among all sectors of the economy. To illustrate our premise we created a model based on Nash's Game Theory in an attempt to universalize some basic concepts regardless of how a domestic liability system is construed. Environmental harm and degradation is often irreparable to the status quo. Therefore, our assumption is that precaution is the main objective of any environmental international and domestic legal regime. By using Nash's Game Theory we aim at answering the question presented in the title of our manuscript: how much is too much environmental liability for a financial institution to bear?

**Keywords:** Lender environmental liability; Nash equilibrium.

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## 1. Introduction

Lender's environmental liability ("LEL") in Brazil was instituted as a general concept 33 years ago into the 1981 National Environmental Policy Act ("NEPA"). A significant gap between law and practice prevented implementation of LEL in Brazil, which became bigger over time. Failure in compliance and enforcement ("C&E") resulted in a system focused on strict and joint liability. Brazilian environmental policy went from the complete absence of LEL to an attempt of instituting full LEL.

Meanwhile, at the international (and even national) level the debate over the role of financial institutions in promoting sustainable development emerged strong. LEL is one aspect of such debate. Influenced by the aforementioned failure in C&E, practitioners and academics in Brazil started to turn to LEL indistinctively in recent years. Social costs, legal inefficiencies and contradictions are directly linked to the use of LEL without carefully construed criteria.

The United States provides for a good comparative case study. LEL was broadly construed by a judicial opinion on *United States v. Fleet Factors Corp.* in 1990. Under the category of "owner" 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, in 1992 the U.S. Environmental Protection Agency ("EPA") regulated the interpretation of CERCLA, setting standards and criteria to implicate lenders. In 1996, after extensive and long debates over how far could reach a lender's liability, a set of objective criteria were incorporated into law when Congress passed the Asset Conservation, Lender Liability Act ("ACLLA").

This manuscript takes the Brazilian and the American examples to examine the degree of liability suited to promote and enhance financial institutions' environmental accountability. By comparing distinct legal traditions and systems, in two major economies, our aim is to extract common grounds for a model that could be replicated in different legal regimes.

In particular, we propose a legal standard for LEL using the Game Theory in an attempt to demonstrate that a strategic lender's and firm's behavior towards more precaution depends on a carefully designed LEL police. To illustrate it, we consider a model that describes the relationship between a financial institution and a borrower firm under three different scenarios. In the first one, which corresponds to the Brazilian situation before lender's liability was considered, the financial institution is never liable for the environmental damage and the firm is the agent who should bear all the costs of repairing the harm. The second scenario is the opposite of the first, where the financial institution is strictly and jointly liable for the environmental harm incurred by the firm production. It illustrates the situation created by the recent case law from the highest Brazilian Court of Appeals in 2009. And finally, in our third scenario, we propose an intermediate LEL policy where the financial institution is only liable when it does not adopt any precautionary measures.

Observe that our assumption is that precaution is the main objective of any environmental international and domestic legal regime. Thus, the results of our Game Theory<sup>4</sup> model explicitly illustrate that it should be carefully analyzed the LEL measures adopted to not create the wrong incentives or incentives different from the original intention to increase precaution.

<sup>4</sup> It is important to highlight that the balance results can differ depending on the legal system. Consequently, those results might reverberate in different environmental impacts.

## 2. Fundamentals of LEL

LEL translates into the possibility of holding a financial institution accountable for an environmental harm incurred by a borrower client. Distinct legal traditions and systems treat liability regimes differently. Usually, harm, causal relationship and fault / guilty ("negligence") are necessary elements for a legal system to hold an offender liable.<sup>5</sup>

In environmental law quite often negligence is dispensable. The rationale is construed so that those ("risk takers") undertaken actions (or inactions) that may subject someone or something to a potential harmful situation must undertake all necessary measures to internalize the maximum degree of care. If negligence is not required, the risk taker has no possible liability defense regarding her/his conduct.<sup>6</sup> That is the so-called strict liability regime, as opposed to the negligence regime applied to different areas of law.<sup>7</sup>

Different legal regimes also present diverse grounds upon which they construe how far in time (or in space) a risk taker's action (or inaction) can be taken in order to build the causal relationship necessary under a liability rule. The mere involvement, even if indirectly, with a harm might be a cause for causal relationship to be established or, to the contrary, a close and more direct involvement might be required depending upon the legal regime at stake.

When a legal regime aims at targeting financial institutions, a more relaxed approach to causal relationship must be construed in order for the courts to being able to hold lenders accountable for an environmental damage caused by a borrower company or individual. And that is because a financial institution's action (or inaction) is not necessarily close in time and/or in space to an environmental harm. In this particular subject, that is how active judicial interpretation is indicating as the proper way to apply environmental liability under the Brazilian legal regime. The reasons for that are manifold as presented in the following sessions.

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5 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."

6 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."

7 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."

### 3. The Environmental Liability to LEL in Brazil

The Brazilian National Environmental Policy Act (“NEPA”) enacted in 1981 formally inaugurated the country’s environmental legal framework.<sup>8</sup> Many other laws, rules and regulations followed NEPA, which constitutes a fundamental interpretative pillar for the entire regime. But since NEPA, Brazil has been struggling with promoting compliance and enforcement.<sup>9</sup>

The Public Civil Action Act (“PCA” - Law 7,347) was enacted in 1985.<sup>10</sup> PCA was a landmark prosecutorial enforcement mechanism empowering the Public Prosecutor’s Office, Non-Governmental Organizations (“NGO”), the federal, states and municipal governments and public companies to sue on behalf of society for environmental compliance and enforcement. Soon thereafter the 1988 Constitution (“FC/88”) of the newly democratic nation devoted a whole chapter dealing with the environment.<sup>11</sup>

Ten years later, the Environmental Criminal Act (“ECA”) completed the prosecutorial enforcement framework.<sup>12</sup> Throughout the 1990s and 2000s many different statutes were enacted on issues ranging from water,<sup>13</sup> conservation units<sup>14</sup> and biosafety<sup>15</sup> to waste management,<sup>16</sup> sanitation,<sup>17</sup> forests<sup>18</sup> and even climate change.<sup>19</sup> In addition, a constitutional provision allowing for states and

8 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](http://www.planalto.gov.br/ccivil_03/Leis/L6938.htm).

9 See McAllister (2008): “While Brazilian environmental laws are strong on the books, environmental enforcement has been limited in its effectiveness.”

10 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 7,347 (1985), [http://www.planalto.gov.br/ccivil\\_03/leis/17347orig.htm](http://www.planalto.gov.br/ccivil_03/leis/17347orig.htm). For a comprehensive study about the Brazilian Public Civil Action Law, see Gidi (2003).

11 The Brazilian Constitutions were enacted in chronological order as follow: March 25, 1824; February 24, 1891; July 16, 1934; November 10, 1937; September 18, 1946; January 1, 1967 and October 5, 1988. See generally Silva (2008). (detailing 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](http://www.planalto.gov.br/ccivil_03/Constituicao/principal.htm) (last visited Apr. 20, 2010). 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#mozTocId30141> (last visited May 3, 2011)

12 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 9,605 (1998), [http://www.planalto.gov.br/ccivil\\_03/leis/19605.htm](http://www.planalto.gov.br/ccivil_03/leis/19605.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.”

13 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 9,433 (1997), [http://www.planalto.gov.br/ccivil\\_03/leis/19433.htm](http://www.planalto.gov.br/ccivil_03/leis/19433.htm)

14 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 9,985 (2000), [http://www.planalto.gov.br/ccivil\\_03/leis/19985.htm](http://www.planalto.gov.br/ccivil_03/leis/19985.htm)

15 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 11,105 (2005), [http://www.planalto.gov.br/ccivil\\_03/\\_ato2004-2006/2005/lei/111105.htm](http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2005/lei/111105.htm)

16 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 12,305 (2010), [http://www.planalto.gov.br/ccivil\\_03/\\_ato2007-2010/2010/lei/112305.htm](http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/112305.htm).

17 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 11,445 (2007), [http://www.planalto.gov.br/ccivil\\_03/\\_ato2007-2010/2007/lei/111445.htm](http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2007/lei/111445.htm).

18 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 12,651 (2012), [http://www.planalto.gov.br/ccivil\\_03/\\_ato2011-2014/2012/lei/112651.htm](http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/112651.htm).

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municipalities to legislate over environmental issues was responsible for thousands of different rules and regulations nationwide on all aspects of environmental protection.<sup>20</sup>

In a little over three decades since the 1981 NEPA, Brazil managed to create one of the most comprehensive environmental legal frameworks in the world. Notwithstanding, the country was (or still is) struggling to bridge the gap between laws on the books and their effective implementation into practice.<sup>21</sup> Reasons for such a gap are manifold. Poorly structured environmental agencies is one important reason.<sup>22</sup>

Without a proper system of enforcement deriving from environmental agencies, public prosecutors and the Judiciary started an active prosecutorial campaign. A wave of well-intentioned prosecutorial and judicial activism<sup>23</sup> led to a reinterpretation of how consolidated concepts of the law should be read in order to broadening the range of stakeholders that could be held potentially liable for environmental recovery costs. Of particular importance to the scope of this manuscript, two concepts of law under attack by this environmental prosecutorial movement are: judicial deference and liability.

Judicial deference never enjoyed the same status in Brazil as it does in the U.S., for instance, due to the Chevron doctrine applied in American Law.<sup>24</sup> Under Brazilian Administrative Law, a

19 See Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, Brazilian Law 12,187 (2009), [http://www.planalto.gov.br/ccivil\\_03/\\_ato2007-2010/2009/lei/l12187.htm](http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/lei/l12187.htm).

20 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://www.georgetown.edu/pdba/Constitutions/Brazil/english98.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."

21 McAllister (2008).

22 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."

23 Brubaker (1984), p. 504. "The program of judicial activism holds that courts should void the decisions of the other branches of government whenever they offend the judges' own sense of principles required by the Constitution, even though the decisions of the other branches were backed by admittedly reasonable understandings of the Constitution."

24 Findley and Brubaker (2000), p. 16. "The Supreme Court has also emphasized an additional reason for deferring to administrative agencies on statutory interpretation issues. In *Chevron U.S.A., Inc. v. NRDC* (S.Ct.1984), (...), the Court stressed that policy choices should be made by the political branches of government, rather than the courts. Where Congress has delegated regulatory authority to an administrative agency, that agency should decide upon public policy in the area, not federal judges. Of course, the agency must act within the scop (Melo, 2012) (Lazarus, 2004)e of the authority delegated by Congress. Thus, the Court still plays an important role in assuring that the agency decision is consistent with the statutory mandate. Nevertheless, while Chevron does not give agencies unlimited discretion with respect to statutory interpretation, their decisions are entitled to a high level of deference."



minimum standard existed in a concept known as the presumption of legality of an administrative decision and the separation of powers' principle as a deterrent to the Judiciary' power of reviewing indistinctively the merits of an administrative act.<sup>25</sup> However, when the environment is at stake, Brazilian courts may ignore those standards of review.

The second area of law being reinterpreted by active judicial decisions is environmental liability. Causation in environmental harm is often difficult to establish. Environment harm is not necessarily close in time and in space to the responsible party.<sup>26</sup> An even when the harm is close to a polluter, a valid permit, third party defense or an act of God could constitute valid arguments against holding someone responsible for lack of causation even under a strict liability regime.

In Brazil, however, the Superior Court of Justice has asserted that under environmental law, strict liability shall apply in its full risk extent.<sup>27</sup> That means no permit shield, third party or act of God defense. In other words, causation as almost an inexistent standard for holding a responsible party liable. Something similar to "status" liability as built into the rationale of the judicial ruling on the U.S. case of *New York v. Shore Realty Corp.*<sup>28</sup>

Based on the above described scenario of how and why environmental liability evolved in Brazil, an active approach to the topic did not take long to construe a rationale in which financial institutions could also be held liable. The development of such a topic is causing a great deal of uncertainty. The consequences are yet to be determined, but the U.S. example provides for a good paradigm.

#### 4. LEL in Brazil and the Concept of Indirect Polluter

Article 12 of the Brazilian NEPA states that public financial institutions and public subsidies entities shall make credit conditional upon a verification of compliance with environmental norms. Article 3o, item IV, defines a polluter as anyone who directly or indirectly contributes to pollution.<sup>29</sup> Those aforementioned NEPA Articles (12 and 3, IV) do not mention a lender can be hold liable for an environmental harm imputable to a borrower client. The language also limits the obligation of requiring a valid permit to financial institutions owned by the government.

Notwithstanding, based on those two NEPA Articles, public prosecutors started to make a case arguing that all financial institutions can be held strictly and jointly liable for an environmental harm.<sup>30</sup> Before that, the possibility of implicating a lender was a topic restricted to very few law review articles. These line of academic work and prosecutorial approach led Brazil, in three and a half decades, from a system of no liability whatsoever to financial institutions to a possibility of full, strict and joint lender's environmental liability.

25 One of the most important and influential Brazilian administrative law scholar on the subject is Celso Antônio Bandeira de Melo.

26 See Lazarus (2004), p. 5, "Addressing the complexity of the elements time and space for environmental law making".

27 (Miller & Craig N., 1996)

28 *New York v. Shore Realty Corp.* United States Court of Appeals, Second Circuit, 1985. 759 F. 2d 1032. The Court imposed "...strict liability on current owners and operators of contaminated property regardless of whether they played any part in causing the relevant contamination. This is sometimes referred to as 'status' liability, because the current owner is deemed liable due merely to its status as such." Miller and Johnston (1996).

29 Reis (2011) Article 3, item IV, defines a polluter "as natural person or public/private legal entity, directly or indirectly liable for an activity that causes environmental degradation."

30 Reis (2011) p. 469, reporting recent lawsuits filed by the Public Prosecutors Office  
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The Brazilian legal debate over LEL was fueled by the growing internationally recognized importance of the bigger topic of financial institutions' accountability.<sup>31</sup> Throughout the 1990s accountability over projects supported by the World Bank worldwide and the launch of the United Nations Environmental Programme Financial Initiative ("UNEP FI") helped promote the debate over the global financial systems' design and the reconciliation with the sustainability agenda. In the 2000s the Equator Principle initiative constituted another important landmark in setting standards for member institutions before lending to projects over US\$ 10 million.<sup>32</sup> Some domestic initiatives in Brazil throughout the 1990s and 2000s went towards the same direction.<sup>33</sup>

The international debate on financial institutions' accountability and growing domestic scholarly work about LEL constituted the basis from which lawsuits and few judicial decisions built the argument to transfer to lenders liability and, consequently, a duty to oversee and monitor how a borrower was investing the borrowed money. All of the sudden, the lack of environmental agencies' infrastructure could be solved by using "unlimited" resources flowing from financial institutions.

Few cases against financial institutions were trialed in regional state and federal circuit courts around the country throughout the 2000s. Those cases involved public owned banks: *Public Prosecutor v. Bank of Brazil* (2000);<sup>34</sup> *Public Prosecutor v. Caixa Econômica Federal* (2000);<sup>35</sup> *Brigitte Barreto e outros(as) v. Banco Nacional de Desenvolvimento Econômico e Social ("BNDES")*.<sup>36</sup> On those few occasions courts ruled that no causation could be established solely on grounds of NEPA's definition of indirect polluter.

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31 Yet the focus was much more on how to increase accountability in the financial system towards a green economy broadly considered and less on LEL narrower considered. The later was one piece to the bigger puzzle of how to use the financial system's power to reach out to all sectors of the real economy as an additional support to governmental efforts in trying to push forward the sustainability agenda.

32 Equator Principles: <http://www.equator-principles.com/>.

33 The 1995 Green Protocol and specific rules and regulations imposing duties upon financial institutions prior to granting credit to borrowers are examples of how the debate evolved outside courtrooms.

34 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.

35 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.

36 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, 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.



In 2009 though judicial interpretation of LEL in Brazil took a significant turn. 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.”<sup>37</sup>

The Superior Court of Justice’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. In more plain words, that means each party, borrower or lender, can be independently liable for the full extent of the damages.<sup>38</sup>

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 in noncompliance with environmental rules and regulation. As of today, except for the Superior Court of Justice precedent, there is not an observable trend in precedents yet. LEL in its full extent as indicated in the aforementioned 2009 Superior Court of Justice precedent is still speculative.

If such speculation becomes a trend in judicial opinion throughout the country, because financial institutions always (or for the most part) have deeper pockets than those of the borrowers, the chances tend to be high a prosecutor will favor suing a lender without even bothering to bring the borrower as a co-defendant. Before such judicial policy can be implemented, we investigate what are some of the potential associated non-intended consequences of such full risk liability for financial institutions. We argue financial institutions might not have the proper incentive to internalize any duty of care in case they bear full liability.

The U.S. example with CERCLA provides lesson to be learned. The following topic describes how the debate evolved in the U.S. from a regime of full liability to another (Zambão, 2010) (Lee, 1994) establishing standards of management and control before a financial institutional can be held liable for hazard wastes sites. Albeit different in nature, scale and extent of the two liability regimes (in Brazil and in the U.S.), the parallel between the two systems is useful to demonstrate that well-intentioned judicial policy done in a case-by-case basis can generate unintended negative consequences. In the U.S., for instance, credit restriction was linked to the initial CERCLA interpretation policy.

37 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.).

38 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.”.

## 5. Lessons From the U.S. Experience With LEL for Policymakers

CERCLA was enacted in 1980 in response to major contamination sites being found around the country during the 1970s.<sup>39</sup> CERCLA instituted a Superfund by imposing a tax on chemical and petroleum industries.<sup>40</sup> The statute also allowed for broad federal authority to intervene and manage listed Superfund sites. One of its 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. Financial institutions were not expressly mentioned in the law as PRP.

The major liability risk for financial institutions lied on the first category of the definition: “current owners and operators of contaminated areas”.<sup>41</sup> Notwithstanding, such a risk was mitigated by CERCLA’s original language excluding from this classification of PRP for the purpose of liability those not involved in the management of the activity. Therefore, when a party had interests in the property (indicia of ownership), if such interest was limited to securing its investment, that party would not fall under the definition of a PRP.<sup>42</sup>

LEL became a reality ten years after CERCLA was enacted, in 1990, with the ruling on *United States v. Fleet Factors Corp.*<sup>43</sup> 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. 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 inference that it could affect hazardous waste disposal decisions if it so choose”.<sup>44</sup>

The court’s interpretation was a major shift on the degree of involvement needed for a financial institution to face liability. Since *United States v. Fleet Factors Corp.* financial institutions did no longer need an active involvement on the daily operations of the funded activity to be consid-

39 Lee (1994). “In 1980, Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to address the environmental and health dangers resulting from unfettered disposal of hazardous wastes, and to combat increasing cleanup costs.”

40 Reis (2011), p. 461. “The enactment of CERCLA established the levy of a tax on chemical and petroleum industries in order to finance a fund in response to the environment degradation scenario (Superfund). Over five years, 1.6 billion dollars were collected and transferred to the fund.”

41 Frye. (1998) “The Eleventh Circuit concluded that a secured creditor could incur liability as an “owner” of a facility: ‘by participating in the financial management of a facility to a degree indicating a capacity to influence the corporation’s treatment of hazardous wastes. It is not necessary for the secured creditor to involve itself in the day-to-day operations of the facility in order to be liable . . . nor is it necessary for the secured creditor to participate in management decisions relating to hazardous waste. Rather, a secured creditor will be liable if its involvement with the management of the facility is sufficiently broad to support the inference that it could affect hazardous waste disposal decisions if it so chose.”

42 Miller and Johnston (1996), p. 634, “The issue of lender liability under CERCLA arises from § 101(20)’s definition of “owner or operator,” which from the outset has provided an exemption for those who won property to protect their security interests, so long as they refrain from “participat[ing] in the management” of those facilities.”

43 Frye (1998) “Fleet Factors Corporation advanced funds to a cloth printing facility against the assignment of the printer’s accounts receivable, with a security interest in the textile facility and all of its equipment as additional collateral. After the cloth printer filed for bankruptcy, Fleet Factors continued to collect on the accounts receivable and ultimately foreclosed on its security interest in some of the manufacture’s inventory and equipment. The United States Environmental Protection Agency (EPA) subsequently found 700 drums containing toxic chemicals at the closed facility and incurred costs of nearly \$ 400,000 in responding to environmental threats at the plant. The government sued the principal officers and stockholders of the textile printing company, as well as Fleet Factors Corp., to recover these costs.”

44 *United States v. Fleet Factors Corp.*, 901 F.2d 1550 (11th Cir. 1990), cert. denied, 498 U.S. 1046 (1991).

ered a PRP under CERCLA. This leading case created a concrete fear that funding could be restricted in the years to follow.<sup>45</sup>

In order to mitigate the negative impacts on credit activities, in 1992 the U.S. Environmental Protection Agency (“EPA”) sought to clarify the LEL rule stated in *United States v. Fleet Factors Corp.* through regulation. EPA’s regulation attempted to create objective criteria to set standards of care and involvement financial institutions had to meet in order to avoid liability. Soon thereafter EPA’s regulation was overruled by the 1994 *Kelley v. Environmental Protection Agency*. The court found EPA did not have the power to interpret the meaning of a PRP.<sup>46</sup>

A year later, EPA took another shot at trying to stabilize the funding market shaken by the broad interpretation of a PRP. Together with the U.S. Department of Justice (“DOJ”) both agencies stated that they would no longer pursue liability against lenders not directly involved in the daily operations of a contaminated site. EPA and the 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.

A more stable environment was possible in 1996 when Congress passed the Asset Conservation, Lender Liability Act (“ACLLA”). Prior to ACLLA, financial institutions depended on the will of EPA/DOJ of not pursuing them if the established threshold of involvement was not met. ACLLA then adopted EPA/DOJ’s criteria set forth in their 1995 joint statement (documenting their aforementioned will), which, in turn, resembled very much those criteria established in the 1992 EPA’s regulation. ACLLA stated in plain language which activities did not characterize “participation in the management activity”.<sup>47</sup>

In practical terms, a policy was put into place to set objective criteria to allow for a liability defense for financial institutions. Even though different from why and how the LEL debate is evolving in Brazil, the U.S. example serves a useful paradigm to demonstrate distinct behaviors and consequences from a scenario without liability whatsoever to one with full liability. Credit restriction was one verifiable (and important) social cost created by a policy of full liability.<sup>48</sup> When middle ground became part of a third policy, one allowing for objective criteria, a duty of care was internalized by those financial institutions meeting those standards set forth by law. Instead of simply not funding, lenders became aware of how much care was necessary for them to avoid the risk of being held liable.<sup>49</sup>

45 Frye (1998) “Fleet Factors generated extensive criticism of the government’s aggressive pursuit of lenders and the very real concern that commercial transactions were being impeded or avoided because of excessive concern about environmental liability by lenders.”

46 Reis (2011), p. 462

47 Frye (1998) “[I]n 1992 the EPA promulgated a rule interpreting CERCLA and describing a broad range of practices in which lenders could engage in and still maintain their “secure creditor” exemption from CERCLA liability, according to the EPA. Ultimately, the principles expressed in that rule were incorporated into CERCLA and the Resource Conservation and Recovery Act (RCRA) in 1996, which substantially reduced, although did not eliminate, lender concerns about direct liability under CERCLA or RCRA for normal lending and workout activities.”

48 A study conducted by former Brazilian Central Bank official, Maria de Fátima C. Tosini, referenced research from the U.S. Environmental Bankers Association demonstrating a 46% reduction in loans for projects and activities that imposed environmental risks. TOSINI, Maria de Fátima Cavalcante. *Risco Ambiental para as Instituições Financeiras*. Annablume: 2007, p. 21/22.

49 Miller and Johnston (1996), p. 634, “In response to these decisions (particularly Fleet Factors), the financial community galvanized support for legislative action limiting, or even eliminating, lender liability under CERCLA. Although EPA had been the prevailing party in both Fleet Factors and Maryland Bank, it immediately began to back away from the approaches reflected in those decisions in an effort to forestall legislative action. EPA’s damage control activities EALR, V. 6, n° 1, p. 128-151, Jan-Jun, 2015

Both the U.S and the Brazilian examples although different in nature, concept and scale of each country's environmental liability regime seem to suggest extreme policies are not efficient to provide for greater precaution. Without liability, banks just do not have the proper incentive to collaborate with environmental policies. Under a broad and recently universalized accountability trend towards a green economy, that is simply no longer desirable.

On the other hand, however, with full and indistinctively liability, the U.S. and the Brazilian model seem to suggest that financial institutions do not have the proper incentive also to internalize the duty of care the green economy is claiming for them to adopt. To the contrary, such a policy is demonstrating some perverse consequences. Credit restriction, for instance, is one likely and unfortunate outcome. Greater environmental precaution, on the flip side, unfortunately, is not achievable. In other words, that means less money and the same (or even more) level of environmental risk.

From the Brazilian and the U.S. examples we attempt to apply Nash's Game Theory in the next topic as an attempt to universalize a LEL model regardless of the legal tradition or legal system such policy is introduced.<sup>50</sup> Our main objective is to demonstrate where lays equilibrium under three different scenarios: financial institutions are never liable; financial institutions are always liable; financial institutions can avoid liability by internalizing a certain degree of care.

## 6. The Economic Model: How Much is too Much?

In this section we present an economic model to describe some possibilities about the relationship between a financial institution and a borrower firm, in order 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.

We need to recall that the Game Theory is an approach to studying the strategic decision of the agents.<sup>51</sup> It is largely used in any situation that involves two or more agents, where each one has a set of possible strategies, but we are interested in identifying the (Nash-)equilibrium that is precisely characterized by adopting the best strategy for each agent. The agents for the purpose of this paper are the financial institution and the borrower. We aim at demonstrating how those agents might behave under different scenarios of LEL.

Our economic environment is a credit market in which there is a firm that takes 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  $\pi$ . However, this production might cause environmental impact. In particular, we consider that the production of the firm might cause an environmental damage with probability  $p$ , and might not cause with complementary prob-

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culminated in the issuance of an administrative rule specifying in great detail EPA's modified view of the security-interest exemption. (...) ...it (...) ultimately served as a template for the legislative relief that Congress provided that same community four years later."

50 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."

51 Myerson (1991), p.1, presents that the Game Theory is "the study of mathematical models of conflict and cooperation between intelligent rational decision-makers".

ability  $(1 - p)$ . Notwithstanding, 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.

Worth noticing, however, that 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 (in other words, precautionary measures) and act responsibly, which implies a compliance cost of  $w$  monetary units, or the firm might choose to act environmentally irresponsible, by poorly managing its operational risk towards the environment. Under this scenario, 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, such that the financial institution can recognize if the firm is responsible or not, and charge a lower interest rate if the firm is responsible. Thus, in particular, we shall consider that  $r^r$  is the interest rate when the firm is more responsible and  $r^i$  when the firm is less responsible, such that the interest rate charged from the firm that adopts precautionary measures is smaller than the interest rate charged from the firm that does not adopt, that is,  $r^r < r^i$ , which immediately implies for the financial institution that  $R^r < R^i$ .

Also note that the probability  $p$  of environmental damage is also affected by the type of the firm, that is, it 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,  $p^i$ , that is,  $p^r < p^i$ .

In the same direction, the financial institution may incorporate environmental risk management analysis into its decision process prior to granting any loans and, therefore, act responsibly. Just like what happens with the responsible firm, under this scenario, the financial institution incurs on a precautionary cost of  $c$  monetary units in order to inspect the production in the sense to try to prevent a possible environmental damage, or may not be careful and does not incur in any cost. Similarly, the type of the financial institution is also common knowledge to all the agents and also interferes in 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,  $p_n$ , regardless of the firm type.<sup>52</sup> Formally, it implies that  $p_c < p_n$ .

It should be highlighted, however, that even though when the firm and/or the financial institution are careful, meaning they both internalize precaution measures and incur on costs, there is still the possibility of an environmental damage. Only what happens is that precautionary measures taken by both agents or taken by one of them decrease the likelihood of an environmental harm.

After we have briefly described the economic environment of our model, we shall now analyze the decisions of both agents – firm and financial institution – under the above-mentioned three different standards of liability: Inexistent LEL; Strong Potential LEL; and Low Potential LEL.

In the first scenario, the financial institution that offered the finance cannot be responsible for the environmental damage, and the firm is the only agent who should bear the cost of repair  $L$ . Causation cannot be established in order for a financial institution to be held liable. For the purpose of country analysis, this paper refers to this scenario as Inexistent LEL to reflect a country's legal system where causation, and therefore LEL, cannot be imposed upon a lender.<sup>53</sup>

On the flip side, the second scenario is that of a lender being fully liable for an environmental harm incurred by a borrower client. This paper refers to this scenario as Strong Potential LEL.

<sup>52</sup> It means that, fixing the firm type, it is defined that  $p^r_n > p^r_c$  and that  $p^i_n > p^i_c$ . And similarly, fixing the financial institution type, it is defined that  $p^i_n > p^r_n$  and  $p^i_c > p^r_c$ .

<sup>53</sup> Recall that this scenario represents the legal regime of Argentina, Colombia, Peru and Turkey. EALR, V. 6, n° 1, p. 128-151, Jan-Jun, 2015



Under such scenario, the financial institution is always facing liability for the finance granted, regardless whether it internalized or not a duty of care. It is worthy mentioning that the only country arbitrarily included under this category is Brazil for reasons stated previously.<sup>54</sup> Thus, if an environmental damage  $L$  is incurred by the borrower, the financial institution has no defense against a joint, several and strict liability claim.

And finally, the third scenario illustrates an intermediate situation in which the financial institution is only responsible to recovery the environmental damage when it fails to adopt precautionary measures in assessing the environmental risk of the financed project. In other words, this is the scenario of Low Potential LEL, in which a financial institution can only be held liable when it fails to demonstrate a duty of care necessary prior to lending the money.<sup>55</sup> The rationale lies on the fact that 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 in the 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) throughout all sectors of the economy regardless of the legal system at stake.

#### a. Financial Institution Does Not Bear Liability (Inexistent LEL)

We start considering the scenario under which 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 one may be careful or not.

We shall note that, as each agent has two different strategies (be careful and adopt environmental precautionary measures, or not), we have four different situations that 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). We are calling the financial institution's precautionary measures as "precautionary cost  $c$ ", and the firm's duty of care as "compliance cost  $w$ ". 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. And finally, in the last situation both agents choose not to act to minimize the probability of an environmental damage.

Under this first scenario in which the firm is the agent responsible to bear full liability costs if an environmental harm happens, when the financial institution chooses not to be careful, the lender's payoff is given only by the return  $R$  associated with the finance. But when the lender 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 not caution is given by  $\pi - R - w - pL$ ,<sup>56</sup> which is the gross profit  $\pi$  mi-

<sup>54</sup> The potential legal regime introduced in Brazil by the 2009 STJ precedent described in Section 3.1 above.

<sup>55</sup> As mentioned in the Section 3, this third scenario represents the legal regime of United Kingdom, Portugal, Germany, Mexico, India, South Africa, Costa Rica and Paraguay.

<sup>56</sup> 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 the environmental impact, the payoff of the firm is  $\pi - R - w - L$ ; but

nus 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 do not be careful is only  $\pi - R - pL$ ,<sup>57</sup> since under this situation the firm does not incur in the compliance cost  $w$ .

It is worth to recall that the financial institution can recognize the type of the firm (and charge a lower interest rate if the firm is more responsible) and that the probability  $p$  of the environmental harm depends on both agents' types. Also observe that it is a game of complete information, which means that the types of agents are common knowledge and the agents' payoffs are indexed by their types.

After this brief explanation, Table 1 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 who should bear all expected recovery costs due to an environmental damage.<sup>58</sup>

Table 1

|                       |                                  | 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,<sup>59</sup> which is not to be cautious and acts without environmental precaution. For a better understanding we shall note that, no matter which is the firm's strategy, the financial institution's payoff when does not adopt environmental precaution,  $R$ , is always higher than when it adopts,  $R - c$ . Formally, it means that regard-

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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  $\pi - R - w - pL$ .

<sup>57</sup> 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*  $w$ .

<sup>58</sup> 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 the 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  $R^r - c$  and of the firm is  $\pi - R^r - w - p_c^r L$ .

<sup>59</sup> 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).

less the firm type, the financial institution is always better off not incurring on the precautionary cost  $c$ , since

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

under this first scenario. In other words, when the scenario is Inexistent LEL, the financial institution has as a dominant strategy that is not to undertake precautionary measures.

Meanwhile, the identification of the best strategy for the firm depends on the parameters of the economy. In particular, it is observed that, 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, which formally can be translated as

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

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.

Thus, 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,<sup>60</sup> 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 that<sup>61</sup>

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

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,

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

or alternatively, if the *compliance cost* is such that<sup>62</sup>

<sup>60</sup> 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.

<sup>61</sup> This expression might be interpreted as the compliance cost  $w$  is 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.

<sup>62</sup> This expression might be interpreted as the compliance cost  $w$  is 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.

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

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, it is worth highlighting that in both equilibria the financial institution has a dominant strategy of not being cautious. In other words, 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, that 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 modeling such a scenario falls outside of the scope of this paper and is recognized herein as a topic that should be further elaborated.

### b. Financial Institution Bears Full Liability (Strong Potential LEL)

Under our second 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 also 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, such that 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 quite similar to the first case, the main difference is only that the expected cost of environmental recovery,  $pL$ , must be always incurred by the financial institution rather than by the firm.<sup>63</sup> Thus, under this new assumption, Table 2 represents the agents' payoffs and strategies for this second scenario.

Table 2

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

<sup>63</sup> 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 on 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  $\pi - R$ .

Similarly, analyzing 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,

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

Observe that these conditions above 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 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 careful, then the financial institution chooses the strategy of adopting precautionary measures.<sup>64</sup> Otherwise, which means

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

the financial institution chooses to do not take precautionary measures since it is extremely costly.<sup>65</sup> However, the central question is: how likely is that to happen?

Notice that  $(p_n - p_c)$  is a difference of probabilities,<sup>66</sup> which tends to be very small<sup>67</sup>, because the financial institutional is not responsible for managing the firm's operational risk. What the financial institution does is to set standards in an attempt to influence the borrower to increase 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 a duty of care (precaution) with direct impact on reducing the socioenvironmental risk of its activities. That is why the aforementioned

<sup>64</sup> 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.

<sup>65</sup> 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.

<sup>66</sup> A difference of probabilities of occurrence of an environmental damage when the financial institution chooses to do not be cautious and when it chooses to be.

<sup>67</sup> At least, smaller than the isolated probability  $p$ , and obviously smaller than 1.



difference of probabilities in directly reducing the socioenvironmental risk when the financial institution adopts and does not adopt precaution tends to be very small.

Thus, the financial institution shall 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 Strong Potential LEL it is sufficient that a regulator sets an extremely high cost of repair  $L$  so as to ensure that the condition  $c < \min\{(p_n^r - p_c^r)L; (p_n^i - p_c^i)L\}$  shall be always satisfied. However, it should be noted that under this situation 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 observation leads us to believe that under Strong Potential LEL, under which the financial institution is jointly and strictly liable, 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. Thus, 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.<sup>68</sup> But if the relation is the opposite, the firm chooses not to be careful.

The above analysis allows us to conclude that there are four possible Nash-equilibria (in pure strategies) in the game, depending on the parameters of the economy.<sup>69</sup> 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, for the above stated reasons lead us to believe 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,

<sup>68</sup> It might also be rewritten as  $w < R^i - R^r$ .

<sup>69</sup> They would be: when both agents adopt precautionary measures, when both do not adopt, or when one agent adopts and the other does not.

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

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 wherein 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

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

thus 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 in this second scenario with that in the first scenario, 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.<sup>70</sup> And transferring all the liability for 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 developing an accurate remediation regulation aiming at adding to the cost of recovery.

### c. Financial Institution Bears Liability Only if it Does Not Adopt Environmental Precaution (Low Potential LEL)

Finally, our third scenario illustrates an intermediate situation in which the financial institution is only liable when it does not adopt precautionary measures. In other words, under this scenario the financial institution only bears the expected cost of recovery if it does not incur in the *precautionary cost*  $c$ . Our intention is to identify the effects on the equilibrium to analyze 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 definition of the

<sup>70</sup> 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 careful. This comparison reflects that this policy to transfer the liability to the financial institution does not change its strategy, while potentially discourages the firm to adopt precautionary measures.

payoffs are also quite similar to the previous cases, but the main difference is exactly 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, that is, if the financial institution adopts environmental precaution, then the firm shall bear the environmental recovery costs, regardless if the firm have been cautious or not.

Table 3 represents the agents' payoffs and strategies for this third scenario.

Table 3

|                       |                                  | 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 | $R^r - p_n^r L; \pi - [R^r + w]$     | $R^i - p_n^i L; \pi - R^i$       |

Note that for the firm it would always be better 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.<sup>71</sup> However, unlike the previous first scenarios, now there is none straight dominant strategy for the financial institution, and its optimal strategy also depends on the parameters of the economy. If the firm is careful<sup>72</sup> 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 to 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.<sup>73</sup>

Similarly, if the firm is not cautious, we have the same relation, that is, it is optimum for the financial institution to be careful if and only if the precautionary cost  $c$  is lower than expected cost of repairing the environmental damage ( $p_n^i L$ ), that is,<sup>74</sup>

$$c < p_n^i L.$$

<sup>71</sup> It is outside the scope of this paper, but it's worth mentioning that insurance are situations that might potentially involve moral hazard problem.

<sup>72</sup> Recall that the type of the firm is associated with the probability to cause an environmental damage, such 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  $p^r < p^i$ .

<sup>73</sup> Note that 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.

<sup>74</sup> 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.

Otherwise, it is better for the financial institution to not adopt precautionary measures. It should be mentioned, however, that the difference between the two above described conditions 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 who 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 is a desirable policy, 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, worth noticing that when the financial institution internalizes a duty of care prior to lending the money, the lender transfers 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 since does not bear the precautionary cost  $c$ , the public policy considered is such that at this situation the financial institution faces liability for environmental recovery costs, regardless of the firm's behavior. Thus, in this case, it is observed that when the expected cost to be careful is lower than the expected cost of not being, that is, when

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

or alternatively, if  $w < (R^i - R^r)$ , the firm opts to be responsible and incurs on 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

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

thus the firm will always adopt precautionary measures. While if

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

thus 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 of the financial institution are higher when they adopt environmental precaution, which means if

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

then the Nash equilibrium is given by both agents adopting the strategy of being cautious.<sup>75</sup>

Another possible equilibrium is when the parameters are such that

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

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.

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

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

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

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

After the discussion of these four possible equilibria, observe that if the regulator impose a very high cost of repair  $L$  and if the interest rate that financial institutions charge of the irresponsible firm is considerably higher than the interest rate when it is responsible, then the equilibrium will be such that both agents shall adopt precautionary measures. In other terms, if the intention is to im-

<sup>75</sup> 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 be both the firm as the financial institution adopting precautionary measures.



plement a public policy to encourage both agents to adopt precautionary measures, it is just necessary that the regulator imposes a very high cost of recovery  $L$ , and the financial institutions charge a very high interest rate when the firm is irresponsible and does not incur on the precautionary cost.<sup>76,77</sup>

## 7. Conclusion

Undoubtedly, our economic model offers a simplified representation of reality, but still allows us to make some interesting conclusions on how much is too much liability for a financial institution to bear. Our work is intended to shed light over a tentative case law seeking to pursue full liability against financial institutions aiming at promoting better environmental enforcement. Our main conclusion is that such well intentioned (judicial) policy might have a detriment impact on the environment by lowering the degree of internalization of precautionary measures throughout all sectors of the economy. What the Brazilian 2009 Supreme Court of Justice precedent might be ignoring is that if applied as stated, the rationale can increase the risk of environmental damages by reducing incentives to firms and lenders to internalize a duty of care.

In particular, when we compare the Nash-equilibria of the three scenarios analyzed, it is observed that transferring all the liability for the financial institution will only create incentives for it to adopt precautionary measures in a situation that is unlikely to occur.<sup>78</sup> More than that, our results emphasize that the partial transfer of responsibility to the financial institution might be a good policy when the intention is to increase the level of caution to avoid environmental damage.

We recognize the need to further investigate how a policy of full liability can impact on the availability of credit. There has been suggested that in the U.S. a broad interpretation of lender's environmental liability had shortened credit towards environmental sensitive activities. A new economic model must build upon already existing economic research on the topic<sup>79</sup> to measure how can the degree of liability impact on credit availability. This is a recognizable future research need that our works intends to further explore.

Our work reflected in the present manuscript, however, has a limited scope. We aimed at demonstrating that the goal of increasing lender's accountability through liability is more complex than what the rationale built into the Brazilian 2009 Superior Court of Justice precedent might have had in mind. Our work suggests that regardless which is the legal tradition at stake and regardless which legal liability regime is applied, a well-intentioned policy of holding financial institutions strictly and jointly liable does not translate into more precaution. Albeit such a policy can solve an environmental harm in one single case, it can spread and promote, on the other hand, greater environmental risks throughout all sectors of the economy.

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

77 It is worth to mention that it is outside the scope of our work to analyze aspects of reputation of the agents.

78 Recall that the condition for the financial institution adopts precaution is given by

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

79 Heyes (1996) presents a model of lending relationship that incorporates both adverse selection and moral hazard, and shows that increasing the liability of lenders for environmental damage has a qualitatively ambiguous impact upon interest rate.

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