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TROIS ESSAIS SUR LA PERFORMANCE RSE DES BANQUES

THREE ESSAYS ON CSR PERFORMANCE OF BANKS

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À mes parents

À mes frères

À ma fille

Et à la mémoire du Professeur

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Résumé

Cette thèse constituée de trois essais s'intéresse à la performance RSE des banques. Nous menons d'une part une analyse microéconomique des effets de la performance RSE des banques sur leur comportement et, d'autre part, une analyse macroéconomique de l'impact de certains facteurs macroéconomiques sur la performance RSE de ses mêmes banques. Ainsi, dans un premier essai, nous étudions l'efficacité des banques qui s'engagent dans des activités RSE. En particulier, nous analysons comment l'adoption des activités RSE par les banques impacte leur efficacité. Nous constatons qu'une performance RSE élevée augmente l'efficacité des banques. Cependant, cette relation dépend de divers facteurs économiques et institutionnels. Plus précisément, il apparaît que la RSE n'augmente l'efficacité des banques que dans les pays développés, dans les pays présentant un niveau élevé de protection des investisseurs et dans les pays orientés vers les parties prenantes. Dans un second essai, nous nous intéressons au rôle que peut jouer la performance RSE dans l'exposition des banques au risque systémique. Nos résultats montrent que la performance RSE réduit l'exposition des banques au risque systémique. Une analyse des piliers de la RSE montre que l'exposition au risque systémique est réduite spécifiquement par une bonne gouvernance et la performance sociale. Nous trouvons également que l'environnement institutionnel joue un rôle dans la relation entre la performance RSE et le risque systémique. Certaines spécificités institutionnelles diminuent l'exposition des banques RSE au risque systémique, tandis que d'autres caractéristiques réglementaires peuvent rendre ces banques vulnérables face à un risque systémique. Enfin, notre troisième essai étudie l'impact de l'incertitude de la politique économique sur la performance RSE des banques. Nous montrons que l'incertitude de la politique économique a un impact positif sur la performance RSE. Les banques augmentent leurs investissements dans les activités de RSE en période d'incertitude. Nous trouvons que cette relation est persistante dans le temps ainsi que pour l'ensemble des dimensions de la RSE.

Mots clés : Performance RSE, Efficacité bancaire, Risque systémique, Incertitude de la politique économique.

Abstract

This thesis, consisting of three essays, focuses on the CSR performance of banks. On the one hand, we conduct a microeconomic analysis of the effects of banks' CSR performance on their behavior and, on the other hand, a macroeconomic analysis of the impact of some macro-economic factors on the CSR performance of the same banks. Thus, in a first essay, we study the efficiency of banks engaging in CSR activities. In particular, we analyze how the adoption of CSR activities by banks impacts their efficiency. We find that high CSR performance increases the efficiency of banks. However, this relationship depends on various economic and institutional factors. Specifically, it appears that CSR increases bank efficiency only in developed countries, in countries where investor protection is high and in countries with a high level of stakeholder orientation. We thus assert that some institutional characteristics must be present for the positive impact of CSR on bank efficiency to materialize. In a second essay, we examine the role that CSR performance can play in banks' exposure to systemic risk. Our results show that CSR performance reduces banks' exposure to systemic risk. An analysis of the CSR pillars shows that exposure to systemic risk is reduced specifically by good governance and social performance. We also find that the institutional environment has a role in the relationship between CSR performance and systemic risk. Some institutional specificities reduce the exposure of CSR banks to systemic risk, while other regulatory features may make these banks potentially vulnerable to systemic risk. Finally, our third essay examines the impact of economic policy uncertainty on banks' CSR performance. We show that economic policy uncertainty has a positive impact on CSR performance. Banks increase their investments in CSR activities in times of uncertainty. We find that this relationship is persistent over time and for all CSR dimensions.

Keywords: CSR performance, Banking Efficiency, Systemic Risk, Economic Policy Uncertainty.

Table des matières

Introduction générale	1
Chapter I: Social responsibility and banks: A review of the literature	10
1. Introduction	11
2. The foundations of CSR	12
2.1 The concept of CSR	12
2.2 CSR theories and approaches:	13
2.3 The effects of CSR	19
2.3.1 CSR and the business case	19
2.3.2 The link between CSR and financial performance	20
2.3.3 CSR and value creation	22
3. The Broad Principles of Banking Economics	24
3.1 The banking business	24
3.2 Banking performance vs efficiency	26
3.3 The notion of risk in the banking sector	30
3.4 The institutional environment	33
4. Banks and CSR	36
4.1 The integration of CSR into the banks' activities	37
4.2 The motivations for banks' commitment to CSR	39
4.3 Role of banks' CSR activities in their performance	41
4.4 Role of CSR performance on bank risk	42
5. Conclusion	44
6. Bibliography	46
Chapter 2: Corporate social responsibility and bank efficiency	64
1. Introduction	65
2. Related literature and hypotheses	67
3. Data and methodology	71

3.1 Sample selection	71
3.2 Bank efficiency	72
3.2.1 Inputs and outputs	74
3.2.2 CRS versus VRS model.....	77
3.2.3. Efficiency measure	77
3.3 Corporate social responsibility.....	79
3.4 Control variables	80
4. Empirical Analysis.....	80
4.1 Summary statistics results.....	80
4.2 CSR performance and efficiency	82
4.3 Evidence from Sample Splits.....	83
5. Conclusion.....	87
6. Bibliography.....	89

Chapter 3: The effect of CSR performance on bank exposure to systemic risk: international study96

1. Introduction	97
2. Related literature and hypotheses	99
2.1 CSR performance and risk.....	99
2.2 Systemic risk.....	102
2.3 The link between CSR and systemic risk	104
2.4 CSR, systemic risk and institutional environment	105
3. Data and methodology	106
3.1 Sample selection	107
3.2 Systemic risk measure	107
3.3 CSR measure.....	110
3.4 Control variables	110
3.4.1 Financial variables of banks and the CAMEL model	110
3.4.2 Institutional variables.....	112
4. Empirical Analysis.....	114
4.1 Summary statistics results.....	114
4.2 CSR performance and systemic risk	114
4.3 CSR performance, systemic risk and the institutional environment	124
5. Conclusion.....	128
6. Bibliography	129

Chapter 4: Drivers of CSR activities in the banking industry: The role of Economic Policy Uncertainty	137
1. Introduction	138
2. Related literature and hypotheses	140
2.1. Economic Policy Uncertainty and Financial Behavior.....	141
2.2 Corporate Social Responsibility.....	142
2.3 CSR and Economic Policy Uncertainty.....	143
3. Data and methodology	146
3.1 Sample selection	146
3.2 EPU measure.....	147
3.3 CSR measure.....	147
3.4 Control variables	147
4. Empirical Analysis.....	148
4.1 Summary statistics results.....	148
4.2 EPU and CSR performance	150
4.3 Accounting for CSR's pillars.....	153
4.4 Subsamples analysis	155
4.5 Institutional environment.....	156
5. Conclusion.....	162
6. Bibliography.....	163
Conclusion générale.....	174
Bibilographie générale	182

Introduction générale

Introduction générale

À l'ère de la mondialisation et des répercussions de différents scandales financiers, les banques ont connu une grande crise de réputation et un déficit d'image qui ont augmenté la méfiance et le scepticisme de leurs parties prenantes. Parmi ces scandales figure la crise financière de 2007-2008 qui a commencé par une crise du marché des prêts hypothécaires et s'est ensuite transformée en une crise de liquidité et de solvabilité. L'affaire dite du LIBOR ou « *London interbank offered rate* » a aussi affecté le secteur bancaire à l'échelle mondiale. Ce taux est une référence à de très nombreuses transactions entre une sélection de grandes banques internationales. Certaines banques ont manipulé ce taux interbancaire au cours des années 2005-2008 afin de cacher leur fragilité. Ces crises bancaires ont parfois contribué à alimenter des récessions mondiales et ont remis en question la stabilité et la transparence des banques.

Pour autant, un système bancaire performant et stable est la clé d'une prospérité durable (King et Levine, 1993). Les institutions bancaires sont en effet un acteur incontournable de l'économie. Elles jouent un rôle d'intermédiaire financier entre les dépositaires et les demandeurs des fonds. Elles évaluent, valorisent les actifs financiers, contrôlent les emprunteurs, gèrent les risques financiers et organisent le système de paiement (Greenbaum et Thakor, 2007). En utilisant des ressources considérables de la société, les banques sont tenues de fournir des feedbacks à la communauté plus que les autres industries (Wu et Shen, 2013). Ainsi, les banques doivent être plus transparentes quant à leurs pratiques commerciales. Il est donc vital et primordial pour ces intermédiaires financiers d'intégrer des préoccupations morales, éthiques et environnementales dans leurs opérations commerciales (Evangelinos et al. 2009, p. 167). Plus que tout autre, le secteur bancaire se doit donc être socialement responsable (Chambers et Day 2009, p. 4).

Ce concept de la RSE a été au centre de nombreux travaux académiques. D'un point de vue théorique, la théorie des parties prenantes stipule que l'entreprise doit prendre en compte l'intérêt de l'ensemble des parties prenantes (Freeman, 1984). La RSE est susceptible de minimiser les coûts et d'améliorer la réputation des entreprises (Jones, 1995), grâce à une bonne gestion des intérêts des parties prenantes qui fournissent des ressources stratégiques importantes aux entreprises (Branco et Rodrigues, 2006).

Les pratiques de la RSE peuvent aussi améliorer l'image de l'entreprise et renforcer sa compétitivité (Sen et Bhattacharya, 2001).

Certaines études empiriques mettent en avant les effets positifs de la performance RSE. Des méta-analyses de Orlitzky et al. (2003), Wu (2006), Yen (2014) et Wang et al. (2016) montrent un lien positif entre la performance RSE et la performance financière des entreprises. Certains auteurs avancent que la RSE peut réduire l'exposition au risque idiosyncratique, systématique (Jo et Na, 2012 ; Salama et al., 2011) et de crédit (Shen et al., 2016 ; Wu et al., 2017). Selon Wu et Shen (2013), une entreprise s'engage dans des activités RSE en raison de ses avantages perçus tant pour les macros que pour les micro-performances. La macro-performance comprend la protection de l'environnement et la réduction des inégalités sociales. La micro-performance comprend l'amélioration de la réputation, la possibilité de vendre les produits à un prix plus élevé ainsi que la capacité de recruter et de retenir des employés de haute qualité. Les entreprises RSE peuvent enfin obtenir des avantages financiers supérieurs aux coûts qui en découlent, en améliorant la performance financière sur le long terme (Wu et Shen, 2013).

L'intérêt de la recherche pour la RSE a été initié dans les années cinquante par l'ouvrage de Bowen¹. Mais la première étude empirique sur la RSE bancaire date seulement de 2002² (McDonald, 2015). Notre revue de littérature a mis en évidence que la recherche sur la RSE dans l'industrie bancaire est émergente. La majorité des études antérieures excluent le secteur bancaire en raison de ses caractéristiques particulières. Les banques fonctionnent sous des codes réglementaires spécifiques (Finger et al., 2018) et ont des règles comptables et des expositions au risque différentes de celles des autres secteurs.

Notre recherche prend tout son sens et son utilité dans un environnement de plus en plus incertain et un contexte de multiplication des crises bancaires et financières qui ont mis en évidence l'instabilité du système bancaire et la baisse de confiance des parties prenantes. L'adoption d'un comportement socialement responsable par les banques est un sujet qui suscite de plus en plus l'attention des

¹ Bowen H., (1953), « *Social responsibilities of the businessman* », Harper et Row, New York.

² Simpson et Kohers (2002), "The link between corporate social and financial performance: Evidence from the banking industry". *Journal of Business Ethics*

régulateurs, des politiciens et des chercheurs académiques. Cela a motivé le choix de notre sujet de recherche.

Ce travail doctoral s'intéresse aux banques qui s'engagent dans des activités RSE. Nous menons d'une part une analyse microéconomique des effets de la performance RSE des banques sur leur comportement et, d'autre part, une analyse macroéconomique de l'impact de certains facteurs macroéconomiques sur la performance RSE de ses mêmes banques.

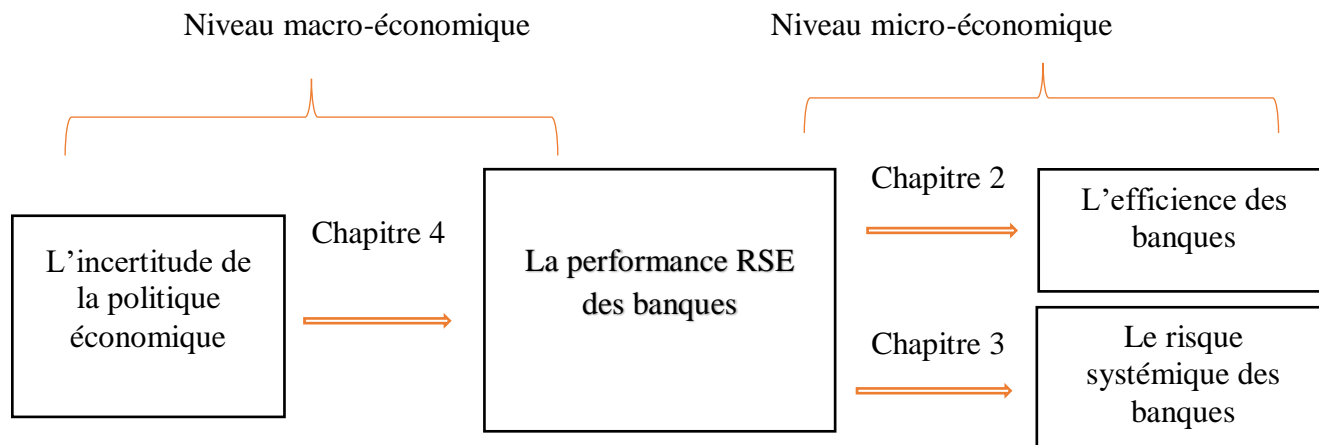
Notre étude de la littérature montre l'abondance des recherches qui analysent le risque systémique. Aussi, un nombre de travaux antérieurs ont étudié l'impact de l'incertitude de la politique économique sur le comportement des firmes. Cependant, l'effet de la performance RSE sur l'exposition des banques au risque systémique et l'effet de l'incertitude de la politique économique sur l'engagement des banques dans des activités RSE n'ont pas été étudiés. Le lien entre l'efficacité et la performance RSE des banques n'a pas été exploré également. L'analyse de ses liens sera notre contribution à la littérature.

Notre thèse s'articule ainsi autour de trois questions de recherche :

- *Quel est l'impact de la performance RSE sur l'efficacité des banques ?*
- *Quel est l'impact de la performance RSE sur le risque systémique des banques ?*
- *Quel est l'impact de l'incertitude de la politique économique du pays sur la performance RSE des banques ?*

La figure 1 suivante représente schématiquement les trois questions de recherche qui constituent notre thèse.

Figure 1 : les questions de recherche :



Source : construction de l'auteur

Cette thèse s'articule donc en trois essais et une revue de la littérature organisés sous la forme de quatre chapitres.

Le chapitre 1 aborde une revue de la littérature théorique et empirique sur la responsabilité sociale des entreprises et l'économie bancaire. Dans une première section, nous exposons les principales définitions de la RSE ainsi que les différentes approches théoriques qui ont été développées pour cerner le concept de la RSE. Nous mobilisons les travaux de Mullenbach-Servayre (2004) et Garriga et Melé (2004) qui établissent un classement des approches théoriques et une typologie des fondements de la RSE. Nous présentons les résultats non concluants des travaux empiriques antérieures qui analysent l'impact de la performance RSE sur la performance financière des entreprises. Dans une seconde section, nous explorons les grands principes de l'économie bancaire. Sous cet angle, nous définissons le métier de la banque, son efficacité, ses risques ainsi que son environnement institutionnel. La dernière section se concentre sur les banques RSE. Nous discutons les motivations des banques qui les incitent à s'engager dans la RSE et les conséquences de cet engagement sur leurs efficacités et leurs expositions aux risques. Cette étude de la littérature nous permet d'identifier certaines lacunes spécifiquement sur l'estimation de la performance des banques

et le rôle que peut jouer la performance RSE dans l'exposition de ces banques à certains types de risque et en particulier le risque systémique. Ceci fait l'objet de la suite de notre thèse.

Ainsi, Le chapitre 2 (1er essai) se propose d'analyser empiriquement l'efficacité des banques qui s'engagent dans des activités RSE. En particulier, nous analysons comment l'adoption des activités RSE par les banques impacte leur efficacité. Cependant, l'utilisation des ratios pour évaluer la performance des banques présente certaines limites. En effet, l'analyse des ratios est limitée et incomplète car elle se concentre sur une partie de l'activité commerciale en utilisant très peu de variables. Ceci peut être problématique lors de l'analyse des activités complexes des organisations multidimensionnelles, telles que les banques, qui produisent plusieurs outputs en utilisant plusieurs inputs. Pour pallier les lacunes de l'analyse des ratios, nous avons adopté une micro mesure de la performance. Il s'agit de l'efficacité. Nous utilisons la méthode *DEA Network Dynamic* pour estimer l'efficacité technique des banques. Grâce à un échantillon international de 184 banques RSE notées par *Sustanalytics*, nous constatons qu'une performance RSE élevée augmente l'efficacité des banques. Cependant, cette relation dépend de divers facteurs économiques et institutionnels. Plus précisément, il apparaît que la RSE n'augmente l'efficacité des banques que dans les pays développés, dans les pays présentant un niveau élevé de protection des investisseurs et dans les pays orientés vers les parties prenantes. La contribution de cet essai est triple. Premièrement, nous utilisons une technique d'analyse de la frontière efficace qui permet l'interaction d'un grand nombre de variables et permet une analyse multidimensionnelle de la performance. Deuxièmement, nous appliquons le modèle *DEA Network Dynamic* pour estimer les scores de l'efficacité. La plupart des études précédentes estiment l'efficacité par le modèle DEA basique qui se concentre sur une seule période et ignore les liaisons entre les périodes. En effet, ce modèle ne permet pas de retracer l'effet dynamique de la performance dans le temps (Tsionas et al., 2015). Cela peut être une limitation importante, en particulier pour le secteur bancaire. *DEA Network Dynamic* offre une analyse plus complète puisque le modèle prend en compte le changement dynamique d'efficacité entre deux périodes et estime l'efficacité de chaque sous-processus dans le processus de production. Cette méthode est la plus appropriée lorsqu'il s'agit d'évaluer la performance des banques qui mettent en œuvre des politiques de RSE car la performance de ces activités est envisagée sur le long-terme. Troisièmement, nous étudions un échantillon international de banques. Cela nous permet de différencier les pays développés des pays en développement et évaluer le rôle que peuvent jouer les spécificités des pays dans la relation entre la performance RSE et l'efficacité des banques.

Le chapitre 3 (2ème essai) s'intéresse au rôle que peut jouer la performance RSE dans l'exposition des banques au risque systémique. Ce risque systémique ne provient pas de la faillite inconditionnelle d'une banque, mais plus spécifiquement de la faillite d'une banque lorsque l'ensemble du système financier est sous-capitalisé. Si une banque échoue de manière isolée, le risque est absorbé par le marché interbancaire. Cependant, dans une période de stress global où l'ensemble du secteur financier est sous-capitalisé, les entreprises financières ne peuvent pas se financer auprès du marché interbancaire. Ainsi, les banques défaillantes affectent négativement l'économie réelle (Achraya et al., 2014). Pour cela, nous avons adopté la mesure SRISK de Browleens et Engle (2017) qui estime l'insuffisance de capital attendue d'une institution financière lorsqu'une crise de grande ampleur affecte l'ensemble du système financier. À partir d'un échantillon international de 297 banques RSE notées par *Asset4 Thomson Reuters*, nous montrons que la performance RSE réduit l'exposition des banques au risque systémique. Une analyse des piliers de la RSE montre que l'exposition au risque systémique est réduite spécifiquement par une bonne gouvernance et la performance sociale. Nous étudions ainsi l'exposition des grandes banques d'importance systémiques *GSIFs* au risque systémique. Nous remarquons que les G-SIBs surinvestissent dans les activités de RSE. Ces banques sont exposées à un risque systémique malgré leur engagement dans des activités de RSE. Les autres résultats de cet essai mettent en évidence le rôle de l'environnement institutionnel dans la relation entre la performance RSE des banques et le risque systémique. Certaines spécificités liées à la réglementation peuvent favoriser une moindre exposition au risque systémique grâce à la performance RSE tandis que d'autres caractéristiques de l'environnement institutionnel estompent l'effet de la performance RSE à amortir ce risque. L'apport de cet article est double. Premièrement, nous soulignons que la RSE peut être un des mécanismes qui peut réduire l'exposition des banques au risque systémique. À notre connaissance, cette relation n'a jamais été exploré auparavant. Deuxièmement, nous utilisons un échantillon international composé des banques qui ont une performance élevée en RSE et des banques qui enregistrent une performance faible en RSE et nous analysons l'impact de la gouvernance, la dimension sociale et environnementale de la RSE individuellement et simultanément. Or, les travaux antérieurs (voir les études d'Andries et Nistor, 2016 et d'Iqbal et al., 2018) examinent l'effet d'une seule dimension de la RSE (par exemple : la gouvernance) sur le risque systémique pour un échantillon de banques situées dans une seule région ou un seul pays (par exemple : l'Europe centrale ou les USA).

Le chapitre 4 (3ème essai) soulève la question de l'impact de l'incertitude de la politique économique (EPU) sur la performance RSE des banques. En utilisant un échantillon international de 181 banques

pour lesquelles nous disposons de données RSE notées par *Asset4 Thomson Reuters*, nous montrons que l'incertitude de la politique économique a un impact positif sur la performance RSE. Nous trouvons que cette relation est persistante dans le temps ainsi que pour l'ensemble des dimensions de la RSE. Les banques augmentent leurs investissements dans les activités de RSE en période d'incertitude. Ce résultat indique que les banques RSE utilisent leur avantage concurrentiel, en particulier les activités socialement responsables, comme mécanisme d'assurance dans une période d'incertitude accrue. L'image de marque RSE signale aux parties prenantes la fiabilité et de la stabilité de ces banques dans une période d'incertitude. Nous examinons l'impact de l'environnement institutionnel sur cette relation. Il apparaît que l'incertitude de la politique économique encourage les banques à investir dans la RSE spécialement dans les pays développés. Il apparaît également que la relation est positive dans les pays appliquant des mesures restrictives sévères sur les activités bancaires et une régulation des capitaux élevée. Nous trouvons la même relation positive et significatif entre la performance RSE et l'EPU dans les pays de droit civil, alors qu'il n'y a aucun lien RSE- EPU dans les pays de droit communs. Par contre, nous constatons que certains indicateurs de gouvernance notamment l'indice de contrôle de la corruption et le degré de l'application des lois n'ont aucun impact sur la relation entre la performance RSE des banques et l'incertitude. La contribution de cet essai à la littérature est double. Premièrement, le lien entre l'EPU et la performance RSE des banques n'a jamais été exploré. Aucune des études antérieures n'a trouvé que l'EPU comme moteur de la RSE. Deuxièmement, nous avons mené une étude sur un échantillon international composé des banques situées dans 23 pays. Or, la plupart des études portant sur l'EPU explorent un seul pays ou une seule une région.

Notre travail doctoral débute par une présentation de la littérature théorique et empirique qui portent sur la RSE et l'économie bancaire. Cette analyse de la littérature nous permettra d'explorer les résultats des travaux antérieurs et comprendre tout d'abord les motivations qui poussent les banques à intégrer la RSE ainsi que les conséquences d'une adoption de la RSE sur leur performance et leurs risques. Cela fera l'objet du chapitre introductif de notre thèse.

Chapter I: Social responsibility and banks: A review of the literature

1. Introduction

A healthy banking system is the key to sustainable prosperity (King and Levine, 1993). This stability is essential for the smooth functioning of the economy. On the other hand, this sector has undergone significant transformations in recent years due to changes in world markets (Poolthong and Mandhachitara, 2009). Deregulation, disintermediation, and financial innovation have transformed their scale, increased their size and complexity and broadened their exposure to risk. These financial institutions have been involved in crises that have bred distrust and skepticism among all stakeholders. Given the intangible nature of their business, Thompson and Cowton (2004) noted that banks are more likely to be influenced by a bad reputation than other companies and are more vulnerable to negative reactions by stakeholders. In this context, it is of vital importance for banking institutions to manage their brand image in order to regain customer trust (Flavián et al., 2005). Therefore, the banking sector has been particularly attentive to socially responsible activities (Peterson and Hermans, 2004).

Corporate social responsibility in banking industry became a key concept. Banks became proactive investors in CSR activities (Marin et al., 2009). Today, they are investing more and more in societal and environmental causes. CSR is now an integral part of banks' strategic considerations. CSR programs are becoming deeply integrated into the banking sector and their activities more transparent (Scholtens, 2008). They communicate and disclose information about their practices (Peterson and Hermans, 2004).

The purpose of this chapter is two-fold. On the one hand, it highlights the importance of CSR as a concept. On the other hand, it provides insight into the effects of CSR integration in the banking sector. To do this, this introductory chapter is therefore divided into three sections.

The first section focuses on the foundations of CSR. It discusses the various definitions of CSR and the multiple theoretical approaches to help the reader fully grasp all aspects of this concept. It also presents the empirical literature that studies the impact of CSR on business performance. The second section looks at the main principles of banking economics. It explores banking theories and approaches, efficiency, risks and the institutional environment of banks. The last section brings the two literatures together and looks at the motives that drive banks to adopt CSR policies as well as the consequences of these policies on their performance and risks.

2. The foundations of CSR

This section discusses definitions and theories about the concept of CSR. Although researchers have tried to provide a relevant definition of this concept, the surge in the number of theoretical papers and the divergence of approaches reflect the complexity of this concept. We present the reflections of researchers who have sought to define this concept. Then, we list the different theories and approaches that seek to explain CSR. We conclude this section with an analysis of the effects of CSR on the business case, financial performance and value creation.

2.1 The concept of CSR

Several researchers have contributed to the literature by attempting to provide a clear definition of the concept of CSR. Among these researchers, Carroll (1979, 1999) devised the CSR pyramid explaining that corporate social responsibility encompasses the economic (be profitable), legal (comply with the law), ethical and philanthropic (do good for the community) obligations that companies must take on with respect to society. In addition, businesses must operate within the law and behave as good citizens (Carroll, 1999). Wood (1991, p. 695) adds to this definition considering that “the meaning of social responsibility can be understood only through the interaction of three principles: legitimacy, public responsibility and managerial discretion, these three principles resulting in three levels of analysis: institutional, organizational and individual”.

Over the past two decades, CSR research has expanded and been considerably enriched. A study by Dahlsrud (2008) lists 37 different definitions of CSR. It reveals the main dimensions that define CSR, namely the social, economic, environmental and philanthropic dimensions and adds a stakeholders dimension. The companies respect their social responsibility when integrating the expectations of their stakeholders into their strategic management.

For Hopkins (2003), CSR is concerned with treating the stakeholders of the firm ethically or in a socially responsible manner. The most important goal of corporate social responsibility is to create rising standards of living, while preserving profitability for the company's stakeholders. However, Hopkins (2003) notes in his study that CSR companies generally focus on the following:

(i) The environment: firms examine the environmental impacts of their products and services, as well as their efforts outside the company to improve the environment.

(ii) Employees: firms place sufficient focus on working conditions, benefits, wages and training for their employees.

(iii) Communities: businesses that care about communities voluntarily take measures to improve the quality of life of employees and their families, as well as the local community and society.

(iv) Regulation: organizations comply with the laws and directives which relate to the adoption of a CSR activity.

(v) Emergency support mechanisms: Sometimes organizations have plans ready to manage business crises. In addition, they also take initiatives to provide support in the event of an emergency such as a disaster or an epidemic.

The main goal of social responsibility is to create sustainable living standards while preserving the profitability of the company. The key is to know how profits are made and not the pursuit of profits at all costs (Hopkins, 2003).

In general, corporate social responsibility is the response given by companies to the growing pressure exerted by employees, shareholders, local authorities and legislators to take the environmental and social impacts of their actions into account. A socially responsible approach to business implies paying attention to social and environmental concerns in addition to economic goals and encourages companies to balance financial benefits, economic added value and the social good.

After addressing the definition of the CSR concept, an analysis of the theoretical foundations is a very important step in explaining CSR. To this end, we will now analyze the theoretical abundance and multiplicity of divergent approaches to CSR

2.2 CSR theories and approaches:

Many researchers have used theories to further define the concept of CSR (Frederick, 1978, 1987, 1998; Gendron, 2000; Gond and Mullenbach-Servayre, 2004; Garriga and Melé, 2004). Without wishing to be exhaustive on these approaches, we rely on two recent studies.

Gond and Mullenbach-Servayre (2004) established a typology of the theoretical foundations of CSR. They define three theoretical corpora:

a- Stakeholder theory

Stakeholder theory focuses on the nature of the relationship between the company and its stakeholders (Jones and Wicks, 1999). It concerns the management of "potential conflicts arising from divergent interests" (Frooman, 1999). The company has no obligation to society but to its stakeholders (Clarkson, 1995 and Donaldson and Preston, 1995). Freeman (1984) defines stakeholders as "*any group or individual who can affect or is affected by the achievement of the organization's objectives.*" The main stakeholder groups considered are generally: governments, investors, political groups, customers, communities (i.e. the social environment in which the company operates), employees, professional associations and suppliers (Donaldson and Preston, 1995). Mitchell et al. (1997) identify and prioritize stakeholders by three attributes: the power to influence the business, the legitimacy of a relationship and the urgency of the stakeholder's claim on the firm. These three criteria give rise to the ranking of stakeholders as dominant, dependent, dangerous, discretionary, definitive, demanding and dormant.

According to stakeholder theory, companies try to manage stakeholders in order to achieve financial performance. This is the principle of instrumental stakeholder theory advanced by Donaldson and Preston (1995).

b- The theory of the business-society contract

According to this theory, there is an implicit contract between the company and society (Donaldson, 1982). The company must maintain the power and legitimacy granted to it by society. "*The basic idea of CSR is that business and society are interwoven rather than distinct entities; therefore, society has certain expectations for appropriate business behavior and outcomes*" (Wood, 1991, p. 695).

c- Neo-institutional theory

This theory was developed by DiMaggio and Powell (1983), who argue that CSR is a response to different institutional pressures. According to Rojot (2005), organizations can only be understood if one accepts that they are connected to each other, on the one hand, and built by their social environment, on the other. These organizations adopt structures in response to external expectations. They want to become isomorphic with their environment because they seek legitimacy to survive (Meyer and Rowan, 1977). DiMaggio and Powell (1983) explain that these organizations seek this legitimacy according to *a collective rationality*. This search for legitimacy takes the name of

isomorphism, which can take three forms: (i) coercive isomorphism results from both formal and informal

pressures produced by force exerted on organizations by other organizations upon which they are dependent. The former are forced to adopt certain changes and new structures. (ii) the mimetic isomorphism adopted by companies that are unable to find innovative solutions, they mimic the solutions identified and used by other organizations. (iii) normative isomorphism, which is a behavior adopted by organizations in accordance with the phenomena of professionalization and socialization. These phenomena are explained by “*the collective efforts of the members of a profession to define their working conditions and methods and to establish a legitimate basis for their activities, guaranteeing them a sufficient degree of autonomy*” (Huault, 2002, p.

Another ranking of theoretical approaches to CSR has been established by Garriga and Melé (2004). The authors identify four groups of theories:

a- Instrumental theories

This group brings together the theories that consider that economic objectives are achieved through social activities. Three types of instrumental theories can be identified: Maximizing shareholder value, obtaining competitive advantages and marketing.

The first group of theories considers CSR to be a strategic tool for creating wealth. Maximizing shareholder value is considered the ultimate criterion for assessing the social activity of the company. Friedman (1970) argues that “the only responsibility of business to society is to increase profits for shareholders within the country’s legal and ethical framework.” The most important stakeholder is the shareholder. Therefore, the company's goal is to maximize shareholder profit by maximizing the economic value of the company. This approach is consistent with the agency theory (Jensen and Meckling 1976) that states that “one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent.”

The second group focuses on how to allocate resources to achieve social goals and create a competitive advantage (Hsted and Allen, 2000). For Porter and Kramer (2002), investing in

philanthropic activities can be the only way to improve a company's competitive advantage and create greater social value.

The third group believes CSR is related to cause-related marketing. It is defined as “the process of formulating and implementing marketing activities that are characterized by an offer from the firm to contribute a specified amount to a designated cause when customers engage in revenue-producing exchanges that satisfy organizational and individual objectives” (Varadarajan and Menon, 1988, p. 60). Its goal is to enhance company revenues and sales or customer relationship by building the brand through the acquisition of, and association with the ethical dimension or social responsibility dimension (Murray and Montanari, 1986).

b- Political theories

In this category, CSR expresses power relations. It incorporates political considerations. Several concepts are discussed in this group, such as the company's social constitutionalism, the theory of the social contract and the corporate citizen.

Davis (1960) presents his theory of corporate constitutionalism. He recognizes that business is a social institution and it must use power responsibly.

The second concept in the political category is the integrative social contract theory by Donaldson (1982). This researcher confirms the existence of a social contract between business and society. This social contract implies some indirect obligations of business towards society. This approach informs about the role of society in the existence of business.

The last approach in this group is corporate citizenship. Carroll (1999) believes that corporate citizenship is a new conceptualization of the role of companies in society and that this concept broadly overlaps other theories about corporate responsibility in society. The company is part of society as a citizen. Corporate citizenship is changing from philanthropic to general responsibility. This view stems from the fact that some firms have gradually replaced governments as they fail to protect the rights of their citizens (Matten et al., 2003)

c- Integrative theories

Theories in this group examine how companies integrate social and environmental requirements and operate in accordance with socially responsible values.

The first theory in this category is the issues management theory or the theory of social reactivity which was defined by Wartick and Rude (1986, p. 124) as "the processes by which the corporation can identify, evaluate and respond to those social and political issues which may impact significantly upon it".

The second theory put forward by Preston and Post (1981) is the principle of public responsibility. These authors prefer the term "public" rather than "social" to emphasize the importance of the public process, rather than personal moral opinions or narrow interest groups defining the scope of responsibilities. The existing law and public policy process are taken as a reference for social performance.

The third approach in this category is that of Freeman (1994), who explains that the true responsibility of companies is to create value for stakeholders, without separating the company from ethics. It is a new approach to the relationship between corporations and their stakeholders that recalls the benefits of cooperative rather than opportunistic behavior (Jones 1995). Businesses are being pressured by non-governmental organizations, activists, communities, governments, the media and other institutional forces demanding socially responsible business practices. Thus, some companies are seeking answers to social requirements by establishing a dialog with a wide range of stakeholders (Garriga and Melé (2004). Many empirical studies examine these relationships such as how best practices are determined in a company's relationships with stakeholders (Bendheim et al., 1998), the impact of stakeholder management on financial performance (Berman et al., 1999) and the influence of the structural relations in the stakeholder network (Rowley, 1997).

The last approach of integrative theories is the social performance of companies. Carroll (1979) defines corporate social performance as the intersection of three dimensions: the principles of corporate social responsibility (which includes economic, legal, ethical, and philanthropic responsibility), the societal issues associated with that responsibility and the philosophy of responsiveness to these issues. The concept of corporate social performance was also defined by Wood (1991, p.693) as "*a business organization's configuration of principles of social responsiveness, and policies, programs, and observable outcomes as they relate to the firm's societal relations*". Thus, CSR is the basic component of corporate social performance.

d- Ethical theories

This fourth group of theories focuses on ethical requirements that consolidate the relationship between business and society. This category contains:

The normative theory of stakeholders that is classified in the group of integrative theories and also normative theories because some authors consider that management of the relationship between the company and its stakeholders integrates social requirements and ethical considerations, in particular mutual benefit, justice, cooperation, sacrifice and voluntary acceptance of the benefits of cooperative regimes (Phillips, 2003).

Human rights and respect for the environment have been taken as the basis for CSR (Cassel, 2001). Some approaches to corporate responsibility based on principles in the areas of human rights, labor and the environment have been proposed by the UN Global Compact and The Global Sullivan Principles (1999).

Sustainable development is one of the ethical approaches. According to Gladwin and Kennelly (1995, p. 876) sustainable development is “a process of achieving human development in an inclusive, connected, equiparable, prudent and secure manner.”. It is essential to differentiate between sustainable development and CSR. *"Sustainable development is a macroeconomic and macro-social concept on a planet-wide scale that does not apply directly to a particular entity"* (Capron and Quairel-lanoizelee, 2010, p.16). *"The concept of sustainable development challenges business as to its ends, by providing the principles that frame economic activities. CSR is the company's response modalities"* (Capron and Quairel-lanoizelee, 2010, p.16). CSR intervenes at a microeconomic level. Sustainable development is reflected in business by CSR (Van Der Yeught, 2015)

A final approach holds the common good of society as the referential value for CSR. Business has to contribute to the common good because it is a part of society (Mahon and McGowan, 1991; Velasquez, 1992) by creating wealth, providing goods and services in an efficient and fair way, at the same time respecting the dignity and the inalienable and fundamental rights of the individual.

CSR is a complex and evolving concept. The analysis of the ever increasing volume of theoretical research on CSR enables us to define this concept and leads us to question the effects of a CSR commitment on the value of the company in order to understand the motivations and incentives that encourage companies to adopt CSR activities. This point deserves a thorough analysis. This is the subject of the next subsection.

2.3 The effects of CSR

Does CSR help increase the value of the business? What is the business case for CSR? Is there a link between CSR performance and the financial performance of the business? We explore the effects of CSR on corporate activity. The answers to these questions are provided below.

2.3.1 CSR and the business case

The business case is a pitch for investment in a project or initiative that promises to yield a suitably significant return to justify the expenditure (Kurucz et al., 2008). The goal of a business case analysis of CSR is to inform the business motivations and the specific benefits to businesses in an economic and financial sense that would flow from CSR activities and initiatives (Carroll and Shabana, 2010). The business case analysis for CSR has been broken down into four different categories by Zadek (2000). He notes that companies pursue CSR strategies to (1) defend their reputations, (2) justify benefits over costs, (3) integrate with their broader strategies (the ‘strategic’ business case), and (4) learn, innovate and manage risk. Kurucz et al. (2008) also define four types of CSR business cases for CSR that partly overlap with Zadek’s. Their four approaches include: (1) reducing cost and risk (2) building competitive advantage (3) strengthening legitimacy and reputation and (4) creating win–win situations through synergistic value creation.

Cost and risk reduction arguments posit that building positive community relationships may contribute to the firm’s attaining tax advantages. In addition, positive community relationships decrease the amount of regulation imposed on the firm, because the firm is perceived as a sanctioned member of society ((Berman et al. 1999). “Being proactive on environmental issues can lower the costs of complying with present and future environmental regulations . . . [and] . . . enhance firm efficiencies and drive down operating cost” Berman et al.(1999, p. 489). High CSR firms have a lower cost of equity and low CSR companies are more likely to suffer from a penalty because of their low level of sustainability and that high CSR firms are likely to issue more equity than low CSR firms (Girerd-Potin et al., 2011).

Legitimacy and reputation arguments hold that CSR activities may help a firm strengthen its legitimacy and reputation by demonstrating that it can meet the competing needs of its stakeholders

and at the same time operate profitably. “Competitive advantage arguments contend that a firm may be able to build strong relationships with its stakeholders and garner their support”. Accordingly, the firm will be able to differentiate itself from its competitors (Carroll and Shabana, 2010, p.102). Synergistic value creation arguments hold that CSR activities may present opportunities for a firm that would allow it to fulfill the needs of its stakeholders and at the same time pursue its profit goals. The pursuit of these opportunities is only possible through CSR activities (Carroll and Shabana 2010). Other widely accepted approaches to the business case include focusing on the empirical research linking CSR with CSP and identifying benefits to different stakeholder groups that directly or indirectly benefit companies’ bottom lines (Carroll and Shabana 2010). In the next sub-section, we will examine this observation in greater detail.

2.3.2 The link between CSR and financial performance

CSR is a strategic source that can influence the financial performance (FP) of the business. A number of empirical studies seek to analyze the relationship between CSR and FP and conclude that there is a lack of consensus on the nature of this relationship. Barnett (2007) argues that the impact of CSR on FP varies from company to company. He explains that such a variation, reflected in inconclusive results as to the CSR-FP relationship, can be attributed to factors specific to each situation. As a result, CSR can have a positive effect on the company's FP in certain situations, while having a negative or no effect in other situations.

- Negative link:

In a neoclassical setting, the sole objective of a company is to maximize profits. Friedman (1970) considers CSR to be a source of conflict between the interests of company leaders and shareholders. In other words, managers try to use CSR as a tool to advance their own social, political, or professional agendas at the expense of shareholders. As a result, CSR activities can be linked to agency problems (Friedman, 1962, 1970). Thus, the costs involved in agency relationships can be high and adversely affect the value of the company (Wang et al., 2016).

Moreover, the theory of managerial opportunism states that managers can overinvest in CSR activities for their own benefit at the expense of shareholders (Barnea and Rubin, 2010; CESPA and Cestone, 2007), which negatively impacts financial performance (Preston and O’Bannon, 1997). This negative link is also defended by Preston and O’Bannon’s “trade-off hypothesis” (1997), which suggests that

companies with good CSR practices have weak financial performance. As Waddock and Graves (1997), Preston and O'Bannon (1997), and Simpson and Kohers (2002) indicate this assumption is based on the neoclassical argument that CSR implementation is a complex and costly process and thus creates a competitive disadvantage (Aupperle et al. 1985; Friedman, 1970).

- Positive link:

Other studies based on stakeholder theory, the “resource-based view” (RBV), and reputation theory confirm that the real relationship between CSR and financial performance is positive.

Freeman's (1984) stakeholder theory states that CSR is likely to minimize costs and maximize profit through a good strategy for managing the interests of stakeholders who provide significant resources to companies. In this sense, the Waddock and Graves (1997) "good management theory" notes that CSR is naturally associated with good management practices. In this way, CSR becomes an irreplaceable strategic resource that managers can use to create value (McWilliams and Siegel, 2011; McWilliams et al., 2006).

Barney's (1991) resource-based view (RBV) predicts that CSR performance has a positive impact on financial performance. This theory suggests that a firm can perform better than its competitors if it has valuable, rare, inimitable, and not substitutable resources (Barney, 1991). In this theory, researchers highlight the importance of intangible assets such as corporate culture, reputation, leadership (Barney, 1986; Hall, 1992; Teece, 1998; Coff, 1997) that provide a competitive advantage to the firm (Branco and Rodrigues, 2006; Hsu, 2012; Porter and Kramer, 2006; Gherra, 2010). Edmans (2011) considers CSR commitment to be a long-term investment in intangible assets that address a wide range of stakeholder interests. In addition, Jones (1995) shows that ethical behavior provides a competitive advantage to the company, especially in terms of relations with stakeholders. He also stresses that instrumental stakeholder theory could clarify the association between corporate social performance and financial performance: "Certain types of social performance of companies are an attempt to build trust and cooperative relationships between companies and stakeholders and should be positively related to a company's financial performance" (Jones, 1995, p. 430).

The corporate reputation theory (Godfrey et al., 2009; Muller and Kraussl, 2011)) suggests that companies with a strong CSR reputation can better preserve the value of the company in times of crisis than companies with a weak CSR reputation. The "moral reputation capital" derived from CSR reduces the impact of negative events (Godfrey et al., 2009).

On the empirical side, the majority of previous studies and meta-analyzes have shown a positive relationship between CSR and FP. Griffin and Mahon (1997) analyzed 62 empirical studies and found

that many of these studies support a positive link between CSR performance and financial performance. Meta-analyses by Margolis and Walsh (2001, 2003), Orlitzky et al. (2003), Wu (2006), Yen (2014) and Wang et al. (2016) conclude that the dominant finding as to the CSR – FP link is that of a positive and significant relationship.

- Neutral link:

For Waddock and Graves (1997), there is no simple and direct relationship between CSR and FP. Based on a theory of CSR supply and demand by the company, McWilliams and Siegel (2001) confirm a neutral, if not non-existent, relationship between CSR and FP. They specify that companies produce to maximize their performance based on demand, with the aim of maximizing shareholder wealth. Therefore, the social performance supply depends on the social performance demand from stakeholders. This leads each company to deliver different amounts of social performance based on the demand the company experiences. In market equilibrium, i.e. between CSR supply and demand, companies are profitable, but the amount of socially responsible activities produced will be different. The link is neutral because the CSR offer does not stem from financial performance.

2.3.3 CSR and value creation

Policy debates focus on conflicts between the company's various stakeholders in terms of privileges. The interests of managers and shareholders are not aligned. For Jensen (2002), these concerns are not what matters. According to Jensen, the company must focus first on good management behavior. The real challenge for the company is to use a limited amount of resources and minimize costs in order to increase its value. A company maximizes its value if the profits from production cover the resources consumed (Jensen, 2001).

On the other hand, the stakeholder theory is completely consistent with maximizing value because good management of stakeholder relations leads the company to value maximization. The challenge is to achieve a compromise between the often contradictory and inconsistent demands of all stakeholders. Customers want low prices, high quality and expensive service. Employees want high wages, high-quality working conditions and benefits. Capital providers demand low risk and high profitability. Communities want high charitable contributions, social spending by businesses for the good of the community, increased investment. Thus, we need to specify how to make all these compromises, knowing that stakeholder theory as set out by Freeman (1984) contains no conceptual specification on how to make these compromises among stakeholders (Jensen, 2001).

However, new interpretations of the concept of maximizing value and stakeholder theory need to be used to show that maximizing value over the long term is an indicator of a successful compromise between all stakeholders and that maximizing short-term financial performance is a sure way to destroy value (usually earnings per share) (Jensen, 2001). In this sense, Jensen advocates the “Enlightened stakeholder theory” and the “Enlightened Value Maximization theory”. These theories explain that the company cannot create value without having good relationships with all stakeholders, and that managers must make management decisions independent of their personal preferences. Value creation is therefore the only determinant that measures the success of the activity since the value created will be distributed among stakeholders and will meet their expectations.

Theoretical positions of this thesis:

The theoretical development listed below has revealed that CSR is a complex and evolutive concept. There are different approaches that explain this concept. In this research, we will approach CSR from the perspective of stakeholder theory and resource based view theory (Resource Based View). The combination of these two theories allows us to enhance the discussion and interpretation of our findings. Indeed, stakeholder theory is based on two visions: the "business-oriented" and the «ethics-oriented» (Pasquero, 2005). The corporate objective is to respond to the expectations of all its stakeholders. Thus, socially responsible management of stakeholder interests enables financial performance to be achieved and also helps to maintain trust relationships with stakeholders. This is crucial for banks that have experienced a decrease in stakeholder trust after the succession of financial scandals.

Ethical behavior, reputation and stakeholder relationships provide a competitive advantage to the company (Jones, 1995). It then seems evident to us to complement stakeholder theory with resource theory. Indeed, stakeholders managed in this way are like an essential resource for the company (Lee, 2012). This theoretical approach to our thesis represents the essential precepts that support the adoption and engagement in CSR activities.

In short, we have discussed the foundations of the CSR concept. In our first point, we tried to define this concept despite the complexity and ambiguity surrounding it. Thus, we presented the theoretical foundations of CSR, building on the multiplicity of approaches that have been mobilized to identify

this concept. Finally, we completed this section with a presentation of the abundant literature that analyzes the effects of CSR commitments on value creation, the business case and corporate financial performance.

The next section is given over to the second part of our thesis topic which is banking. We present the key principles of the banking economy: the banking business, its performance, banking risks and regulations that attempt to control these risks.

3. The Broad Principles of Banking Economics

Banking contributes to monetary creation and capital formation. Banks are major players in the financing circuit of the economy through their direct and indirect intermediation roles. There are several factors that expose banks to multiple risks. As a result, the supervisory authorities are introducing macroprudential regulation aimed at regulating banking activities. However, this regulation has given rise to much controversy given the repeated financial crises, prompting the Basel Committee to review its regulations on several occasions in order to adapt to changing risks.

Thus, banking management is based on three constraints: risk, regulation and information (Lamarque, 2003, p. 63)

We start this section by defining the banking business and some of the theories surrounding it. Then we look at the concept of efficiency, which is a component of performance. We then detail all the risks facing the banking sector. We conclude this section with a presentation of the Basel Accords, which establish regulatory measures for this sector.

3.1 The banking business

The banks manage deposits and loans, which are the foundations of all economic activities. They manage a public good that is the currency. They are reservoirs of resources for a nation's economic growth and development. A study by King and Levine (1993) found that the impact of the banking system on average GDP, capital stock, and productivity growth is statistically significant. Other studies by Beck and Levine (2004) and Levine and Zervos (1998) show that bank development remains a good predictor of economic growth.

Academic thinking has enabled banking theories to emerge. Fama (1980) studied business banking in the light of finance theory. According to Fama, banks perform two key functions, namely, (a) a transaction function, i.e. "an accounting system of exchange for transferring wealth", and (b) a portfolio function, i.e., the collection of deposits, the granting of loans and the purchase of securities. Banking theory focuses on the role of the banks as financial intermediaries. The theory of financial intermediation by the banks explained by Sealey and Lindley (1977, p. 1252), states that "the transformation process for a financial firm involves the borrowing of funds from surplus spending units and lending those funds to deficit spending units, i.e. financial intermediation". According to Casu et al. (2006, p. 18), "Banks, as other financial intermediaries, play a pivotal role in the economy, channeling funds from units in surplus to units in deficit. They reconcile the different needs of borrowers and lenders by transforming small-size, low-risk and highly liquid deposits into loans which are of larger size, higher risk and illiquid (transformation function)".

Some studies on banking microeconomics support the "industrial organization of banking" approach. The Klein (1971) and Monti (1972) model explains that banks are service companies that aim to maximize profit. The main hypothesis of this model is that the banks operate in a perfectly competitive market and have a monopoly on the loan and deposit markets. Monopolistic banks charge high interest rates on loans and grant low interest to savings. In such a situation, the intermediation margin increases. One property of the model is the principle of separability: The deposit rate is independent of the bank's rate and quantity decisions. Freixas and Rochet (2008) develop an oligopolistic definition of the model and show that the bank maximizes profit by taking the volume of loans and deposits from other banks for granted. They assume constant elasticities of demand for credit and the supply of deposits.

The bank is a business, but it differs from non-financial businesses by the particularity of its activity based on loans and deposits. Hempel and Yawitz (1977) identify the key variables that define the banking business. These are the gross earnings on assets (*interest income* and *non-interest income from loans*), the cost of liabilities (*interest expense on deposits*), overheads (*non-interest expense*), taxes and the risk premium and the free interest rate (*taxes, and an appropriate risk premium to be added to the risk-free interest rate*). These researchers explain that the banking business management decisions must be based primarily on these variables.

There are four categories of key activities that determine the performance of banks and influence the value of equity: spread management, control over overheads, liquidity management and capital management (Avkiran, 2006). Spread management refers to how the difference between gross income

(interest income plus non-interest income) and interest expenses is managed. The control of non-interest expenses is concerned with the bank's ability to reduce these expenses while maintaining spread management. Liquidity management traditionally involves the presence of short-term assets that can be rapidly converted into cash to meet unforeseen deposit withdrawals, financing needs and the liquidity needs of the country's central bank. Capital management involves balancing the level of capital so that growth in assets and liabilities is sustainable without eroding public confidence or profitability (Avkiran, 2006). These four categories of activities are the keys to a strong banking performance and can also be the cause of risk in the event of mismanagement.

The changing financial world has impacted banking practices. Banks have moved from being simple deposit-taking and loan granting institutions to complex organizations with numerous functions and offering several services. The result is the universal bank that collects deposits, grants loans, trades in securities, offers insurance and conducts off-balance-sheet transactions. The primary goal of the banks is to manage all of these activities with efficacy and efficiency.

Performance and efficiency are two key concepts in a bank's production process and are the goals sought by all firms. A definition of these concepts is essential in order to understand the bank's ultimate goal: strong performance and efficiency. This is what we will define in the following.

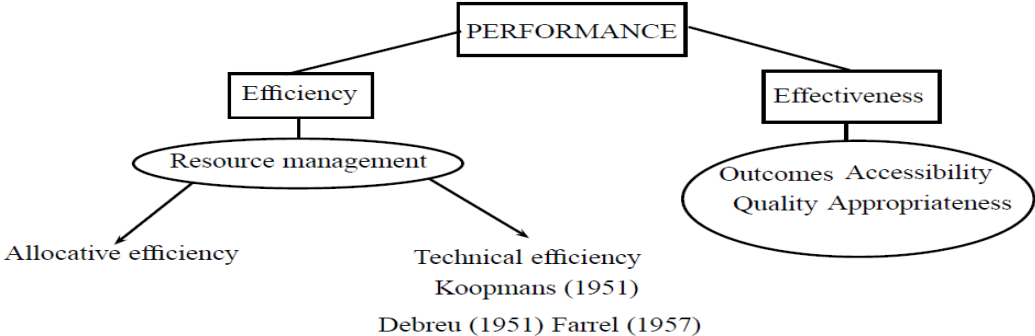
3.2 Banking performance vs efficiency

A successful company must be both effective and efficient (see figure 2). Bourguignon (1997, p.934) defines performance *"as the achievement of organizational objectives regardless of the nature and variety of these objectives. This achievement can be understood in the strict sense (result, outcome), or in the broad sense of a process that leads to the result (action)"*. Other definitions of the term in management control have emerged. According to Bouquin, (2004, p. 62), performance is *"the impact an activity, a center of responsibility, a product, etc, has on the business'bottom line"*. Bouquin (2004) breaks performance down into three elements: economic performance (obtaining resources at the lowest cost), efficiency (maximizing the quantity obtained from a given quantity of resources), and efficacy (achieving the expected objectives).

In this section, we look at the definition of the concept of efficiency, which is a component of performance. Koopmans (1951) and Debreu (1951) proposed the first measure of productive or technical efficiency. Pareto-Koopmans concept of efficiency states, "that a DMU (decision-making

unit) is fully efficient if and only if it is not possible to improve any input or output without worsening some other input or output” (Cooper et al. 2007, p. 45). In other words, a firm is efficient when it is on the production frontier where it is unable to raise the output level produced for a given input level, or to lower the level of resources consumed to produce a given amount of output.

Figure 2: The Performance Framework



Source: Procelli 2009

In addition, efficiency is a microeconomic measure of productivity that assesses the production process taking into account the volume of inputs and outputs. According to a literature review, many authors do not differentiate between efficiency and productivity. However, the two concepts are not completely identical even if they are linked. Productivity is defined as the relationship between outputs and inputs and encompasses the various possible measures of efficiency (Coelli et al., 2005, p. 4). Efficiency measures are more accurate than productivity measures in the sense that they involve a comparison with the most efficient frontier, and for this they can complement productivity measures (Daraio et al., 2007, p. 30). In other words, a firm can be efficient (located at the production frontier), but have the possibility of improving productivity by taking advantage of economies of scale (use lower volumes of inputs or produce more quantities of outputs while maintaining the position at the production frontier) (Coelli et al., 2005, p. 4).

Traditionally, bank performance is measured by accounting ratios (ROA or ROE). However, many researchers criticize this approach for its limited scope (Berger and Humphrey, 1997; Estéban-Sanchez, 2017). Ratio measures are attractive to analysts because they are simple and easy to understand, but they provide limited analysis due to the lack of a powerful and comprehensive optimization method (Berger and Humphrey, 1997). Their main weakness is that each of the ratios

examines only part of the company's activities. They are not therefore capable of properly measuring the contribution of all production division units or detecting inefficient production sub-processes. Thanassoulis et al. (1996) compare the analysis by measuring efficiency and the estimates by ratios. They find that both methods may disagree on performance assessment. Efficiency takes all resources and results into account when assessing performance, whereas ratio-based analysis only concerns one resource at a time.

Researchers highlight the benefits of efficiency measures as indicators of bank performance (Berger and Humphrey, 1997; Berger, 2007; Fethi and Pasiouras, 2010). Measuring efficiency helps to inform operational areas that require improvement, and it also allows firms to define future development strategies by comparing themselves with their peers in terms of scale, cost minimization, income and profit maximization (Paradi and Zhu, 2013).

There are several approaches to efficiency. Mester (2008) identifies two key approaches that define efficiency: technical efficiency and economic efficiency. Technical efficiency explores whether a bank maximizes its outputs based on its input levels, or whether a bank minimizes the amount of inputs used to produce its current output levels. Economic efficiency examines whether a bank minimizes its costs or maximizes its profits. According to Mester (2008), the most important concepts of economic efficiency are cost and profit efficiency. Cost efficiency measures how close a bank's cost is to the bank that has the best practice in terms of cost, assuming that it produces the same outputs under the same conditions. (Berger and Mester, 1997). Profit efficiency measures the profit of a bank in relation to the maximum possible profit produced by a best-practice bank under the same conditions (Isik and Hassan, 2002).

There is also allocative efficiency (Figure 1), which refers to the ability to combine optimal proportions of inputs and outputs and their respective prices. Most of the analyses reported in the literature focus on technical efficiency rather than allocative efficiency, since the latter requires the calculation of prices of inputs and outputs, and information on costs and income from inputs and outputs is generally not available or very difficult to obtain (Quaranta et al., 2018).

All types of efficiency are estimated by the bank's position relative to a best-practice frontier. The distance from this frontier reflects the bank's ability to convert inputs to outputs as efficiently as possible relative to its peers. A bank is considered as relatively less efficient than others if it is located far from the frontier. This bank can reduce costs by improving its sub-optimal management choices, while producing a similar set of products. In this way, the bank moves closer to the frontier.

Parametric and non-parametric methods exist to estimate efficiency. The two methods define the functional form of the efficiency frontier differently (Bauer et al., 1998). The parametric method defines the production frontier by econometric techniques. The critical point of this method is the management of several inputs and outputs. Non-parametric models use linear programming to construct the frontier from the data. Their main advantage is ease of handling of multiple inputs and multiple outputs. In contrast, they are quite sensitive to the selection of inputs and outputs (Daraio et al. 2007, p. 26).

Selection of inputs and outputs:

According to Zaim (1995), two main approaches can be used to determine inputs and outputs variables: the production approach and the intermediation approach. The production approach considers a bank to be a producer of deposits and loans, using capital, labor and materials. Thus, outputs are deposits and loans, while inputs include physical capital and human capital. For Sealey and Lindley (1977), “the production process of the financial firm, from the firm's viewpoint, is a multistage production process involving intermediate outputs, where loanable funds, borrowed from depositors and serviced by the firm with the use of capital, labor and material inputs, are used in the production of earning assets” (p. 1254). This approach has been criticized since it distorts the reality of the banking business. The intermediation approach treats a bank as a collector of funds, which are then transformed into loans. Therefore, the outputs are loans and investments and inputs include labor, physical capital, client deposits and funds borrowed from other sources. Advocates of this approach include Sealey and Lindley (1977), Humphrey (1987), Berger and Mester (1997) and Weill (2004). They show that this approach is best suited to a bank’s production process which revolves around financial intermediation. This approach seems to draw the attention of the majority of researchers interested in estimating efficiency. The choice of approach depends on the researcher's intent and the variables that will be used in the efficiency models. Sealey and Lindley (1997) and Ferrier and Lovell (1990) stated that researchers choose the approach to be adopted based on the goal of the study. By contrast, Berger and Humphrey (1997) suggest that the intermediation approach is best suited to analyze a bank’s efficiency. While the production approach is more suited to estimating the efficiency of agencies.

In short, the keys to a bank’s strategic management are essentially based on proper management of all inputs and outputs, which are linked directly or indirectly to each bank’s stakeholders.

After addressing the concept of banking performance and efficiency, another key concept in the banking sector is risk. Banks face a number of risks related to the nature of their business. The definition of these risks is the subject of the next subsection.

3.3 The notion of risk in the banking sector

The economic and financial environment has undergone major transformations such as liberalization, globalization and the extension of financial markets. The number and nature of the risks facing a bank is multiple. According to Lamarque (2009), the core business of a financial institution is to manage risk. All the functions of the bank must be oriented towards risk control. Finance is the core activity and risk is therefore the main decision criteria.

We will focus on a non-exhaustive list of risks incurred by the banks. These are liquidity, credit, operational, systematic and systemic risk. We consider these risks to be the main sources of bank vulnerability.

Liquidity risk

The bank as a financial intermediary is distinguished by two services: the qualitative transformation of assets and the management of means of payments (Diamond and Dybvig, 1983). It receives deposits and demand investments that are short and highly liquid commitments, and it grants loans and issues securities that are long term and illiquid assets. Through these operations, it creates liquidity. The fact that the bank's commitments are on demand and that its receivables are at term exposes it to a potential liquidity or insolvency risk.

Credit risk

This risk materializes when a borrower is no longer capable of meeting its loan repayment obligation and becomes insolvent. This leads banks to set aside provisions for non-performing loans that are deducted from their profits. A thorough review of the client's quality, monitoring the client and negotiating the loan are the bank's main concerns. The Basel Committee notes that "credit exposure encompasses not only the standard forms of lending, but all on and off-balance-sheet positions which may involve any element of loss if the counterparty defaults" (BIS, 1991). When banks have full

responsibility for managing credit risk, they do not necessarily introduce the best hedges, leading to a large amounts of non-performing loans.

Operational risk

It is linked to deficiencies in internal controls and corporate governance. In the banking and insurance sector, this risk has a specific definition. Basel II prudential regulations (Decree of 20 February 2007) define operational risks as "The risk of loss resulting from inadequate or failed internal processes, people and systems or from external events, including events of low probability of occurrence, but bearing the risk of high losses". Operational risk is divided into 7 categories: Internal fraud, External fraud, Employment practices and workplace safety, Clients, products, and business practice, Damage to physical assets, Business disruption and systems failures, Execution, delivery and process management. The more operational risk increases due to staff behavior, system inefficiencies, exposure to external fraud or any external event, the greater the losses registered and therefore the decrease in profitability (Karfoul and Lamarque, 2011).

Systematic risk

Systematic risk in the case of a bank, also called market risk, measures the risk of a security based on its sensitivity to variations in market return and that cannot be eliminated by diversifying the portfolio. Other financial institutions are not necessarily impacted by this risk (Berger, 2016). Market parameters, also known as risk factors, include fluctuations, interest rates, exchange rates and stock market indices. The four risks mentioned above are related. Credit risk can be generated by operational risk (internal fraud in the loan granting process), market risk (higher rates that lead to higher monthly payments), liquidity risk (massive loan granting that may not keep pace with deposit withdrawals).

Systemic risk

This risk does not come from the unconditional failure of a bank, but more specifically from the failure of a bank when the entire financial system is undercapitalized or illiquid. If a bank fails in isolation, the risk is absorbed by the interbank market. However, in a period of global stress where the entire financial sector is undercapitalized, financial firms cannot find the necessary resources on the interbank market (Achraya et al., 2014). During the 2007-2009 crisis, the failure of several large

international financial institutions caused shockwaves to ripple throughout the financial system and impacted the real economy. A shock that takes on a macroeconomic dimension. De Bandt and Hartmann (2000) consider contagion or the propagation of the failures in one institution, market, or system to another, as a key element of systemic risk. Caruana (2010) argues that the financial system is a network of interconnected balance sheets, which means that a shock hitting one institution can spread to the other institutions that are connected to it and become systemic. For example, the credit boom of the noughties and housing bubbles in many countries are good examples of widespread imbalances. Low interest rates and financial innovation have led to excessive risk-taking by financial institutions and increased unsustainable debt levels. Then, the collapse of credit markets around the world that followed contributed to the spread of the crisis (Pais and Stork, 2013)

In 2009, regulators identified a category of financial institutions that had greatly contributed to the deepening of the financial crisis. The Financial Stability Board (2011) distinguishes G-SIFIs "Global Systemically Important Financial Institutions" due to their size, complexity, systemic interconnectedness and their contribution to national and global financial systems (BIS, 2013). Their failure propagates contagion across the system, and can also trigger the failure of other banks and degenerate a global financial crisis. The purpose of designating systemically important financial institutions is to address systemic risks and the moral-hazard issue associated with these banks. Regulators are concerned by the fact that these banks are too big to fail, too connected to fail and too many to fail (Varotto and Zhao, 2018; Chan-Lau, 2010; Acharya and Yorulmazr, 2007).

Other factors may exacerbate systemic risk. This is *Shadow Banking*. These are off-balance sheet operations and are therefore not regulated. According to Acharya (2009), the shadow banking system is likely to spread risk to the traditional banking system.

According to Lamarque (2009), the management system for these risks has two dimensions: a technical dimension and an organizational and human dimension that combine to try to achieve maximum security. Therefore, it is necessary to reconcile finance and management.

Aside from these risks, several aspects of the banking sector contribute to its fragility. Banks are not immune to asymmetric information issues. Banks are more opaque than other companies (Furfine, 2001; Morgan, 2002). The main source of this opacity is loans. Levine (2004) explains that credit quality is difficult to observe. Banks can easily hide or adjust the quality of their loans for long periods. Asymmetric information between bank managers and potential investors exacerbates

governance problems within these institutions. It can even amplify agency problems within banks (Morgan, 2002; Levine, 2004).

Another aspect that plays an important role in the functioning and financial stability of financial institutions is governance (Ellis et al., 2014). Weak governance leads to inappropriate management (Berger and Bouwman, 2013). These researchers argue that all relevant studies show that governance structures have a considerable influence on bank risk. On the other hand, Andries and Nistor (2016) note that strong governance can encourage financial firms to take excessive risk thus increasing systemic risk. Iqbal et al. (2018) examine the link between systemic risk and incentives for risk-taking based on executive compensation. They found that financial institutions benefiting from these incentives were associated to significantly higher levels of systemic risk during the 2008 crisis. Laeven and Levine (2007) and Bolton et al. (2007) found that large banks that engage in multiple activities suffer from agency problems and poor governance that can lead to systemic risk.

Because of the complexity of these risks, internal management of these risks may be insufficient and requires external oversight and a regulatory framework. For Andries and Nistor (2016), regulation can be seen as a complementary external force of governance, which may be particularly relevant to reducing systemic risk in banks with weak internal governance.

In the next sub-section, we develop the regulations and measures taken by the authorities aimed at mitigating the risks incurred by the banks.

3.4 The institutional environment

Given their vital role in the economy, the opacity of their activities, their exposure to macroeconomic shocks and systemic risk, it is not surprising that banking institutions are subject to so many constraints and control compared to non-financial firms. The most important corporate control mechanism in banks is regulatory intervention (Prowse, 1997). Two arguments are often put forward to explain this strong regulation, namely the protection of depositors (Demirgüç-Kunt et al., 2005) and systemic risk (Flannery, 1998). The *Basel Committee on Banking Supervision* (BCBS) was established for this purpose.

Basel I was the first attempt at creating a global benchmark for banking regulation. Thus, in order to maintain the stability of banking institutions, minimum capital requirements have been subject to a wide range of regulations since the first accord was established in 1988 (BCBS, 1988). Two main

objectives are assigned to the accord: strengthen the stability of the international banking system and create conditions for fair competition between international banks by diminishing the existing sources of competitive inequality. To achieve these objectives, international banks are required to meet a minimum ratio of capital to weighted risk assets of 8% (Cooke ratio: $\text{capital} / (\text{credit risk} + \text{market risk}) > 8\%$). The Basel I design is far from perfect because of its many shortcomings. First, the accord focuses solely on credit risk. Second, it allocates risk and regulatory capital based on the identity of the borrower. These shortcomings reinforced the need for a revision of the 1988 Basel I accord, hence the publication in June 2006 of Basel II. This agreement presents two main innovations compared to Basel I. First, it is not concerned with the identity of the borrower, but rather the borrower's solvency. Thus, in addition to the two stated objectives of Basel I, Basel II aims to promote the adoption of stricter risk management practices. Basel II contains three pillars. Pillar 1 sets the minimum capital requirements and defines the method of measuring risk in order to calculate the corresponding regulatory capital. Pillar 2 concerns Supervisory review, the prudential examination of the adequacy of an institution's capital and deals with the appropriate measures that the supervisor should take if the bank's own risk assessment is not satisfactory. Pillar 3 tackles Market discipline by imposing disclosure of information to the market to enhance transparency and encourage good banking practices. Basel II introduced the new Mac Donough ratio, which takes into account the borrower's solvency and operational risks, two elements absent from the Cooke ratio (Mac Donough ratio: $\text{regulatory capital} / (\text{credit risk} + \text{market risk} + \text{operational risk}) > 8\%$).

The eruption of the sub-prime crisis in mid-2007 and its consequences highlighted the shortcomings of Basel II. It was striking to see in the middle of the crisis that the banks that were struggling with excessive leverage had risk-adjusted capital ratios well beyond regulatory minimum capital requirements yet insufficient liquidity. These shortcomings were accompanied by poor governance and poor risk management. The dangerous combination of these factors was demonstrated by the mispricing of credit and liquidity risk and excessive credit growth. Accordingly, the Basel Committee published Basel III in December 2010 (BCBS, 2010). Basel III builds on the three pillars of the Basel II framework and adds several new measures. At the microeconomic level, it supplements the capital ratio of Basel II. At the macroeconomic level, it aims to limit leverage in the banking sector going into a crisis thus mitigating the risk of deleveraging during the crisis. Basel III also introduces two ratios for the first time: a short term liquidity coverage ratio (LCR) and the long-term net stable funding ratio (NSFR) (BCBS, 2014). Other new elements have been introduced, including measures to address systemic risk, interdependence arising from *shadow banking*, and the supervision of global systemically important financial institutions (G-SIFIs) (see BCBS, 2010, p.7)

Systemic risk and systemically important financial institutions received special attention from supervisory authorities. The Financial Stability Board FSB (2011) published a set of policy measures to combat systemic risks and moral hazard associated with financial institutions. These measures consist of (i) developing measures to identify and monitor systemic risk, including regulated banking services and shadow services, (ii) identifying and containing systemic risk through credible instruments and tools, (iii) achieving regional and international cooperation that is essential to address systemic risk challenges that often take on a supranational scale (Ellis et al., 2014).

Apart from regulatory measures, the legal environment can play a role in the behavior and development of the banking sector. Levine (1998) highlights the close relationship between the legal system and banking development. Countries with legal systems that rigorously enforce laws and contracts have better-developed banks than countries with more lax enforcement. In addition, these differences can be attributed to the legal origin of the country. As noted by LaPorta et al. (1998) that English Common Law countries have laws that place more emphasis on the rights of creditors than the French, German and Scandinavian Law countries.

Barth et al. (2013) conducted four international surveys covering 180 countries over a period from 1999 to 2012. These surveys provided information on bank regulatory and supervisory policies and how these have changed over time. The result of this effort is the construction of more than 50 indices that rate capital management policies, ownership, bank activities, the arrival of new banks on the market, the powers of supervisors, the ability of private investors to monitor bank behavior and govern banks, deposit insurance characteristics, loan classification and provisioning practices and many other areas of banking regulation and supervision. They also assess the organization of regulatory agencies and the size and structure of the entire banking system, the existence of one or more regulators. Thus, they note the size of each country's banking system, concentration in the system, and the role of public and foreign banks. These surveys explain the disparities between countries in terms of the relationship between national banking authorities, the enforcement of financial regulation and supervision and the size and structure of the banking system. All of these factors can influence the quality of the country's banking system and can contribute to its stability or fragility.

In addition, a number of researchers conduct empirical analyses based on this data to explore the factors that explain banking sector policies and the consequences of such policies on a variety of

outcomes. For example, the studies of Laeven and Levine (2009), Pasiouras et al. (2006), Chortares et al. (2012), Anginer et al. (2018), Wu et al (2017), Pasiouras et al. (2009) and Barth et al. (2013).

After laying out the foundations of CSR and the main principles of the banking economy, in a next section, we try to reconcile the two literatures and present previous work on the effects of banks adopting CSR. Research on bank CSR is very limited. A review of the literature conducted by McDonald and Lynette (2015) over a 20-year period from 1993 to 2013 found that studies on CSR banks are still emerging. Banks are often excluded from empirical work samples because of their special characteristics. They have different accounting requirements and risk exposures from those of other sectors. They also operate under unique regulatory codes. As such, studies in finance and accounting generally study financial institutions separately from other sectors (e.g. Abreu and Gulamhussen, 2013; Riedl and Serafeim, 2011). The next section examines work on CSR banks.

4. Banks and CSR

In recent years, there has been a rush by banks to embrace CSR in order to improve their image, which has deteriorated because of their involvement in accounting and financial scandals. The investment by banks in CSR activities is a response to the strong pressure they came under from society because of their central role in the economy. As indicated in the section below (section1), CSR has positive effects on a company's business. Consequently, CSR can also help banks to differentiate themselves (Pomering and Dolnicar, 2009) and strengthen their brand image (Gracia de los Salmones et al., 2005).

In this section, we attempt to analyze the potential aspects and consequences of the banks' commitment to CSR. We initially focus on the aspects of CSR integration within banks. Second, we try to understand the incentives that drive banks to adopt these practices. At the end of the section, we analyze the effects of such a commitment on the performance and risk of banks.

4.1 The integration of CSR into the banks' activities

The economic crisis had a strong impact on banks' image and reputation. They need to renovate themselves, and this certainly begins with their management, the need to restore customer confidence through improved service quality, respect for commitments made and a strengthened role for governance (Lamarque, 2009). As a result, banks are now spending considerable sums on societal and environmental causes to strengthen their image and build positive relationships with their stakeholders (McDonald and Rundle-thiele, 2008). Commitment to CSR is one of the most widely used tools to improve the company's image (Poolthong and Mandhachitara, 2009). In this sense, Rugimbana et al. (2008) noted that banks must adopt a strategy to maintain a well-controlled balance between the social and economic aspects of their services in order to meet the needs of their stakeholders.

Scholtens (2009) conducted a study on the degree of banks' commitment to CSR and compares these results to those reported by Jeucken (2001). He concludes that banks paying much more attention to their social responsibilities as time goes by. Most banks are disclosing information about their CSR activities and are increasingly adhering to international codes of conduct such as ISO 14001 certification or the Equator Principles. Banks that are signatories to the Equator Principles filter funded projects so that they meet social and environmental criteria³. They refuse to finance ethically questionable industries and ensure that funded projects reflect social responsibility. Borrowers must report on the outcome of loans and their projects must meet the requirements of these principles. The bank may withdraw funds if the borrower does not comply with these principles (Shen et al., 2016).

According to Sarro et al. (2007), the involvement of banking institutions in CSR initiatives is a response to their commitment to stakeholders: shareholders, employees, customers, suppliers, the government, investors or the local community. In general, social dimensions (including relations with the community, employees and customers), governance, the economy and the environment are indicators that reflect the company's commitment to CSR activities (Johnson and Greening, 1999).

The integration of CSR activities within a bank takes several forms. In retail banking, micro-credit can meet CSR requirements, since it consists in providing small-scale loans to entrepreneurs and artisans who cannot access conventional bank loans (Gadioux, 2010). Moreover, micro-finance

³ www.equator-principles.com

covers other activities aimed at financial inclusion, such as micro-savings and micro-insurance (Hikkerova and Bortolotti, 2013). These measures also reduce social inequality (Wu and Shen, 2013).

Corporate and investing banking applies the principles of CSR in its financial intermediary function as well as in asset management. It sets a number of social and environmental criteria in product design, credit and investment policy, in a word in its business strategy (Prior and Argandona, 2009).

In the area of asset management, CSR banks are developing socially responsible investment funds (SRI). Thus, financial investments incorporate the principles of sustainable development, including environmental, social, ethical and governance issues (Gadioux, 2010).

In environmental management, the banking sector is not considered as being particularly polluting. Even though banks can indirectly impact the environment through their project financing decisions (Esteban-Sanchez, 2017).

The bank's relationship with its community is measured by its commitment and efficiency in building a relationship of trust through its philanthropy policy and respect for business ethics. This also includes human rights concerns (Esteban-Sanchez, 2017). Good community relations can encourage local governments to help banks by cutting taxes or simplifying legal standards (Preston and O'Bannon, 1997).

On the employee side, CSR banks are committed to building trust and loyalty among its employees through responsible practices generally related to employment quality, benefits, training and diversity (Esteban-Sanchez, 2017). A good personnel management policy leads to competitive advantages in terms of efficiency, productivity and earnings by reducing staff turnover, absenteeism and stress, which ultimately increases profitability (Esteban-Sanchez, 2017).

With respect to shareholders, the bank must provide transparent information about its business. It must also ensure financial profitability and good risk management by adopting control and regulatory measures for its business.

The bank offers clients products and services that meet their social and environmental quality expectations. Researchers are exploring the links between banks' CSR efforts and client attitudes such as loyalty, brand preference and buying behavior. They found that CSR improves loyalty, trust (Bhattacharya and Sen, 2004) and increases sales volumes of products and services resulting in stronger cash flows (Gruca and Rego, 2005), which ultimately improves financial performance (Waddock and Graves, 1997; Luo and Bhattacharya, 2006).

Another key feature of banks as regards CSR is ensuring the quality of disclosed information. This principle contributes to a reduction in information asymmetry. External rating agencies play a key role in ensuring investors are well informed about a bank's overall solvency and its ability to meet its financial obligations. According to Nier and Braumann (2006), rating agencies can have access to private information that they take into account in their ratings. As a result, investors can have reliable information and transparency about the bank's business.

The last decades saw the creation of so-called ethical banks⁴. These banks differ from conventional banks in several ways. Ethical banks avoid investing in complex financial instruments that promise high profits but also imply higher risk. They consider this economic logic to be responsible for many international crises, social inequalities and environmental problems. Their stock market participation is generally limited to long-term, non-speculative operations. They focus on the core business of banking: collecting savings and distributing credit, instead of trading on secondary financial markets. In developing their credit policies, ethical banks emphasize the social, environmental and economic dimensions of the projects they finance. Moreover, they encourage savings-borrowing solidarity to provide loans at low interest rates and allow depositors to specify the type of project they want to support. The logic of transparency is an essential element in their activities to the point that they publish all approved loans with details on the nature of the project, the name of the beneficiaries and the amount of funds granted (Paulet et al., 2015)

In recent years, we have seen an increased commitment by banks to CSR. This has given rise to interest by many researchers in studying the banks' motivations in adopting CSR. Below we present the various motivations advanced by previous studies.

4.2 The motivations for bank's commitment to CSR

The banks underwent a major reputation crisis and deterioration in their image increasing consumer distrust and skepticism. The brand image of the banks was uncertain after the financial crisis. Perez and Del Bosque (2015) found that the bank's CSR brand image had an impact on customer attitudes such as their choice of bank, satisfaction, banking recommendations and behavior towards the bank's services. CSR generates positive attitudes and behaviors (Fatma et al., 2015). Thus, strong client

⁴Example: GLS Bank, Triodos bank, Banca Popolare Etica, Fiare Banca Etica, Cultura Bank, Ekobanken, Merkur.

preferences and positive reactions to CSR encourage banks to engage in these activities (Perez and Del Bosque, 2014).

A number of researchers are trying to shed light on what drives companies to adopt CSR activities. For Jones (1995), companies can gain competitive advantage through CSR. He shows that ethical behavior provides a competitive advantage to the company, including as regards stakeholder relations. In this sense, Chih et al. (2010) found that large companies, operating in highly competitive industrial sectors, tend to invest in CSR activities to strengthen their competitive advantage. However, when a company deviates from the norm by adopting environmentally sound production technology, it can gain a competitive advantage over the others (Flammer, 2015). Other researchers say that companies are engaged in CSR to maximize their profit (McWilliams and Siegel, 2001; Bagnoli and Watts, 2003). While other authors consider the integration of CSR to be a moral duty that enables firms to act responsibly towards society (Freeman and Evan, 1990). For Baron (2001), firms can adopt CSR on altruistic grounds⁵. Altruistic CSR leads to an increase in social performance for all stakeholders and meets their needs, but it comes at a cost that weakens financial performance.

Research has also been carried out on the banking sector to explain the motives that drive banks to adopt CSR activities. Among these studies, Wu and Shen's (2013) analysis explored a sample of 162 banks from 22 countries and examined three driving motives: altruism, greenwashing and strategic choices. They ruled out greenwashing⁶ as a reason for engaging in CSR, because it does not impact performance measures. They also show that altruism does not motivate the banks either. The social performance of altruistic banks generates additional costs that adversely affect the financial performance of these banks. From this result, the researchers concluded that banks adopt CSR by strategic choice. The CSR brand image allows them to differentiate themselves from competitors, which is how they can raise interest rates to increase their profits considerably.

The same observation is defended by Esteban-Sanchez et al. (2017) who studied the CSR reports published by banks over the past two decades. It appears that a strong reputation and financial viability are the main arguments for adopting CSR activities, in addition to altruistic and ethical motivations. Reputation is used by many companies to justify CSR initiatives on the grounds that they enhance a company's image, strengthen its brand and even increase its stock value (Porter and Kramer, 2006). It is through strategic CSR that the company will have the most significant social

⁵Altruism is directed toward the well-being, preservation, understanding and protection of others and nature. The "altruism" value is likely to have a positive influence on the firm's ethical and legal behavior and a negative influence on the firm's economic behavior (Aron and Chtourou, 2014)

⁶Greenwashing aims to improve the firm's image without significantly changing the business activities (Frankental, 2001)

impact and reap the greatest business benefits (Porter and Kramer, 2006). As a result, CSR has become an integral part of the business strategy (Carroll, 1999; McWilliams et al., 2006). McWilliams et al. (2006, p.4) find that "*CSR can be an integral element of a firm's business and corporate-level differentiation strategies and can be viewed as a form of reputation building or maintenance*".

To this end, Scholtens and Dam (2007) show that banks adhering to the Equator Principles have been able to improve their reputation and have less exposure to the risks often associated with financial institutions. Shen et al. (2016) compare two categories of banks: Banks that engage in CSR and those that do not. They found that CSR banks have a better reputation than the other category. This reputation enables them to retain customers, increase the amount of deposits and loans and differentiate themselves from non-CSR banks. They concluded that CSR brand awareness is an important factor in increasing customer loyalty, improving reputation and therefore creating economic value over time. Mcdolandls and Rundle-Thiele (2008) explain that the strategic motive has a positive but indirect impact on customer satisfaction, particularly in terms of loyalty. From this perspective, Fatma and Rahman (2016) suggest that a socially responsible image of the bank has a favorable effect on consumer behavior towards the bank. Moreover, the importance of building and managing a reputation in the banking sector is high due to the intangible nature of the products and the need to build stakeholder trust (Perez et al. 2013).

To sum up, we see a near consensus in the findings of previous work. CSR is adopted for strategic motives to enhance the reputation and brand image of the bank with the aim of maximizing profit. Except for these effects, is there a positive effect on banks' financial performance? To answer this question, we present in the next subsection some previous studies that specifically analyze the link between CSR performance and the financial performance of the banks.

4.3 Role of banks' CSR activities in their performance

CSR by banks generates additional costs in the form of donations, support for major international programs, programs to combat corruption or money laundering and microcredit programs for the poorer sections of society (Shen et al., 2016). However, the cost of a CSR approach is difficult to quantify because data on the exact amount of CSR spending in the banking sector are not available (Shen et al., 2016). But, while such spending is contained, it does not prevent banks from increasing their profits (Yen, 2014).

Wu and Shen (2013) found that CSR affects both bank costs and revenues. Engaging in CSR leads to an increase in costs. Nevertheless, revenues increase even more due to the good reputation that attracts more loan applications and deposits when compared to non-CSR banks. Thus, CSR can generate financial benefits that exceed the costs generated, thereby improving financial performance over the long term. Wu et al. (2017) found that the relationship between the banks' CSR performance and financial performance is significantly positive. These researchers found "more corporate social responsibility, better financial performance".

Scholten and Dam (2007) state that commitment to the Equator Principles is associated with additional costs. However, this commitment does not impact stock prices. Both researchers found that CSR policy is specifically adopted by large banks and that the financing of CSR projects only accounts for a small part of the overall activities of these large banks. This is why there has been no significant impact on stock market prices. These banks achieved a much lower ROA, which is why implementing the Equator Principles has tangible associated costs. It therefore appears that engaging in CSR activities is not just for show, but does come at a real cost. However, the perceived benefits of adhering to these principles outweigh the costs incurred.

The same cost-benefit ratio for CSR was studied by Simpson and Koher (2002) across a sample of 385 US banks. These authors confirm that the costs of being socially responsible are offset by improved productivity and other factors that improve financial performance.

As explained above (Section 1.3.2), there is no consensus as to the nature of the impact of CSR performance on corporate financial performance. Although most previous studies find a positive link, other studies find a negative or non-existent link. We consider the same is true for the banks. From a sample of international banks, Soana (2011) examined the relationship between CSR and financial performance and showed that there was no statistically significant link between CSR and financial performance.

After addressing the effect of CSR performance on banks' financial performance, the impact of CSR performance on the risks incurred by corporations and in particular the banks should be examined.

4.4 Role of CSR performance on bank risk

At the center of the arguments in favor of CSR is the idea that such initiatives reduce risk. The researchers show that CSR performance reduces idiosyncratic and systematic risk (Luo and

Bhattacharya, 2009; Oikonomou et al., 2012; Salama et al., 2011; Jo and Na, 2012; Orlitzky and Benjamin, 2001).

Stakeholder theory predicts that a strong social performance reduces the firm's financial and operational risks (McGuire et al., 1988). Research based on Instrumental Stakeholder Theory also finds a negative relationship between CSR and financial risk (Jones, 1995).

Other studies support the same view. Oikonomou et al. (2012) show a strong positive relationship between social irresponsibility and financial risk and a weak negative relationship between CSR and systematic corporate risk. Also, Lange and Washburn (2012) indicate that the activities of socially irresponsible firms have a negative influence on idiosyncratic risk, due to a decline in investor confidence and high stock price volatility. The same result is mentioned by Price and Sun (2017). Mishra and Modi (2013) refer to stakeholder theory to suggest that managing stakeholder expectations through CSR can reduce idiosyncratic risk. Bouslah et al. (2013, 2016) found that the company's governance and social performance negatively impact idiosyncratic risk and reduce stock price volatility during adverse periods (financial crisis, economic recession...).

In addition, firms with low levels of systematic risk are more likely to be in a position to engage in social responsibility activities. Conversely, companies with a high level of CSR activities can be considered to be better managed and thus less risky (Roberts, 1992).

As for the banks, previous studies show that CSR performance reduces different types of bank risk as well. Zhao et al. (2016) found that CSR significantly reduces the operational risk of Chinese companies. Wang and Hsu (2013) found that strong governance contributes to a reduction in operational risk in financial firms.

On the credit risk side, Simpson and Kohers (2002) and Shen et al. (2016) indicate that CSR banks have significantly lower non-performing loan volumes than non-CSR banks. Wu et al. (2017) conducted a study of 194 banks in 22 countries and confirmed that banks commitment to CSR reduces the volume of non-performing loans. CSR banks integrate environmental and social considerations into their bank loans and their other products and services (Thompson and Cowton, 2004). Project funding and granting of loans align with the requirements of the *Global Reporting Initiative* (GRI) and *Financial Services Sector* (FSS). In addition, the development of environmental credit risk management (ECRM) integrates environmental risk assessment procedures into the credit assessment process and is a key element in bank risk management (Mengze and Wei, 2013).

Banks naturally tend to take on excessive and growing risks. While implementation of CSR activities can mitigate risks.

5. Conclusion

We can see that the literature on the fundamentals of CSR and the banking economy is abundant. However, research on CSR by banks remains very limited to date. Most of the previous work on CSR excludes banks from their samples due to the complex and regulated nature of banking. But we have tried to explore and combine the literature on CSR and the banks to inform the different aspects, mechanisms, and effects of banks engaging in CSR activities.

The first section of this chapter was given over to presenting the foundations of the CSR concept. Firstly, we listed a number of works that sought to define the concept of CSR. It turns out that this concept is complex and difficult to pin down. As a result, many different theories and diverging approaches attempt to delineate this concept. We have studied the work of Gond and Mullenbach-Servayre (2004) and Garriga and Melé (2004) which establish a classification of theoretical approaches and a typology of the foundations of CSR. In another point, we examined previous studies that discuss the effects of CSR on financial performance. There is a debate as to the nature of this relationship and the findings are inconclusive. Nevertheless, many studies find a positive relationship between CSR performance and financial performance. An analysis of the business case shows that CSR provides a competitive advantage, a strong reputation and legitimacy as well as reducing costs and risks for the firm. In addition, accommodating the interests of all stakeholders is an effective mechanism for creating value.

In a second section, we discussed the literature concerning the role of the banks in the economy, the concept of efficiency, the risks incurred by banks and the regulations put in place to mitigate these risks. We find that measuring efficiency is more relevant when assessing a bank's performance. We also argue that a stable banking sector is essential to a well-functioning economy whereas it is inherently vulnerable and has to cope with a large number of risks. Therefore, banking institutions are subject to strict controls and regulations established by the Basel Accords and the *Financial Stability Board* which attempt to protect the banking system from systemic risk that can lead to economic collapse.

The final section deals with banks that adopt a CSR policy. It sets out previous studies that analyze aspects of integrating CSR into banks' activities and the motives for such engagement. We note that banks engage in CSR for strategic reasons. Brand image, customer loyalty, strong reputation and profit maximization are the motives that drive banks to engage in CSR activities. In addition, this activity positively impacts financial performance and plays a significant role in reducing risk.

6. Bibliography

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Chapter 2: Corporate social responsibility and bank efficiency

1. Introduction⁷

The question of whether adopting corporate social responsibility (CSR, henceforth) can improve a firm's financial standing has been the subject of various academic investigations. Existing studies show that CSR impacts the financial performance of firms (Lins et al., 2017), their market value (Ding et al., 2016; Ferrell et al., 2016), and their financial risk (Kim et al., 2014). In spite of an important body of research, whether shareholders' interests are consistent with those of other stakeholders is still up for debate. Conflicting results could be attributed to the fact that the motives underlying firms' engagement in CSR could influence the way CSR impacts performance (Wu and Shen, 2013). Ambiguous results may also come from the fact that the financial consequences of CSR could be sector-specific (Esteban-Sanchez et al., 2017).

In the wake of the 2008–2009 financial crisis, in which the behavior of financial institutions has been questioned, various scholars have attempted to specifically study CSR in the banking sector. This focus is interesting for various reasons. First, banks are key elements in an economy. They play an important role in economic development and may create several external benefits to society (Shen and Lee, 2006). By facilitating the transfer of resources between lenders and borrowers, they contribute to sustained prosperity (King and Levine, 1993). Second, compared to other sectors, banks are subject to particularly stringent expectations in terms of providing feedback to stakeholders such as governments, media, or communities (Wu and Shen, 2013). Because banks benefit substantially from society (e.g., through government guaranties or even bailouts (Iannotta et al., 2013)), public opinion often stresses the need for them to engage in CSR (Shen et al., 2016). That being said, the impact of CSR on banks' profitability remains controversial. On the one hand, banks may be reluctant to engage in CSR because of the costs associated with the implementation of CSR policies. On the other hand, CSR could also have a positive impact on financial performance through its positive impact on reputation. Third, understanding the impact of CSR in the banking sector is especially important given the fact that banks are often excluded from samples in empirical work due to their special characteristics (e.g., reporting and accounting requirements, specific regulatory framework). As a result, studies linking CSR to finance generally do not assess the banking sector (Finger et al., 2018).

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Some authors have tried to empirically assess the relationship between CSR and banks' profitability. They tend to show a positive link between CSR and some bank profitability indicators such as return on assets or return on equity (Nizam et al., 2019; Wu and Shen, 2013; Shen et al., 2016; Wu et al., 2017). However, using ratios to assess the performance of banks has some limitations. Indeed, the univariate nature of ratio analysis may be problematic when analyzing complex multidimensional organizations, such as banks, which produce multiple outputs using multiple inputs. To circumvent the shortcomings of ratio analysis, most studies focusing on bank performance make use of efficiency frontier techniques (Berger and Humphrey, 1997). Among the available modeling techniques in the banking sector, Data Envelopment Analysis (DEA, henceforth) is probably the most successfully used operational research technique in assessing bank performance (Fethi and Pasiouras, 2010).

In this paper, we use the DEA Dynamic Network Model to evaluate bank efficiency and study how it is impacted by CSR. Using an international sample of 184 banks in 41 countries over the 2009–2015 period, we find that the CSR of banks is positively related to their efficiency. Specifically, we show that a unit-increase in a bank's CSR score is associated with a 0.13 percentage point increase in its efficiency. We further show that the positive impact of CSR on bank efficiency is contingent upon various economic and institutional factors. Specifically, it appears that CSR only increases bank efficiency in developed countries while it has no impact on efficiency for banks located in developing countries. It also appears that the CSR-efficiency relationship only holds in countries featuring a high level of investor protection. Finally, we find that a high degree of country stakeholder orientation is necessary for the CSR-efficiency link to materialize.

Our contribution to the literature is manifold. First, we explore a microeconomic measure of bank performance: technical efficiency. The existing literature examines the link between CSR and financial performance through an analysis of performance ratios. However, the analysis of ratios is limited and incomplete as it focuses on a part of business activity using very few variables. Technical efficiency, unlike ratios, enables a large number of variables to interact and provides a multidimensional analysis of the company's performance. It analyzes the performance at all stages in the bank's production process. In our study, we measure efficiency using the DEA method to identify benchmark banks that have the best practices as well as banks that need to improve the management of their inputs and outputs. Second, we apply the DEA Dynamic Network (DEA-DN, henceforth) model to estimate efficiency scores. Most previous studies estimate efficiency using a

basic DEA model that focuses on a single period. This can be a significant limitation, especially for the banking industry. Indeed, the basic DEA model does not enable the dynamic effect of performance over time to be traced (Tsionas et al., 2015). When the network and dynamic models are combined, a more comprehensive analysis is obtained since the model takes into account the dynamic change in efficiency between two periods and estimates the efficiency of each sub-process in the production process. This method is the most appropriate when it comes to assessing the performance of banks that implement CSR policies since the performance of these activities are seen over the long term and DEA-DN provides just this long-term assessment. Third, we study an international sample of banks. This allows us to differentiate between developed and developing countries. In doing so, our study follows the work of Finger et al. (2018). However, our study differs from theirs in various respects. First, we use technical efficiency as a performance measure instead of univariate measures (e.g., ROE, ROA, NII). Second, we measure the impact of actual CSR performance while they study the impact of adopting the Equator Principles (EP). These are very different indicators especially given the fact that adopting EP can be a form of greenwashing (Finger et al., 2018). Finally, the international nature of our study also enables us to assess the extent to which countries' institutional environment and stakeholder orientation shape the CSR-efficiency relationship.

Our paper proceeds as follows. Section 2 presents an overview of CSR in the banking sector and develops the hypotheses. Section 3 provides a description of the data, control variables and methodology. Section 4 discusses the results. Section 5 concludes.

2. Related literature and hypotheses

CSR has been discussed in academic studies for decades. The debate focuses on why firms would invest significant resources on CSR activities and features two conflicting views. The shareholder view stems from neoclassical economic theory according to which the only responsibility of corporate managers should be to maximize profit (Friedman, 1970) within the boundaries of what is permitted by the law. Similarly, Levitt (1958) criticizes beyond-compliance actions by firms, considering their sole responsibilities to be “to obey the elementary canons of everyday face-to-face civility and to seek material gain”. According to this view, resources used for CSR purposes are

wasted and should therefore be reallocated toward firm value-maximizing projects. On the other hand, the stakeholder view (Freeman, 1984; Porter and Kramer, 2006) suggests that ethical behavior and profit are not mutually exclusive and that acting in all stakeholders' interests ultimately increases performance.

In light of this theoretical debate, numerous studies have tried to empirically assess the link between CSR performance and financial performance. Overall, although a majority of studies suggest a positive relationship between CSR and financial performance results remain ambiguous. This ambiguity may come from the fact that the impact of CSR on financial performance⁸ may be sector-specific (Esteban-Sanchez et al., 2017). Recently, some scholars have started to specifically study the consequences of CSR in the banking sector. Simpson and Kohers (2002) investigate a sample of US national banks and conclude to a positive relationship between social and financial performance. Using international samples, Wu and Shen (2013), Shen et al. (2016), Esteban-Sanchez et al. (2017), Wu et al. (2017), and Nizam et al. (2019) confirm these findings and show that the CSR of banks is positively associated with their financial performance as proxied by traditional metrics (i.e., ROA, ROE, NII).

However, using univariate measures to assess the performance of banks has some limitations as it may be problematic when analyzing complex multidimensional organizations which produce multiple outputs using multiple inputs. This is why, when analyzing bank performance, most studies use the concept of efficiency. Efficiency is a measure of the extent to which inputs are well used for an intended output.

There are various reasons suggesting CSR activities could have an impact a bank's inputs and outputs, and as a result on bank efficiency. Indeed, CSR activities can help firms build a strong reputation (Branco and Rodrigues, 2006; Hillman and Keim, 2001) which can in turn provide many benefits such as an increased ability to attract and retain valuable employees (Branco and Rodrigues, 2006; Fombrun et al., 2000; Turban and Greening, 1997). Increased employee productivity and loyalty are associated with a better management of human capital resources or,

⁸ See, for example, the meta-analyses of Margolis et al. (2009) and Endrikat et al. (2014).

from an efficiency perspective, a better use (processing) of inputs. In addition, customers may be willing to accept a lower rate on their deposits if it comes from a bank with strong CSR features (Wu and Shen, 2013). The lower cost of deposits, from the bank's perspective, is akin to a reduction in the cost of inputs.

A strong CSR performance – and the enhanced reputation that comes with it – also has the potential to increase customer loyalty (Fombrun et al., 2000) and draw customers away from competitors. In addition, increased reputation resulting from CSR activities can provide firms with the ability to price products less aggressively (Fombrun et al., 2000). In the case of banks, a good reputation could therefore increase profit by enabling banks to attract new customers and charge higher interests on their loans. Indeed, Kim et al. (2005) state that firms favor borrowing from banks with a good reputation even if they have to pay higher loan rates. In addition, a strong CSR-induced reputation can also provide banks with the ability to charge higher fees and commissions on other services (Wu and Shen, 2013). This expected positive impact of CSR on both interest and non-interest income indicates that CSR could increase a bank's outputs. Consequently, we formulate the following hypothesis:

H1: The CSR of banks positively impacts their efficiency.

The degree of economic development may also influence how CSR affects a firm's revenue (Wang et al., 2016). In developed countries, non-financial stakeholders such as customers, employees or NGOs are more sensitive to the CSR commitment of banks because of their increased awareness of social and environmental concerns. Inglehart (1990) explains that a culture shift has occurred in developed countries "leading to a de-emphasis of economic growth as a dominant goal of society, and the decline of economic criteria as the implicit standard of rational behavior". He further argues that the satisfaction of basic material needs fosters the emergence of post-materialist values potentially linked with environmental protection, workplace well-being, etc. For instance, it is argued that a minimum level of wealth is necessary for individuals to express a preference for environment preservation (Berthe and Elie, 2015; Scruggs, 1998). We thus assert that CSR policies in developed countries are more likely to help banks build a good reputation which in turn can increase their efficiency through better human capital management and improved pricing power. Therefore, we formulate the following hypothesis:

H2: The CSR-bank efficiency link is stronger in developed countries.

Countries that are similar in terms of economic development can nonetheless feature different institutional contexts. Hence, we also want to evaluate whether the quality of institutions shapes the impact of CSR on bank efficiency. According to the shareholder view of CSR, CSR activities may represent a waste of financial resources, potentially leading to a decrease in efficiency. For some authors, CSR policies could be used by managers as a means to extracting private benefits such as personal reputation (Barnea and Rubin, 2010; Brown et al., 2006; Chahine et al., 2019) and increased power within the firm (Cespa and Cestone, 2007; Surroca and Tribó, 2008). Hence, it appears that managers could possibly conduct CSR policies to benefit their own interests rather than to increase shareholder value. However, it has been shown that legal institutions shape the potential impact of CSR policies on firm value (Arouri and Pijourlet, 2017). If legal institutions are strong, shareholders have less difficulty to enforce their rights and they can more easily make sure CSR policies are not used by managers to maximize their own utility. We thus expect the positive effect of CSR on bank efficiency to be stronger in countries where investor protection is high since banks' managers are more likely to implement CSR policies to increase efficiency and not to extract private benefits. Consequently, we formulate the following hypothesis:

H3: The CSR-efficiency link is stronger in countries where investor protection is high.

Finally, a country's stakeholder orientation may also influence the CSR-efficiency relationship. Differences between countries in terms of institutional and social values may explain differences concerning the relationship between firms and their stakeholders (Van der Laan Smith et al., 2005). National legal environments related to stakeholders' protection or labor unions exert an influence on the extent to which CSR-related rules are enforced (Dhaliwal et al., 2014). CSR-related institutions thus encourage managers to take into account the expectations of stakeholders by reinforcing the legitimacy of non-financial stakeholders' claims and enhancing stakeholders' power (Dhaliwal et al., 2014; Van der Laan Smith et al., 2005). Consequently, we can expect the consideration of stakeholders' interests to be more important for banks in countries where stakeholder orientation is high. Therefore, we formulate the following hypothesis:

H4: The CSR-efficiency link is stronger in countries where stakeholder orientation is high.

3. Data and methodology

3.1 Sample selection

To create our international sample, we rely on the Sustainalytics database. Specifically, we include in our sample all banks covered by Sustainalytics for which the necessary financial variables are available in the Datastream database. This requirement reduces the number of banks to 184. Overall, our final sample comprises 184 banks from 41 countries from 2009 to 2015, yielding an unbalanced panel of 937 firm-year observations. Table 1 reports our sample distribution across country.

Table 1 Distribution across countries

Country	Number of banks	Country	Number of banks
Australia	5	Norway	4
Austria	5	Oman	1
Belgium	1	Pakistan	2
Brazil	6	Peru	2
Chile	4	Philippines	3
China	10	Poland	5
Denmark	3	Portugal	1
Egypt	2	Qatar	5
France	4	Russia	1
Germany	1	Saudi Arabia	1
Hong Kong	5	Singapore	3
Hungary	1	South Africa	2
India	12	Spain	5
Indonesia	5	Sweden	3
Israel	4	Switzerland	2
Italy	7	Thailand	6
Kenya	1	Turkey	6
Malaysia	7	United Arab Emirates	7
Mexico	1	United Kingdom	5
Netherlands	1	United States	33
Nigeria	2	Total	184

3.2 Bank efficiency

Following previous literature (Avkiran, 2009; Tone and Tsutsui, 2009), we use the DEA Solver Pro software to obtain efficiency scores. Efficiency values range from 0 to 100%. A score of 100% implies that the bank is efficient and is located on the efficient frontier. A score lower than 100% denotes inefficiency, i.e., that the bank must decrease its inputs and/or increase its outputs.

Specifically, efficiency is a microeconomic measure of productivity that evaluates the production process taking into account the volume of inputs and outputs. The concept of Pareto-Koopmans efficiency states “a production is fully efficient, if and only if, it is impossible to improve any input and output without reducing any other inputs or outputs” (Cooper et al., 2006). A firm is considered efficient when it lies on the production frontier where it is unable to increase the output level produced for a given input level, or to reduce the level of resources consumed to produce a given quantity of output.

There are parametric and nonparametric methods for estimating frontier efficiency. The non-parametric method is recognized as being a better and more robust efficiency analysis tool since it uses actual data from assessed units to construct the efficiency frontier without setting up a specific functional form. The main advantage of this method is that it allows for the accounting of multiple inputs and outputs. Among the non-parametric approaches, the method which is most often used is Data Envelopment Analysis (DEA). DEA makes use of linear programming for the development of production frontiers and the measurement of efficiency relative to the developed frontiers (Charnes et al., 1978). The efficiency production frontier for a sample of decision-making units (DMUs), i.e., banks in our case, is constructed through a piecewise linear combination of an actual input–output correspondence set that envelops the input–output correspondence of all DMUs in the sample (Thanassoulis, 2001). Each DMU is assigned an efficiency score that ranges between 0 and 100%, with 100% indicating an efficient DMU with respect to the other DMUs in the sample.

The two main drawbacks of traditional DEA is that (1) the model does not take into account the internal structure of DMUs and that (2) it does not evaluate the performance of DMUs over the long term (i.e., it neglects the impact of carry-over). Non-performing loans represent the main example of carry-overs for banks.

Fare and Grosskopf (1996) saw the need to explore the internal structures of this black box (see

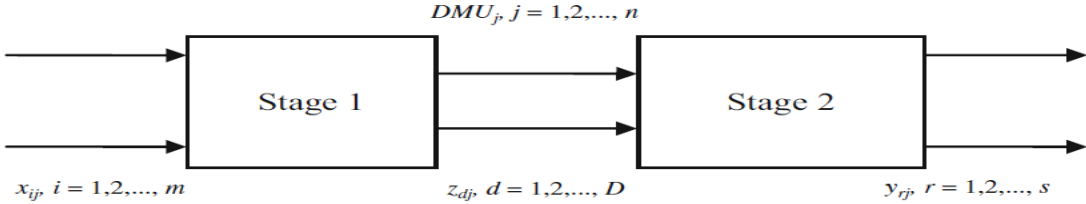
figure 1) and introduced the DEA Network. This method divides the production process into sub-processes forming a "Network" and considers the internal connection through linking variables (see figure 2). This decomposition helps to identify sources of inefficiency. Wang et al. (2014), Kao and Hwang (2008), Chen et al. (2010), Fukuyama and Weber (2010), Akhter et al. (2013), Avkiran (2009), Tone and Tsutsui (2009) study this model. However, the Network DEA model aims at optimization in a single period independently from the successive or previous period and it ignores activities carried over from one period to another. Färe and Grosskopf (1996) have introduced the dynamic model of the DEA to evaluate the performance of the Decision Making Unit (DMU) from a long-term perspective using carry-over variables to connect one period to another (Tone and Tsutsui, 2014) (see figure 3)

Figure 1: Basic DEA



Source : Tone et Tsutsui / Omega (2014)

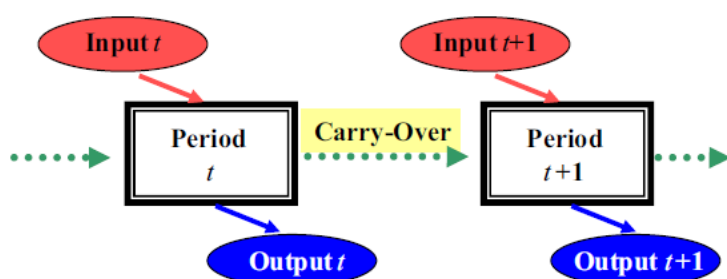
Figure 2: Network DEA



Source: W.D. Cook et al. / Omega (2010)

Which DMU_j is bank ($j=1, 2, \dots, n$); x_{ij} initial input ($i=1, 2, \dots, m$); z_{dj} is intermediate product ($d=1, 2, \dots, D$) et le y_{rj} is final output ($r=1, 2, \dots, s$)

Figure 3: Dynamic DEA



Source : Tone et Tsutsui / Omega (2014)

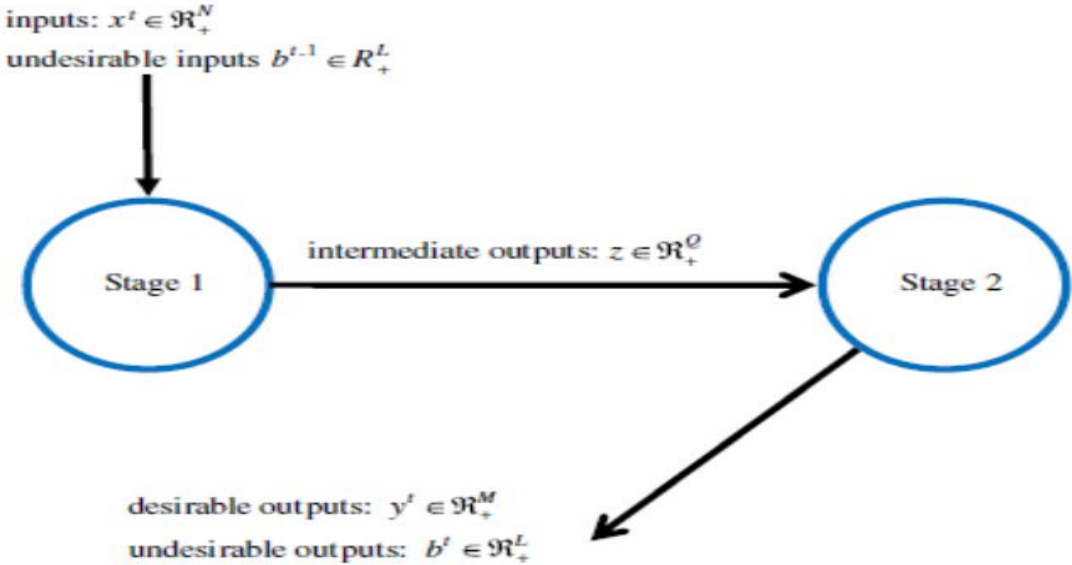
Recently, a combination of a Dynamic and Network models has been developed (Fukuyama and Weber, 2010,2015; Akther et al., 2013; Avkiran, 2015; Lozano, 2016; Tone and Tsutui, 2014). To address these shortcomings, authors (Tone and Tsutui, 2014) have developed the DEA Dynamic Network (DEA-DN). Because the returns from CSR activities appear over the long term, we use the DEA-DN model in this study to help assess the operational performance of CSR banks from a multi-period perspective (see figure 4)

3.2.1 Inputs and outputs

There are contradicting views in the literature as to the role deposits play in bank efficiency. Some studies report that banks adopt a production approach and deposits are treated as outputs (producing deposits using capital and labor), while other studies consider deposits as inputs with banks playing an intermediation role, i.e., converting deposits received into loans and securities (Paradi and Zhu, 2013). Neither the production approach nor intermediation approach alone can fully capture financial activities as a whole (Berger and Humphrey, 1997). The DEA-DN model integrates both production and intermediation approaches. This model considers deposits to be intermediate products, they are outputs from the first production stage and inputs into the second stage. We follow Fukuyama and Weber (2010) to select inputs, outputs, intermediate products (link) and carry-over variables for our study. In the first stage, we select staff costs, fixed assets and equity as inputs. These inputs are used

to produce deposits. In the second stage, deposits are used to generate loans and securities. Among these outputs are non-performing loans (NPL).

Figure 4: DEA Dynamic Network



Source: Akhter, Fukuyama et Weber (2013)

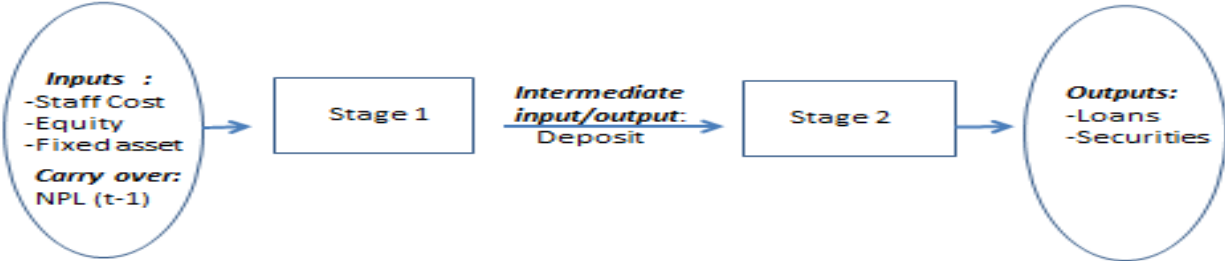
These are undesirable inputs (carry-over) for the following year. These loans cannot be fully or partially repaid by the borrowers and large amounts of these loans require larger amounts of other inputs (equity) to offset their negative effect (Fukuyama and Weber, 2015). DEA –DN model of this study is illustrated in figure 5.

There are two orientations scenarios for inputs and outputs. The input orientation aims to minimize inputs while at least satisfying the given output levels and the output orientation aims to maximize their production without requiring a decrease or increase in inputs (Cooper et al. 2007). The choice of orientations depends on the managerial policy of the leaders.

In the context of DEA – DN, if we opt for an input orientation or an output orientation at the level of the two stages simultaneously, it will not treat the intermediate products in a coordinated way. Since the outputs of the first step are the inputs of the second step, if one wants to improve the

efficiency of the first step by increasing its results, then the efficiency of the second step will be affected. For the choice of orientations, we relied on the work of Kao and Hwang (2011) who used an input orientation to calculate the technical efficiency of the first stage and applied an output orientation for the second stage. The intermediate products remained intact. We apply an input orientation at the first stage in order to minimize the quantity of inputs, because the non-performant loans carried over from the previous year require an additional quantity of the other inputs in order to mitigate their negative effect. The input orientation is preferred in various studies because banks generally have no direct control over the quantity of services demanded by their customers (Yilmaz and Günes 2015). In addition, the CSR activity generates additional costs, which would force banks to strategically focus on cost reduction. At the second stage, we apply an output orientation, keeping the same quantity of deposits produced from the first process and increasing the production of outputs.

Figure 5: Dynamic Network DEA



Source: construction of author

Depending on their management strategy, managers may choose to adopt an input bias (decreasing the amount of input while maintaining the same quantity of output) or an output bias (increasing output while maintaining the amount of input). Following Kao and Hwang (2011), we apply an input bias to decrease NPL. In the second stage, we apply an output bias to increase outputs. Those biases will treat the link variable in a coordinated way.

3.2.2 CRS versus VRS model

We note that our model assumes variable returns to scale (VRS) for production, also known as BBC (Banker Banker, Charnes and Cooper, 1984). The VRS assumption does not assume proportionality between inputs and outputs and is more appropriate for banking efficiency assessment than the constant return to scale model (CRS) as the field of this study involves banks of varying sizes operating in different financial markets (Wang et al., 2014; Avkiran, 2015). The VRS model allow accommodating situations. In the CRS model, also known as CCR models (Charner, Coper and Rhodes, 1978), an increase in the input is assumed to produce a proportional output increase. This assumption is appropriate when firms operate at an optimal level (Pasiouras, 2008).

3.2.3. Efficiency measure

Following our DEA-DN model, the technical efficiency of a DMU is made up of two stages: Stage1 and Stage2. To estimate the overall efficiency of the sub-stages, Kao and Hwang (2008) calculated the product of the two efficiencies E1 relating to Stage 1 and E2 relating to Stage 2: $E = E1 * E2$. This method is limited, as it can only be applied on a CRS model. This approach assumes that the relative weights of the intermediate products in the two stages are equal. However, this calculation method is not valid for a VRS model. Then, Chen et al. (2009) introduce an additive approach of the DEA Network in two steps. The overall efficiency of the whole process is an arithmetic mean weighted by the efficiencies of sub-steps. This method can be applied under both CRS and VRS models. Then, the overall technical efficiency is calculated as follows: $w1 * E1 + w2 * E2$. With $w1$ and $w2$ are the respective weighted weights of step 1 and step 2, provided that $w1 + w2 = 1$. The weighted weight represents the total size of the step (measured by the amount of total resources used in each step).

Cook and Hababou (2001) define overall efficiency as the arithmetic mean of the two components of efficiency. They estimated that the two steps have the same contribution to the overall efficiency, they assume that the weights of the two steps are equal: $w1 = w2 = 0.5$. Liang et al. (2008) and Zha et al. (2016) joined this line of idea and calculated the overall efficiency as follows:

$$E = (E1 + E2) / 2$$

Thus, in our study, we opt for this approach to calculate the overall technical efficiency of a DMU.

The model of our study is explained by the following equations:

Stage 1 : VRS input-orientation model : E1

$$\begin{aligned} &= \max \left(\frac{\sum_{p=1}^q w'_p Z_{pk} - w'_0}{\sum_{i=1}^m v_i X_{ik}} \right) \\ &\sum_{p=1}^q w_p Z_{pj} / \sum_{i=1}^m v_i X_{ij} \leq 1, \quad j = 1, \dots, n, \\ &\sum_{r=1}^s u_r Y_{rj} / \sum_{p=1}^q w_p Z_{pj} \leq 1, \quad j = 1, \dots, n, \\ &\left(\frac{\sum_{p=1}^q w'_p Z_{pj} - w'_0}{\sum_{i=1}^m v_i X_{ij}} \right) / \sum_{i=1}^m v_i X_{ij} \leq 1, \quad j = 1, \dots, n, \\ &u_r, v_i, w_p, w'_p \geq \varepsilon, \quad r = 1, \dots, s, \quad i = 1, \dots, m \\ &p = 1, \dots, q, \end{aligned}$$

Stage 2 : VRS output-orientation model : E2

$$\begin{aligned} &\max \sum_{r=1}^s u_r Y_{rk} / \left(\sum_{p=1}^q w'_p Z_{pk} w'_0 \right), \\ &\sum_{p=1}^q w_p Z_{pj} / \sum_{i=1}^m v_i X_{ij} \leq 1, \quad j = 1, \dots, n, \\ &\sum_{r=1}^s u_r Y_{rj} / \sum_{p=1}^q w_p Z_{pj} \leq 1, \quad j = 1, \dots, n, \\ &\sum_{r=1}^s u_r Y_{rj} / \left(\sum_{p=1}^q w'_p Z_{pk} w'_0 \right) \leq 1, \quad j = 1, \dots, n, \\ &u_r, v_i, w_p, w'_p \geq \varepsilon, \quad r = 1, \dots, s, \quad i = 1, \dots, m \\ &p = 1, \dots, q, \end{aligned}$$

Source: Kao and Hwang (2011)

We consider that a *DMU_j* uses X_{ij} input, $i = 1, \dots, m$, to produce Z_{pj} , $p = 1, \dots, P$, which represents the intermediate outputs of the first step. These are used as much as intermediate inputs to produce the final outputs Y_{ij} , $r = 1, \dots, s$. u_r, v_i, w_p, w'_p are the weights

λ_i, μ_j are the weights.

3.3 Corporate social responsibility

CSR data come from the Sustainalytics ⁹database. Sustainalytics is a provider of environmental, social and governance assessment for responsible investment all over the globe. For each firm analyzed, Sustainalytics generates a profile of the organization's CSR and compiles these profiles in a stepwise approach. First, it scrutinizes relevant organizational information from multiple sources such as financial accounts, organizational documentation, media reports and interviews with stakeholders. This results in a preliminary report on a firm's degree of sustainability, which is then sent to the firm for verification and correction. The changes made by the firm are then checked and verified again by Sustainalytics.

Table 2: Description of variables.

Variables	Description	Source	Expected sign
Dependent			
Efficiency	Technical efficiency score	DEA Solver Pro	
Independent			
CSR	Corporate social responsibility score	Sustainalytics	+
Financial characteristics			
Size	Natural logarithm of total assets	Datastream	+
Leverage	Equity / Total assets	Datastream	+
LoanDep	Total loans / Total deposits	Datastream	+
Macroeconomic			
GDPgrow	Annual GDP growth rate	WDI	+/-
GDPper	GDP per capita	WDI	+/-
CreditGDP	Domestic credit to private sector/GDP	WDI	+
Infl	Annual inflation rate	WDI	+

WDI: World Development Indicator

⁹ Various studies linking CSR to performance have used Sustainalytics data. See, for example, Surroca et al. (2010) or Wolf (2014).

3.4 Control variables

To make sure our CSR indicator does not proxy for other variables known to impact efficiency, we include a set of control variables previously identified in the literature (Pasiouras et al., 2009; Shen et al., 2016; Wu et al., 2017). These control variables can be divided into two categories:

The first category relates to financial characteristics. Size is the natural logarithm of total assets. Leverage represents the ratio of equity to total assets (as in Shen et al. (2016) and Wu et al. (2017)). LoanDep denotes the loans to deposit ratio, which measures the bank's ability to finance its loans through deposits.

The second category comprises macroeconomic variables. GDPgrow and GDPper denote the GDP growth rate and GDP per capita respectively. They capture the economic heterogeneity of a country and may also affect the revenue, cost functions and CSR decisions (Wu and Shen, 2013; Shen et al., 2016). Credit_GDP refers to the ratio of credit to private sector over gross domestic product GDP (Wu et al., 2017) and is included to consider the influence of the country's financial sector development on bank performance. Infl represents the rate of inflation (Pasiouras et al., 2009). Table 2 provides the full description, calculation method and predicted sign of the relationship with bank efficiency for the control variables.

4. Empirical Analysis

4.1 Summary statistics results

Table 3 reports summary statistics related to our set of variables. The mean and median efficiency scores are 36.41% and 31.22% respectively, with a standard deviation of 15.91%. The average bank in our sample has a CSR score of 53.60% and an equity-to-total assets ratio of 52.23%.

In order to evaluate the correlations between these variables, a Pearson correlation matrix is estimated (Table 4). The matrix results suggest that there is a positive and significant relationship at the 5% level between efficiency variable and CSR ($r = 0.251 *$) as well as a link between efficiency and macroeconomic variables, excluding inflation. We assess the degree of multicollinearity between the independent variables by using the VIF (Variance Inflation Factor). The values found are from 1.28 to 1.99, which is far below the generally accepted threshold of 10 found in the literature. VIFs do not exceed 2 for all the variables under analysis, confirming the absence of

significant multicollinearity.

Table 3: Descriptive statistics

Variables	Obs	Mean	Standard deviation	Min	Median	Max
Efficiency	937	36.41	15.91	14.43	31.22	100.00
CSR	937	53.60	9.75	34.00	51.00	88.00
Size	937	18.38	1.46	15.58	18.02	21.66
Leverage	937	52.23	22.96	7.96	52.06	99.74
LoanDep	937	112.38	47.66	50.19	98.10	346.74
GDPgrow	937	2.79	2.95	-5.48	2.53	11.96
GDPper	937	9.98	1.11	6.99	10.50	11.39
Credit_GDP	937	122.55	54.02	15.66	125.61	207.90
Infl	937	2.74	2.47	-1.14	2.08	11.99

Table 4: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Efficiency	1.000								
(2) CSR	0.251*	1.000							
(3) Size	0.531*	0.496*	1.000						
(4) Leverage	-0.349*	-0.243*	-0.452*	1.000					
(5) LoanDep	0.078*	0.205*	0.085*	-0.106*	1.000				
(6) GDPgrow	0.093*	-0.188*	0.018	0.009	-0.270*	1.000			
(7) GDPper	0.107*	0.126*	0.080*	-0.056*	0.232*	-0.412*	1.000		
(8) Infl	-0.111*	-0.014	-0.109*	0.127*	-0.079*	0.227*	-0.270*	1.000	
(9) Credit_GDP	0.488*	0.166*	0.407*	-0.404*	0.193*	-0.020	0.173*	-0.238*	1.000

* shows significance at 5%. Efficiency: Technical efficiency score; CSR is Corporate social responsibility score; Size is natural logarithm of total assets ; Leverage is equity / Total assets; LoanDep is total loans / Total deposits; GDPgrow is annual GDP growth rate ; GDPper is GDP per capita; Infl is annual inflation rate; Credit_GDP is domestic credit to private sector/GDP.

4.2 CSR performance and efficiency

We regress the technical efficiency of banks on CSR score and a set of control variables. Our baseline model is constructed as follows:

$$\text{Efficiency}_{i,t} = \alpha_i + \beta_1 \text{CSR}_{i,t} + \beta_2 \text{Size}_{i,t} + \beta_3 \text{Leverage}_{i,t} + \beta_4 \text{LoanDep}_{i,t} + \beta_5 \text{GDPgrow}_{j,t} + \beta_6 \text{GDPper}_{j,t} + \beta_7 \text{Credit_GDP}_{j,t} + \beta_8 \text{Infl}_{j,t} + \varepsilon_{i,j,t} \quad (\text{Eq.1})$$

In which i , t , j represent bank, year and country, respectively. Table 5 presents the results from the fixed-effect panel regression analysis. Model 1 only includes CSR as an explanatory variable. Model 2 controls for bank-specific indicators. Model 3 includes macroeconomic controls. Model 4 includes both bank-specific and macroeconomic control variables. Regardless of model specification, results show that CSR positively impacts bank efficiency and that this link is statistically significant. Regarding control variables, it appears that bank size and the loan to deposit ratio positively impact bank efficiency. Taking model 4 as our baseline regression, our results show that a unit-increase in a bank's CSR score is associated with a 0.13 percentage point increase in its efficiency. These findings confirm H1.

Table 5: CSR and bank efficiency

	(1)	(2)	(3)	(4)
Intercept	31.690*** (17.89)	-167.100*** (-9.52)	-119.100*** (-2.61)	-142.900*** (-3.28)
CSR	0.106*** (2.69)	0.136*** (3.77)	0.119*** (3.09)	0.130*** (3.55)
Size		10.570*** (11.14)		9.648*** (8.85)
Leverage		0.020 (1.29)		0.022 (1.41)
LoanDep		0.025*** (3.00)		0.021** (2.51)
GDPgrow			0.254** (2.43)	0.255** (2.57)
GDPper			13.990*** (3.00)	-1.352 (-0.28)
Credit_GDP			0.092*** (5.17)	0.056*** (3.24)
Infl			-0.072 (-0.51)	0.095 (0.71)
Year effects	Yes	Yes	Yes	Yes
Observations	937	937	937	937
R^2	0.05	0.48	0.02	0.51

t statistics are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Efficiency: Technical efficiency score; CSR is Corporate social responsibility score; Size is natural logarithm of total assets ; Leverage is equity / Total assets; LoanDep is total loans / Total deposits; GDPgrow is annual GDP growth rate ; GDPper is GDP per capita; Infl is annual inflation rate; Credit_GDP is domestic credit to private sector/GDP.

4.3 Evidence from Sample Splits

In order to extend our analysis, we conduct estimates on sub-samples. We explore whether the level of economic development has an impact on the relationship between CSR and bank efficiency. In Table 6, we estimate our baseline model by splitting our overall sample according to the level of economic development. We re-run our model using a sample made up only of developing countries (Column 1), and a sample of developed countries (Column 2), based on the United Nations' classification. We show that CSR only improves bank efficiency in developed countries, since CSR only seems to have a positive and significant impact on efficiency for firms located in these countries.

Table 6: CSR and bank efficiency: accounting for economic development

	(1)	(2)	(3)	(4)
	Developing	Developed	Low GDP	High GDP
Intercept	-156.700*** (-2.77)	-138.400 (-1.25)	-156.000*** (-3.73)	-541.100*** (-3.69)
CSR	0.016 (0.29)	0.204*** (4.33)	0.045 (1.06)	0.241*** (4.23)
Size	4.299** (2.32)	11.750*** (8.61)	6.713*** (4.94)	9.749*** (5.73)
Leverage	0.028 (1.17)	0.027 (1.31)	0.015 (0.88)	0.034 (1.37)
LoanDep	0.021 (1.42)	0.013 (1.22)	0.016 (1.03)	0.030** (2.35)
GDPgrow	-0.148 (-1.21)	0.634*** (3.39)	-0.033 (-0.35)	0.571*** (2.72)
GDPper	11.420 (1.64)	-5.604 (-0.53)	6.893 (1.33)	34.640** (2.41)
Credit_GDP	0.091** (2.38)	0.054** (2.37)	-0.003 (-0.15)	0.080*** (2.73)
Infl	-0.101 (-0.74)	0.219 (0.76)	0.029 (0.25)	-0.182 (-0.52)
Year effects	Yes	Yes	Yes	Yes
Observations	377	560	465	472
R ²	0.25	0.46	0.30	0.39

t statistics are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Efficiency: Technical efficiency score; CSR is Corporate social responsibility score; Size is natural logarithm of total assets ; Leverage is equity / Total assets; LoanDep is total loans / Total deposits; GDPgrow is annual GDP growth rate ; GDPper is GDP per capita; Infl is annual inflation rate; Credit_GDP is domestic credit to private sector/GDP.

We thus demonstrate that a country's level of economic development plays a role in the CSR-efficiency relationship, confirming H2. It therefore appears that CSR activities help banks build good reputation, but only if a minimum level of economic development is reached. This is in line with the argument positing that a minimum level of wealth is necessary for post-materialist values promoting awareness of CSR among stakeholders to emerge (Berthe and Elie, 2015; Scruggs, 1998). As a robustness test, we also split our sample according to the sample median value of countries' level of GDP per capita (Columns 3 and 4). Our conclusions remain the same.

In addition, because a strong investor protection reduces potential shareholders' expropriation by

managers, we assess whether the CSR-efficiency relationship is stronger when investor protection is high. In Table 7, we thus test whether the quality of institutions exerts an influence on the impact of CSR on bank efficiency. Specifically, we use the rule of law index and the control of corruption index constructed by the World Bank's Worldwide Governance Indicators. These variables have already been used to measure the extent to which institutions enforce investors' rights (Arouri and Pijourlet, 2017; Drobetz et al., 2010). We split our sample according to the sample median value of the rule of law index (Columns 1 and 2) and control of corruption index (Columns 3 and 4). We highlight that CSR only have a significant impact on efficiency for banks located in countries where investors can best enforce their rights, since a high level of investor protection leads to a decrease in agency costs potentially linked with CSR policies. These findings confirm H3.

Table 7: CSR and bank efficiency: accounting for investor protection

	(1)	(2)	(3)	(4)
	Low rule of law	High rule of law	Low control of corruption	High control of corruption
Intercept	-147.300*** (-3.48)	-471.800*** (-3.29)	-154.4*** (-3.59)	-478.6*** (-3.38)
CSR	0.035 (0.82)	0.241*** (4.21)	0.0289 (0.65)	0.224*** (3.96)
Size	6.533*** (4.78)	9.717*** (5.67)	6.555*** (4.67)	10.21*** (5.95)
Leverage	0.010 (0.55)	0.035 (1.41)	0.0130 (0.73)	0.0314 (1.21)
LoanDep	0.011 (0.94)	0.030** (2.36)	0.0127 (1.11)	0.0289** (2.27)
GDPgrow	-0.052 (-0.51)	0.559*** (2.85)	-0.0435 (-0.42)	0.526*** (2.69)
GDPper	6.423 (1.22)	28.550** (2.02)	7.037 (1.32)	28.58** (2.03)
Credit_GDP	-0.009 (-0.38)	0.066** (2.44)	-0.00871 (-0.36)	0.0612** (2.16)
Infl	0.005 (0.04)	-0.229 (-0.65)	0.0470 (0.39)	-0.143 (-0.44)
Year effects	Yes	Yes	Yes	Yes
Observations	468	469	475	462
R ²	0.29	0.37	0.23	0.37

t statistics are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Efficiency: Technical efficiency score; CSR is Corporate social responsibility score; Size is natural logarithm of total assets ; Leverage is equity / Total assets; LoanDep is total loans / Total deposits; GDPgrow is annual GDP growth rate ; GDPper is GDP per capita; Infl is annual inflation rate; Credit_GDP is domestic credit to private sector/GDP.

Table 8: CSR and bank efficiency: accounting for stakeholder orientation.

	(1)	(2)	(3)	(4)
	Low stake	High stake	Low country CSR	High country CSR
Intercept	-147.300*** (-3.48)	-471.800*** (-3.29)	-154.4*** (-3.59)	-478.6*** (-3.38)
CSR	0.0467 (0.79)	0.231*** (3.20)	0.0519 (0.81)	0.159*** (3.71)
Size	7.987*** (4.50)	13.22*** (5.86)	4.267** (1.99)	10.89*** (8.59)
Leverage	-0.0131 (-0.62)	0.0721 (1.57)	0.0524** (2.11)	0.0184 (0.95)
LoanDep	-0.0129 (-0.79)	0.0276** (1.98)	0.0941*** (2.93)	0.0144 (1.56)
GDPgrow	0.103 (0.76)	0.961*** (3.48)	-0.242 (-1.27)	0.584*** (4.43)
GDPper	-10.26 (-1.38)	-3.177 (-0.17)	10.12 (1.26)	-13.02** (-2.01)
Credit_GDP	0.0538** (2.19)	0.0742* (1.88)	0.0237 (0.55)	0.0532*** (2.62)
Infl	-0.0757 (-0.37)	0.812 (1.47)	-0.376** (-2.35)	0.659*** (3.25)
Year effects	Yes	Yes	Yes	Yes
Observations	469	253	268	669
R ²	0.09	0.49	0.22	0.17

t statistics are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Efficiency: Technical efficiency score; CSR is Corporate social responsibility score; Size is natural logarithm of total assets ; Leverage is equity / Total assets; LoanDep is total loans / Total deposits; GDPgrow is annual GDP growth rate ; GDPper is GDP per capita; Infl is annual inflation rate; Credit_GDP is domestic credit to private sector/GDP.

Finally, in Table 8 we test whether a country's stakeholder orientation has an impact on the CSR-efficiency relationship. In order to measure a country's stakeholder orientation, we use the proxy developed by Dhaliwal et al. (2012). This variable takes into account both the legal context and social norms toward CSR, and especially countries' laws concerning labor rights, regulations on CSR disclosure, public awareness of CSR issue and attitudes of managers and investors toward social issues. Hence, we re-estimate our baseline model on subsamples based on the median value of stakeholders' orientation (Columns 1 and 2). We show that the presence of strong CSR-related institutions is necessary for CSR to enable banks to improve their efficiency. These institutions increase legitimacy and salience of stakeholders' claims so that their consideration becomes crucial for the economic activity of banks. Indeed, we observe that CSR has a significant impact on

efficiency only for firms located in countries where stakeholders' orientation is high. For robustness purposes, we also use an alternative proxy of stakeholder orientation. Specifically, we split our sample according to the median value of country-mean CSR scores (Columns 3 and 4). Our results are once again confirmed and validate H4.

Overall, our results suggest that CSR can have a positive impact on bank efficiency. In accordance with the stakeholder view of CSR (Freeman, 1984; Porter and Kramer, 2006), one could explain this fact by arguing that maintaining good relationships with all stakeholders ultimately benefits firms by providing them with a competitive advantage. This CSR-induced competitive advantage can result from increased reputation (Branco and Rodrigues, 2006; Hillman and Keim, 2001), increased employee loyalty and productivity (Branco and Rodrigues, 2006; Fombrun et al., 2000; Turban and Greening, 1997), and the ability to price products less aggressively (Fombrun et al., 2000). In the case of banks, it means strong CSR capabilities should positively impact efficiency through a reduction in the cost of inputs, e.g., lower deposit rates (Wu and Shen, 2013), a better use of inputs, e.g., better human capital management, and an increase in output through higher fees charged to clients (Wu and Shen, 2013) as well as higher interests charged on clients' loans (Kim et al., 2005). However, it appears that a certain level of economic development, institutional quality and stakeholder orientation at the country level are necessary for this positive impact to materialize.

5. Conclusion

Research on corporate social responsibility (CSR) and its financial consequences has grown significantly over the past two decades. In this paper, we assess the impact of CSR on bank efficiency through a DEA Dynamic Network Model. Using an international sample of 184 banks in 41 countries over the 2009–2015 period, we find that the CSR of banks is positively related to their efficiency. We further show that the positive impact of CSR on bank efficiency is contingent upon various economic and institutional factors. First, it appears that CSR only impacts positively bank efficiency in developed countries while it has no impact on efficiency for banks located in developing countries. Second, it appears that the CSR-efficiency relationship only holds in countries in which investor protection is high. Finally, we find that a high degree of country

stakeholder orientation is necessary for the CSR-efficiency link to materialize. Overall, our findings contribute to the banking and CSR literatures by showing that banks may benefit from implementing CSR policies insofar as such policies have in certain cases the potential enhance efficiency.

Our results have practical implications for bank managers in that they show that developing CSR capabilities can yield financial benefits and enhance bank efficiency. Indeed, our conclusions tend to show that CSR spending by banks does not represent a waste of resources but rather may lead to a better use of resources. This study is also of interest to policy makers insofar as it shows that the institutional framework is a key element that shapes the impact of CSR activities on financial and economic outcomes. Finally, our study also has implications for investors in that it shows the CSR credentials of a bank can impact the way it operates and how efficient its business is.

Obviously, our study is not exempt from some limitations that provide avenues for further research. First, our study focuses on a relatively short period (2009–2015) due to data constraints. Future studies could therefore study the CSR- efficiency relationship over an extended period, ideally covering the pre-crisis period (before 2008) in order to determine whether the occurrence of the crisis has impacted the link between CSR activities and bank efficiency. Extending the study period would also be interesting because implementing CSR policies may take many years to produce value-enhancing outcomes. Second, our study focuses on overall CSR. As a result, future investigations could focus on specific CSR actions in order to determine more precisely what initiatives and policies most directly impact bank efficiency.

As found in this study, the CSR performance of banks increases their efficiency. However, the bank is exposing itself to a considerable risk. The question that arises is: can this CSR performance, which increases efficiency, reduce the exposure of these banks to risk?

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Chapter 3: The effect of CSR performance on bank exposure to systemic risk: international study

1. Introduction

Does strong CSR performance reduce the banks' exposure to systemic risk? There is an increasing large volume of literature that identifies certain financial or regulatory characteristics as determinants of systemic risk. Among these are size (Laeven et al.2016; Varetto and Zhao. 2018; De Jonghe et al.2015), regulation (Wei et al., 2014; Anginer et al., 2018), and leverage (Hovakimian et al., 2012; Bierth et al., 2015; Beltratti et Stulz, 2012). Few studies have looked at the relationship between bank governance and systemic risk (Iqbal et al., 2018; Andries and Nistor, 2016; Ellis et al., 2014). These studies focused on one single CSR dimension, i.e. governance. As well as that, they only looked at a sample from one single region or country. We wish to contribute to this literature by studying the effect of the banks' global CSR performance on exposure to systemic risk across an international sample.

We define systemic risk as an overall stress situation in which the entire financial sector is undercapitalized (Achraya et al., 2014). The report from the International Monetary Fund on systemic risk (2009) defines systemic risk as a “disruption to the flow of financial services that is caused by an impairment of all or parts of the financial system that has the potential to have serious negative consequences for the real economy”¹⁰.

Systemic risk played a fundamental role in the development of the 2007-2009 financial crisis. Since then, analyzing and preventing this risk has caught the attention of researchers and regulators. Research in this field examines systemic risk determinants and the measures enabling the capital shortfall faced by the banks as a result of this risk to be assessed. Regulators are concerned first and foremost with Global Systemically Important Financial Institutions (G-SIFIs) who amplify systemic risk by their size, “too-big-to fail”, their complexity and interconnectedness “too-connected-to-fail” (Varotto and Zhao, 2018). Therefore, the Basel III committee has integrated new regulatory measures to handle systemic risk (Rodriguez-Moreno and Pena, 2013), by defining regulatory bank liquidity ratios.

A large number of papers have sought to study the relationship between CSR performance and risk. They found that CSR reduces idiosyncratic risk (Luo and Bhattacharya, 2009), operational risk (Wang and Hsu, 2013), credit risk (Wu and Shen, 2013; Shen et al., 2016) and systematic risk (Oikonomou

¹⁰ Guidance to Assess the Systemic importance of financial institutions, markets and instruments, 20 October 2009, IMF – BIS – FSB

et al., 2012). Researchers also show that systematic risk triggers systemic risk by a cascading effect (Duan and Zhang, 2013) and that systematic risk can be a source of systemic risk (Acharya et al., 2010 ; Brownlees and Engle, 2012). Based on these findings, we set out our first hypothesis which is that CSR performance can reduce bank exposure to systemic risk.

Our second hypothesis states that the institutional environment plays a role in the relationship between CSR performance and systemic risk. Some authors state that regulation and the institutional environment impact systemic risk (Adries and Nistor, 2016; Wei et al., 2018). As for CSR, researchers show that the institutional framework of a country determines the commitment to CSR activities (Ioannou and Serafeim, 2012; Liang and Renneboog, 2017).

To test our hypotheses empirically we have drawn up a sample of 297 banks in 53 countries over the period 2002 to 2018. Our CSR data comes from the Asset4 Thomson Reuters database. We use the SRISK measure developed by Brownlees and Engel (2017) to measure systemic risk. This method assesses the need for recapitalization of a financial institution in the case of a large scale financial crisis. The results obtained show that CSR performance reduces bank exposure to systemic risk. We examine the effect of each CSR pillar separately, i.e. governance, the social dimension and environmental dimension. Regression coefficients are negative and very significant at 1% for the three pillars. Our results show the role of global CSR as well as that of each of these three pillars in mitigating bank exposure to systemic risk. For an in-depth analysis of the CSR dimension, which mitigates this exposure, we have integrated all three dimensions simultaneously in a regression model. This estimate indicates that bank exposure to systemic risk is reduced through governance and the social dimension. Another result of our study shows that Global Systemically Important Banks (G-SIBs) are exposed to systemic risk despite their engagement in CSR activities.

Furthermore, we assess the role of the institutional environment in the relationship between bank CSR and systemic risk. We show that efficient external governance as well as a strong presence of supervisory authorities efficiently reduce the systemic risk of CSR banks. However, severe restrictions on banking activities, the moral hazard, the existence of several supervisory authorities and high levels of state ownership of assets in the banking system undermine the positive effect of a strong CSR performance in reducing bank exposure to systemic risk.

The contribution from this study is two-fold. Firstly, it shows CSR to be one of the determinants of systemic risk, by demonstrating that CSR performance reduces bank exposure to systemic risk. To our knowledge, this relationship has not been explored. Secondly, work by Andries and Nistor (2016) and Iqbal et al. (2018) examines the relationship between governance and systemic risk of banks in

central Europe and the USA, respectively. We use a broad sample on an international scale and we analyze the impact of governance and the social and environmental dimensions of CSR individually and simultaneously.

This article is organized as follows. In section 2, we present the literature and our hypotheses. Section 3 describes the methodology, the data and control variables used in our empirical analysis. Then, we set out our findings in section 4. Finally, we conclude in section 5.

2. Related literature and hypotheses

Despite the increasing number of academic and regulatory papers and reports analyzing the determinants of systemic risk of financial institutions, the effect of CSR performance on systemic risk is not well documented. In this section, we will look at the literature on this subject. Firstly, we will look at existing work on the link between CSR and systemic risk. Then, we will examine studies on systemic risk. Finally, we will link up these two streams in the literature in order to analyze the relationship between CSR performance and bank systemic risk

2.1 CSR performance and risk

Corporate social responsibility has been widely examined in the literature. However, there is no theoretical consensus on the impact of CSR activities on corporate performance.

Firstly, Friedman (1962, 1970) shows that the sole responsibility of corporate leaders is to maximize profit for shareholders, with social and environmental issues being handled by the free workings of market forces. He states that socially responsible behavior is costly and can engender agency conflicts. For Barnea and Rubin (2010), managers overinvest in CSR to satisfy their own personal interest. These researchers expound the “overinvestment hypothesis” which states that investments in CSR are costly and reduce the company's value.

Secondly, the stakeholder theory predicts that CSR can be compatible with profit maximization through efficient management of stakeholders who provide significant resources to companies (Freeman, 1984; Donaldson and Preston, 1995). Thus, CSR increases the value of the company and

reduces the financial risk (Jones, 1995; McGuire et al., 1988). In addition, the so-called “good management” theory suggests that strong commitment by a company to CSR reduces its financial risk through good management (Waddock and Graves, 1997).

The link between CSR performance and risk has been examined in several empirical studies. Financial theory defines total risk as the sum of systemic risk and unsystemic risk (Jo and Na, 2012). These two notions of risk were introduced by the capital asset pricing model (CAPM) developed by Sharpe (1964), Linter (1965) and Mossin (1966). This model determines the expected return from a capital asset depending on its level of risk. According to the CAPM, the relationship between the average return from an asset and its systematic risk (measured by beta) is linear. Given this, the CAPM distinguishes between the risk of an individual security and the risk of a diversified portfolio. To be precise, the systematic risk in the case of a bank, also called market risk, measures the risk of a security based on its sensitivity to variations in market return and that cannot be eliminated by diversifying the portfolio. Other financial institutions are not necessarily impacted by this risk (Berger, 2016). Whereas unsystematic risk results from share price volatility directly associated to factors specific to the company such as its management, marketing and operational activities (Rego et al., 2009). It is called the unique risk specific to the company or the idiosyncratic risk since it affects a security and can be reduced by diversifying the securities portfolio.

Earlier research analyzed the link between CSR performance and these two types of risk (Luo and Bhattacharya, 2009; Oikonomou et al., 2012; Salama et al., 2011; Jo and Na, 2012; Orlitzky and Benjamin, 2001).

CSR can reduce idiosyncratic risk. Across a sample of American companies, Bouslah et al. (2013, 2016) found that a company's governance and social performance had a negative impact on idiosyncratic risk and reduced the volatility of share prices during adverse periods (financial crisis, economic recession...). Lee and Faff (2009) and Mishra and Modi (2013) found that the most socially responsible companies are subject to significantly lower idiosyncratic risk. Also, Lange and Washburn (2012) indicate that the activities of socially irresponsible companies negatively influence the idiosyncratic risk, due to a fall in investor trust and high levels of share price volatility. Price and Sun came to the same conclusion (2017).

CSR can also reduce systematic risk. Salama et al. (2011) found a negative relation between companies' systematic risk and their social performance. A meta-analysis by Orlitzky and Benjamin (2001) found that the systematic risk is negatively correlated with the social performance. Oikonomou et al. (2012) confirmed the same findings indicating that socially responsible companies are subject

to low systematic risk compared to non-CSR companies that are exposed to a higher stock market risk. Jo and Na (2012) show that a high CSR score significantly reduces systematic and idiosyncratic risk in a sample of 513 American companies. Luo and Bhattacharya (2009) studied idiosyncratic and systematic risks across a sample of 541 large companies and found that social performance reduces both risks.

Beyond these risks, banks are faced with other categories of risk. The Basel I and II committees define a number of factors that can lead to considerable losses and that affect banks' portfolios. These are market risk, credit risk and operational risk.¹¹ Empirical studies show that banks' CSR performance can also reduce these risks.

Zhao et al. (2016) found that CSR significantly reduces the operational risk of Chinese companies. Wang and Hsu (2013) found that strong governance helps reduce operational risk in financial institutions. The study by Chernobai et al. (2011) shows that a weak internal control environment in American financial institutions is strongly correlated with a high frequency of operational risks.

Regarding credit risk, Wu and Shen (2013) found that banks that engage in CSR benefit from a good reputation and attract more loan applications and deposits than non-CSR banks¹². These researchers indicate that banks with the highest CSR performances are more profitable, have fewer non-performing loans and have more provisions for loan losses. Simpson and Kohers (2002) and Shen et al. (2016) found that banks that adopt CSR practices have significantly lower non-performing loan amounts than non-CSR banks. Wu et al. (2017) carried out a study of 194 banks in 22 countries and they confirmed that a bank's commitment to CSR reduces the volume of non-performing loans.

While previous studies focused on the relationship between CSR performance and several different risk types, there is little work on the relationship between CSR performance and systemic risk. The purpose of our study is to contribute to the literature by analyzing the role that CSR performance can play in bank exposure to systemic risk. It is necessary therefore to start out by defining systemic risk. This is the goal of the subsection below.

¹¹ The Basel Committee on Banking Supervision (BCBS) defines the operational risk of financial institutions as the risk of loss resulting from inadequate or defective internal processes, persons, systems or external events.

¹²Banks that do not engage in CSR activities.

2.2 Systemic risk

The Basel II (2004) recommendations on risk management for financial institutions focus on market, credit and operational risks and ignore systemic risk (Rodriguez-Moreno and Pena, 2013). Although capital requirements determine the capital banks must hold to protect themselves from these three portfolio-related risks, these measures ignore the interconnections between banks. During the 2007-2009 crisis, the failure of several large international financial institutions caused shockwaves to ripple throughout the financial system and impacted the real economy. The financial crisis proved that the Basel I and II measures were not sufficient to ensure the financial system remained robust. However, this issue has been addressed in the new Basel III agreement (2011) establishing new regulatory measures to cope with systemic risk (Rodriguez-Moreno and Pena, 2013). For the first time this agreement ushered in two liquidity ratios: the LCR (short-term liquidity coverage ratio) and the NSFR (the long-term net stable funding ratio) (BCBS, 2014).

Systemic risk does not come from the unconditional failure of a bank, but more specifically from the failure of a bank when the entire financial system is undercapitalized or illiquid. If a bank fails in isolation, the risk is absorbed by the interbank market. However, in a period of global stress where the entire financial sector is undercapitalized, financial firms cannot find the necessary resources on the interbank market (Acharya et al., 2014).

In a systemic event context, regulators identify a number of Global Systemically Important Financial Institutions whose failure or fragility may affect the broader financial system and national and international economies. The Financial Stability Board (2011) distinguishes G-SIFIs "Global Systemically Important Financial Institutions" due to their size, complexity, systemic interconnectedness and their contribution to national and global financial systems (BIS, 2013). Regulators are concerned by the characteristics of these institutions that amplify systemic risk because they are too big to fail or too connected to fail (Varotto and Zhao, 2018; Chan-Lau, 2010)

Under the Basel III agreement, these institutions are now required to maintain a high capacity to absorb losses and liquidity shocks. As the Financial Stability Board's various publications point out, this additional liquidity requirement, coming on top of capital requirements, aims to reduce the global financial system's "cross-border negative externalities" and thereby reduce systemic risk (Ellis et al., 2014).

In order to prevent systemic risk, the American SCAP (Supervisory Capital Assessment Program) and European EBA (European Banking Authority) regulators conduct stress tests,¹³ in the form of adverse macroeconomic shock scenarios that impact banks' balance sheet assets. The resulting capital ratios are used by the regulator to determine which banks fail under a given crisis scenario (Acharya et al., 2014). These researchers found that the Basel I and Basel II risk standards based on risk-weighted assets (RWA) are erroneous measures of bank risk, since banks manage their RWAs to meet regulatory capital requirements. If risk weights are not set consistently across asset classes, a bank will be encouraged to concentrate its assets on the asset with the most underestimated risk weight. Underestimating risk weights for an asset class can in turn lead to excessive leverage. Acharya et al. (2014) found that regulatory risk weights bear no relation to the banks' actual risk in the course of the six months following publication of stress test results. These researchers compared the results of these regulatory stress tests with an alternative measure that used market data and found that banks with a high capital shortfall, as calculated by this measure, were the least risky banks according to regulatory stress tests. Their findings indicate that stress tests would be more effective if capital requirements based on asset-weighting are supplemented by requirements based on total assets and market risks. These findings are also supported by Dissem and Lobe (2018).

Moreover, it is important to identify the determinants of systemic risk. Previous studies have found that size is an important factor leading to systemic risk under the "too big to fail" hypothesis (Laeven et al., 2016; Varetto and Zhao, 2018; De Jonghe et al., 2015). According to Laeven et al (2016), large banks generally have lower capital ratios, less stable financing and greater exposure to potentially risky market activities. Thus, Hovakimian et al. (2012) indicate that bank size, leverage and asset risk are important determinants of systemic risk. Laeven and Levine (2007) and Bolton (2007) found that large banks that engage in multiple activities suffer from agency problems and poor governance that can lead to systemic risk. For Bierth et al. (2015), leverage¹⁴ is an important factor in exposure to systemic risk. Thus, short-term leverage could induce banks to grant excessive loans to high-risk borrowers, leading to an increase in systemic risk (Acharya et al., 2010).

¹³ These stress tests are built on a hypothetical stress scenario that involves shocks to financial and macroeconomic variables (Dissem and Lobe, 2018).

¹⁴ Leverage is the ratio: $\text{book asset} - \text{book equity} + \text{market equity} / \text{market value of equity}$ (Acharya et al. 2010)

2.3 The link between CSR and systemic risk

As indicated in the previous subsection (2.1), earlier work shows that CSR performance reduces systematic risk (Salama et al., 2011; Orlitzky and Benjamin, 2001; Oikonomou et al., 2012). We refer to some studies that claim there is a link between systematic and systemic risk in order to analyze the effect of CSR performance on banks' exposure to systemic risk.

The analysis by Duan and Zhang (2013) shows that systemic risk is closely related to systematic risk. These researchers consider that systematic risk is likely to cause a cascade effect and lead to systemic risk. Market-wide risk factors such as interest rates, exchange rates and stock indices affect banks' assets and liabilities and generate systematic risk. Because systemic risk is strictly dependent on the nature of the interconnections between banks, bank exposure to systematic risk engenders systemic risk. Using an explicit structural model of cascading failures, Duan and Zhang (2013) confirm that systematic risk is the driver of systemic risk and found an extremely low systemic risk if the systematic risk is insignificant.

The measure of systemic risk advocated by Acharya et al. (2010) "Systemic Expected Shortfall" (SES) estimates a financial institution's propensity to be undercapitalized when the system as a whole is undercapitalized. The SES is the linear combination of MES Marginal Expected Shortfall (linked to the systematic "beta" risk in the CAPM model) and leverage. This measurement is based on how equity profitability reacts to market profitability. Brownlees and Engle (2012) expand this measurement and use dynamic volatility models to measure the expected capital shortfall after a significant decline in the stock market. Their measurement is a function of leverage, size and MES. It reflects correlations that could be due to systematic risk and/or interbank connections. These researchers show that symptoms of systemic and systematic risk (such as volatility) are generally correlated (Brownlees and Engle, 2012). Both approaches identify the source of systemic risk as being a systematic risk. Sedunov (2016) also found that the MES is strongly correlated with the beta, which measures systematic risk in the CAPM model.

In addition, Caruana (2010) notes that a systematic shock may become systemic in the event of common and direct exposure. He also points out that "the financial system is a network of interconnected balance sheets, which means that a shock hitting one institution can spread to the other institutions that are connected to it and become systemic." In other words, systemic risk is caused by a systematic shock.

Ultimately, since CSR reduces systematic risk (Salama et al. 2011; Orlitzky and Benjamin, 2001; Jo and Na, 2012; Luo and Bhattacharya, 2009), we therefore assume that CSR performance will systematically reduce banks' exposure to systemic risk.

To our knowledge, no study has analyzed the link between CSR performance and banks' systemic risk, except for the work of Ellis et al. (2014), Iqbal et al. (2018) and Andries and Nistor (2016), which demonstrates a strong link between governance, risk taking and systemic risk of financial institutions.

Iqbal et al. (2015) examine the relationship between shareholder-centric corporate governance mechanisms and systemic risk. Their empirical results suggest that these financial institutions are associated with increased systemic risk especially during a crisis. Battaglia and Gallo (2017) find that the quality of the board of directors affects banks' systemic risk. Iqbal et al. (2018) examine the link between systemic risk and incentives for risk-taking based on executive compensation. They found that financial institutions benefiting from these incentives were associated to significantly higher levels of systemic risk during the 2008 crisis. Andries and Nistor (2016) note that strong governance can encourage financial firms to take excessive risk thus increasing systemic risk. These studies focus solely on the link between governance and systemic risk, which is one of the pillars of CSR and do not analyze the effect of an overall CSR performance including all pillars.

In short, socially responsible activities reduce credit risk, market risk and operational risk. In addition, CSR can reduce systematic risk. As noted above, systematic risk is the driver of systemic risk. This leads us to the following hypothesis:

H1: Banks' CSR performance reduces their exposure to systemic risk.

2.4 CSR, systemic risk and institutional environment

As detailed in the subsection (2.2), previous studies suggest that certain financial characteristics of banks are determinants of systemic risk. Yet some researchers point out that this risk is determined mainly by the specificities of the institutional environment and regulations in each country.

For Andries and Nistor (2016), regulation can be seen as a complementary external force of governance, which may be particularly relevant to reducing systemic risk in banks with weak internal

governance. Battaglia and Gallo (2017) find that differences in bank regulations between countries are generally correlated with systemic risk. In particular, countries with effective oversight (Demirguc-Kut and Detragiache, 1999; Anginer et al., 2014) and adequate capital requirements (Danisman and Demirel, 2019; Barth et al., 2004) can reduce systemic risk and underpin the stability of their financial systems.

Wei et al. (2018) confirm that the financial characteristics of banks such as the size, leverage or quality of their credit portfolio are not persistent determinants of systemic risk. They point out that the characteristics of the country's regulatory system, deposit insurance and capital requirements have a positive effect on systemic risk. They also found that improved shareholder rights and banking supervision have a negative effect on systemic risk.

As for CSR, Ioannou and Serafeim (2012) showed that the political and legal system in the country has an influence on CSR performance. The institutional framework is the predictor which also explains the difference in the degree of CSR engagement by companies depending on the country. Banks in civil law countries are more engaged in CSR than banks in common law countries (Liang and Renneboog, 2017). During the financial crisis, financial resources become more critical and the cost of over-investing in CSR can exceed the benefits of conflict resolution. Without appropriate monitoring and external corporate governance, the value of the firm diminishes (Buchanan et al., 2018).

In line with the study by Anginer et al. (2018) indicating that the link between capital and systemic risk is affected by a set of institutional variables, we analyze the impact of the institutional environment on the relationship between CSR performance and systemic risk. We therefore formulate the second hypothesis which is linked to our first hypothesis:

H2: the institutional environment influences the relationship between banks' CSR performance and systemic risk.

3. Data and methodology

This section starts by explaining our empirical approach and details how systemic risk is measured. It then presents the control variables of our empirical model. Finally, it describes our sample and details descriptive statistics.

3.1 Sample selection

We compiled our sample from the Thomson Reuters Asset4 base, which covers more than 3000 companies engaged in CSR. We gathered data for 297 banks in 53 countries¹⁵ over the period 2002 to 2018. In all, we compiled a panel of 15 471 observations.

3.2 Systemic risk measure

There are several ways to measure systemic risk:

(i) the marginal expected shortfall (MES) by Acharya et al. (2010) which measures the return on a bank's shares when the daily market return falls by -2% in the event of a crisis; (ii) the systemic expected shortfall (SES), by Acharya, Pedersen, Philippon, and Richardson (2010), which is a linear combination of MES and leverage. It examines how an institution is affected by the market as a whole. This measure estimates the propensity to be undercapitalized when the system as a whole is undercapitalized. It uses stock market returns. The main shortcoming of this measure is that it cannot be used to measure systemic risk *ex-ante*, this approach requires the real data from financial crises to make estimates ; (iii) the CoVaR of Adrian and Brunnermeier (2011) which measures the VaR "Value at Risk" of market profitability conditioned by the distress of a financial institution. This measure uses changes in the market value of an institution's assets.

Acharya et al. (2012) and Brownlees and Engle (2017) develop a new systemic risk measure, called SRISK, that assesses a financial institution's need for recapitalization in the event of a major financial crisis. Banks with the largest capital shortfall are supposed to be the largest contributors to systemic risk in a crisis. In our empirical analysis, we adopt this measure and gather the data sent to us by from The Volatility Institute (NYU Stern's V-Lab¹⁶, which specializes in measuring systemic risk in financial institutions and is led by Robert Engle, winner of the Nobel Prize in economics. This

¹⁵ The countries included in this study are : Japan, Germany, Netherlands, United Arab Emirates, China, Oman, Ireland, Turkey, Arabie saoudites, United kingdom, Poland, United states, Malaysia, Greece, Jordan, Morocco, Australia, India, Italy, Portugal, Colombia, Chile, Spain, Brazil, Argentina, Mexico, Thailand, Indonesia, Israel, Hong Kong, Canada, Philippines, Russia, South Africa, Peru, Korea, France, Taiwan, Egypt, Kuwait, Qatar, Switzerland, Denmark, Singapore, Belgium, Norway, Austria, Nigeria, Czech Republic, Senegal, Hungry, Finland and Bahrain

¹⁶ <http://vlab.stern.nyu.edu/1>

approach may have some advantages over other measures because it provides an overall measure of systemic risk (Yun and Moon, 2014).

SRISK is a function of the bank's leverage, size and MES (marginal expected shortfall). The leverage and size of a company are measured from the accounting data and measuring the MES requires an appropriate time series methodology (GARCH-DDC model). This measure approach merges balance sheet and market information to estimate a firm's conditional capital shortfall. The value of the equity market is prospective and can take into account several factors (Brownlees and Engle, 2017).

The MES is linked to the systematic "beta" risk of the CAPM (Brownlees and Engle, 2012). The CAPM model has been criticized for identifying profitability of the market portfolio as the sole source of risk. However, Fama and French (1993) demonstrate that there are other risk factors that need to be considered when assessing the return on securities such as the size and carrying value to market value ratio. If the data are generated by a single-factor model, the MES is equal to the systematic risk multiplied by the expected market shortfall. However, the SRISK approach is more flexible because it allows for variable moments in time and focuses on exposure of the capital to the downside. It incorporates the conditional involvement of the systemic event.

The measurement of the SRISK for a financial institution is defined as follows:

$$SRISK_{it} = E_{it} (Capital\ Shortfall_{it+h} / R_{m+1:t+h} < C) \quad (Eq.1)$$

$R_{m+1:t+h}$ is the market return over several periods between the period $t+1$ and $t+h$.

C is an extreme loss threshold that represents the crisis event.

$$Capital\ Shortfall_{it} = k (Assets_{it+h}) - (Equity_{it+h}) \quad (Eq.2)$$

By combining equation (2) and equation (1), we get:

$$SRISK_{it} = k E_{it} (Debt_{it+h} / R_{m+1:t+h} < C) - (1-k) E_{it} (Equity_{it+h} / R_{m+1:t+h} < C) \quad (Eq.3)$$

$$SRISK_{it} = k Debt_{it} - (1-k) E_{it} (Equity_{it+h} / R_{m+1:t+h} < C) \quad (Eq. 4)$$

$$SRISK_{it} = k D_{it} - (1-k) E_{it} (E_{it+h} / R_{m+1:t+h} < C) \quad (Eq.5)$$

D_{it} is the carrying value of all liabilities and $E_{it} (E_{it+h} / R_{m+1:t+h} < C)$ is the expected market value of equity during the period $t+h$ conditional on the decline in market profitability over a horizon h .

The sensitivity of a bank's capital profitability conditional on a (future) financial system crisis is taken into account by the long run marginal expected shortfall LRMES "long run MES":

$$LRMES_{it} = E_t (R_{it+1:t+h} / R_{mt+1:t+h} | C) \quad (\text{Eq. 6})$$

Acharya et al. (2012) define LRMES it as follows:

$$LRMES_{it} = 1 - \exp(-LRMES_{it}) \quad (\text{Eq.7})$$

In another way, equation 5 can be written as follows:

$$SRISK = (\text{Prudential Capital}) - (\text{Stressed MV of Equity}) \quad (\text{Eq. 8})$$

$$= K (\text{Debt} + \text{Stressed MV of Equity}) - (\text{Stressed MV of Equity})$$

$$= K (\text{Debt}) - (1-K) * (\text{Stressed MV of Equity})$$

$$= K (\text{Debt}) - (1-K) * (1-LRMES * \text{MV of Equity})$$

LRMES*MV of Equity is the expected loss of market capitalization that equity holders would face in the six-month crisis scenario, and if the MSCI World Index falls to the crisis threshold (-40%)

Debt is the carrying value of the debt assumed to be constant over the six months.

K is the ratio of prudential capital (equity capital/quasi-market value of assets). It is set at 8% for US banks and 5.5% for European banks. This difference is attributed to the accounting standards specific to each region. European Union banks report according to International Financial Reporting Standards (IFRS) while U.S. banks report according to generally accepted accounting principles (GAAP). Under U.S. GAAP, banks are allowed to report their derivatives on a net basis. Clearing of derivatives is mostly prohibited by IFRS, resulting in a substantial increase in the size of the balance sheet.

If the value of SRISK is greater than zero, the bank is undercapitalized and an ex-ante capital increase should be made. If the SRISK value is zero, the institution is sufficiently capitalized. Negative SRISK values show that the bank is overcapitalized and thus can easily absorb systemic shocks (Laeven et al., 2016).

3.3 CSR measure

We use the data provided by ASSET4 Thomson Reuters as a CSR proxy. This database is one of the most reliable sources of CSR data (Stellner et al., 2015) and one of the most widely used for finance work. Analysts collect 900 data points per company to calculate 250 key performance indicators (KPIs) that are grouped into 18 categories within four pillars: (1) environmental performance score; (2) social performance score; (3) corporate governance score; and (4) economic performance score. Each year, a company receives an z-score for each of the pillars, comparing its performance to other companies (Cheng et al., 2014). The resulting percentage is therefore a measure that represents the z-score of the normalized performance between 0 and 100%. Our sample contains banks that have very good CSR performances with high ratings as well as banks with low scores and low CSR engagement.

3.4 Control variables

We include a large number of control variables to mitigate a potential problem of omitted variables. We control on the basis of the CAMEL model as well as other financial variables. We also use institutional variables. All of these variables come from the literature

3.4.1 Financial variables of banks and the CAMEL model

We monitor on the basis of the CAMEL model which is used in the literature as a composite indicator of the financial health of banks (Cole and White, 2012; Berger, 2016; Bertz et al. 2014; Pasiouras et al. 2006). CAMEL variables capture managers' strategic choices in managing banks that can affect their risk profile (De Jonghe, 2010)

According to Bertz et al. (2014), the CAMEL indicators are as follows. The level of bank capitalization (C: Capital adequacy) which is represented by the capital ratio (equity/asset) and the Tier 1 ratio. A high level of capital protects banks from insolvency risks. So we can expect better-capitalized banks to create less systemic risk.

The return on assets (ROA), the share of non-performing assets in total assets and the ratio of loan loss provisions to total loans reflect the quality of assets (A: asset quality), mainly the quality of its

loan portfolio (credit risk) and its securities portfolio (market risk). Wheelock and Wilson (2000) found that banks with low asset quality are more likely to fail. High profitability can reduce systemic risk (Chang et al., 2018; Iqbal et al., 2018; Varetto and Zhao, 2018). Profitable and diversified banks are less vulnerable to macroeconomic shocks and liquidity crises, owing to larger capital reserves (Matutes and Vives, 2000). We anticipate that better asset quality will reduce systemic risk.

The cost to income ratio is a management quality proxy variable (M: management quality). A high value for this ratio means operating cost exceed earnings. This means that the bank has difficulty making a profit and, therefore, increasing its capital (Yeh, 2011). A high ratio is an indicator of the complexity of banking operations (Fields et al. 2004). Since CSR investment is complex and costly, we expect a positive relationship between the cost-to-income ratio and systemic risk.

The ability to make profits (E: Earning ability) is considered one of the main determinants of long-term success or distress of banks. High profits can protect against future potential losses (Brownlees and Engle, 2017). While the ability to generate earnings can lead to higher profitability, it can also lead to higher spending (Pasiouras et al., 2006). Comfortable profits can reduce systemic risk, but cost mismanagement can increase it. The two indicators measuring profit, return on equity (ROE) and the net interest margin should be negatively linked to systemic risk.

Without liquidity and sufficient financing to meet its obligations, a bank can go bankrupt. The bank must have current assets to meet its short-term obligations. Liquidity (L: liquidity position) is represented by the interest expenses / total liabilities ratio. We expect sufficient liquidity to reduce systemic risk.

We add other variables of the bank's financial characteristics that are recognized in the literature as determinants of systemic risk. For the size estimated by the total assets logarithm, we control the credit risk measured by the level of non-performing loans and the level of indebtedness calculated by the ratio of total debt to total capital and the ratio of total loans to total deposits.

Laeven et al. (2016) and Varetto and Zhao (2018) find that size is one of the determinants of systemic risk. Large banks tend to engage more in risky activities and finance themselves through short-term debt, making them more vulnerable to liquidity shocks and market failures (Laeven et al., 2016). We assume that size is positively related to systemic risk.

Short-term leverage could induce banks to grant excessive loans to high-risk borrowers, leading to an increase in systemic risk through increased credit risk (Acharya et al., 2010). We assume that leverage and credit risk increase systemic risk.

In order to capture the economic heterogeneity of the countries in our sample, we control for macroeconomic indicators by natural logarithm of GDP per capita (*Log_GDP*) and the private sector credit ratio as a percentage of GDP (*Credit_GDP*) reflecting the influence of financial sector development on banks' financial performance.

3.4.2 Institutional variables

To test our second hypothesis and examine the impact of the institutional environment on the relationship between CSR performance and systemic risk, we monitor for the effect of the institutional and regulatory characteristics of the countries identified in our sample. We collect these variables from the 2008 and 2011 surveys of Barth et al. (2013). Based on the study by Fazio et al. (2015), we consider the results of the 2008 survey to be the data for the period of our 2002-2008 study and the results of the 2011 survey to be the data for the 2009–2018 study period.

The regulatory and institutional variables are as follows:

- (i) The Restructuring power variable reflects the power of the supervisory authorities to restructure and reorganize a distressed bank. These authorities can cancel shareholders' rights, manage deposit insurance and assets and suspend or replace management and directors.
- (ii) The Multiple Supervisor variable indicates the existence of one single official regulator or several supervisors who share responsibility for supervising the banks in the country.
- (iii) The Moral Hazard variable measures the degree of steps taken to mitigate moral hazard.
- (iv) The Government-Owned Banks variable represents the percentage of assets in the banking system held by the state.
- (v) The External governance index variable measures the efficiency of external audits, transparency of banks' financial reporting practices, ratings by external rating agencies and incentives for the bank's creditors to monitor the bank's performance.
- (vi) The Restrictions on Banking Activities variable is an index that measures regulatory restrictions on banks operating on transferable securities markets, carrying out insurance and real estate business activities.

Table 1 summarizes the definition of all the variables in our study.

Table 1: Definition of variables

Variables	Definition	Source
Dependant :		
SRISK	SRISK measures the capital shortfall of a firm conditional on a severe market decline (in million)	NYU Stern's V-Lab
Independant:		
CSR	CSR Rating Score	Asset4 Thomson reuters
Financial Characteristics :		
Size	Logarithm of total assets	Datastream
NPL	Non Performing Loans	Datastream
Debt to equity	Total debt (long + short term) /total equity	Datastream
Loans to deposits	Total loans/total deposits	Datastream
C : capital adequacy		
Capital ratio	Total Equity/Total Assets	Datastream
Tier 1 ratio	Tier1 capital Ratio	Datastream
A : asset quality		
ROA	Return on Assets	Datastream
PLL/Loans	Provisions for Loan Losses/Total Average Loans	Datastream
NPA/Assets	Non-Performing Assets/Total Assets	Datastream
M : management quality		
Cost to income	Operating Costs/Operating Income	Datastream
E : earning ability		
ROE	Return on Equity	Datastream
Net interest margin	Net Interest Margin	Datastream
L: liquidity position		
Interest expenses to liabilities	Interest Expenses/Total Liabilities	Datastream
Macroeconomics:		
Log GDP	Logarithum GDP per capita	WDI
Credit_GDP	The ratio of credit to the private sector as a percentage of GDP	WDI
Institutional:		
Restructuring power	Rating between 0 and 6: High values indicate great restructuring power	Barth et al.(2013)
Multiple supervisor	Dummy variable: 1 if banks have more than one supervisory authority 0 if only one authority	Barth et al.(2013)
Moral hazard	Rating between 0 and 3: A high value corresponds to an attenuation of moral hazard.	Barth et al.(2013)
Government Owned	A percentage that measures the assets of the banking system held by the government.	Barth et al.(2013)
External Governance	Rating between 0 and 19: Higher values indicate better corporate governance	Barth et al.(2013)
Restrictions activities	Rating between 3 and 12: Higher values indicate stricter restrictions	Barth et al.(2013)

4. Empirical Analysis

In this section, we present the empirical results of the relationship between CSR performance and systemic risk and the role that the institutional environment can play in this relationship.

4.1 Summary statistics results

Table 2 presents the descriptive statistics. These statistics show that the sample in our study is heterogeneous. There is a large gap between the minimum and maximum values of a number of variables. The minimum and maximum values of the systemic risk measure show that there are banks that are overcapitalized and other banks that are significantly undercapitalized (-18300 vs 113000). The average CSR score is 53,66 and the median score 53,99. Our sample contains banks with high CSR performances with a maximum score of 88,41 and banks that have a low CSR commitment with a minimum score of 18,55. This amplitude will enable us to measure the impact of CSR performance on systemic risk by taking into account all levels of the bank's CSR commitment.

Table 3 shows Pearson's correlation matrix between independent variables. There is no multicollinearity between the independent variables except for two coefficients 0,628 and 0,580, which link the capital ratio (equity/asset) with the Tier1 and ROA ratio respectively.

The VIFs confirm the absence of multicollinearity. The values obtained do not exceed 4,37 for the variables analyzed.

4.2 CSR performance and systemic risk

To estimate the effect of banks' CSR performance on systemic risk, we apply the panel regression model specified as follows:

$$\begin{aligned}
SRISK_{i,t} = & \alpha_i + \beta_1 CSR_{i,t-1} + \text{Bank level Control}_{i,t-1} + \text{Country level control}_{j,t-1} + \\
& \text{Year_effect} + \text{Region_effect} + \varepsilon_{i,j,t}
\end{aligned}
\tag{Eq. 9}$$

i, j and t represent the bank, country and year respectively. *SRISK* represents the measure of systemic risk. *CSR* measures the overall CSR score. Bank level control groups together financial variables including size (Size), non-performing loans (NPL), total debt/total equity ratio (Debt to equity) and total loans/total deposits ratio (Loans to deposits) and the CAMEL model (capital adequacy, asset quality, management quality, earning ability, liquidity).

Table 2: Descriptive Statistics

	N	Mean	Max	Min	Median	St.Dev
Dependent variable						
SRISK	3364	5403.47	113000	-18300	107.981	19763.34
Independent variable						
CSR	2607	53.665	88.41	18.55	53.79	18.531
GOV	2607	37.593	93.87	1.55	32.31	29.003
SOC	2607	56.241	97.8	5.49	59.27	30.850
ENV	2607	52.469	95.43	9.23	52.95	32.496
Financial variables						
Size	4340	17.602	22.284	-0.301	17.709	1.79
NPL	3765	3420000	4.51e+07	377	831677	7470000
Dept/equity (%)	4324	285.305	1709.33	0	173.175	321.345
Loans/deposits (%)	3935	2.756	68.25	0.022	0.996	8.429
Capital ratio (%)	4338	0.089	0.417	0.016	0.077	0.056
Tier1 ratio (%)	3152	12.589	38.8	5.97	11.865	4.969
NPA /asset (%)	3597	0.029	5.117	0	0.014	0.115
ROA (%)	3716	1.45	7.1	-1.65	1.21	1.306
PLL/loans (%)	4089	0.008	0.221	-0.033	0.005	0.014
Cost to income	4390	4.501	57.89	-34.664	3.255	9.423
ROE (%)	4169	9.055	104.9	-4298.47	12.17	79.169
Net interest margin (%)	4063	5.284	95.569	0.031	2.259	12.81
Interest expenses to liabilities (%)	4155	2.753	12.2	0.09	2.15	2.358
macroeconomics variables						
Log_GDP	4752	9.735	11.292	6.432	10.212	1.161
Credit_GDP	4635	106.904	203.8	13.4	109.5	54.515
Institutional variables						
Restruc_power	4468	2.521	4.5	0	3	0.86
Multiple_sup	4603	0.186	1	0	0	0.389
Moral_Hazard	3820	1.376	11	0	1.5	1.072
Govermet_owned	3724	15.761	74	0	10.8	20.212
External_Gov	2173	14.975	18	13	15	1.242
Retsri_activ	4396	7.561	12	3	8	2.050

Table 3: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) SRISK	1.000											
(2) CSR	0.286*	1.000										
(3) Capital_ratio	-0.307*	-0.140*	1.000									
(4) Tier1_ratio	-0.122*	0.023	0.628*	1.000								
(5) NPA/assets	-0.080*	-0.038	-0.013	0.029	1.000							
(6) ROA	-0.244*	0.006	0.580*	0.298*	-0.118*	1.000						
(7) PPL/loans	-0.075*	0.042*	0.274*	0.197*	0.274*	0.200*	1.000					
(8) Cost to income	0.095*	0.032	-0.097*	-0.060*	-0.033	-0.080*	0.006	1.000				
(9) ROE	-0.015	-0.009	0.061*	0.041*	-0.152*	0.166*	-0.176*	0.025	1.000			
(10)Net_interest_margin	-0.097*	-0.061*	0.216*	0.174*	-0.020	0.197*	0.214*	0.057*	0.011	1.000		
(11) Interest_liabilities	-0.068*	0.110*	0.129*	-0.032	-0.027	0.454*	0.277*	0.097*	0.017	0.108*	1.000	
(12) Size	0.589*	0.497*	-0.525*	-0.275*	-0.099*	-0.293*	-0.144*	0.040*	-0.008	-0.331*	-0.102*	1.000
(13) NPL	0.574*	0.323*	-0.213*	-0.076*	0.136*	-0.224*	0.113*	-0.004	-0.057*	-0.123*	-0.085*	0.532*
(14) Dept to equity	0.268*	0.231*	-0.416*	-0.265*	-0.021	-0.154*	-0.051*	0.097*	-0.010	-0.135*	0.087*	0.399*
(15) Loan to deposit	0.181*	0.058*	-0.134*	-0.087*	-0.013	-0.076*	-0.023	-0.018	-0.002	-0.109*	0.050*	0.202*
(16) Log_GDP	0.186*	0.087*	-0.121*	-0.001	-0.015	-0.264*	-0.230*	0.028	-0.030	-0.004	-0.320*	0.161*
(17) Credit_GDP	0.224*	0.037	-0.272*	-0.116*	-0.044*	-0.455*	-0.155*	-0.001	-0.042*	0.090*	-0.420*	0.156*
(18) Restruc_power	-0.001	-0.071*	0.022	-0.014	-0.005	-0.027	0.038*	-0.001	0.006	0.038*	-0.032*	-0.080*
(19) Multiple_Sup	-0.018	-0.089*	0.070*	0.083*	-0.052*	-0.107*	-0.072*	0.016	0.000	0.149*	-0.178*	-0.289*
(20) Moral_Hazard	0.002	-0.005	0.030	0.019	0.013	-0.003	-0.017	0.002	0.003	0.046*	-0.052*	-0.024
(21) Govermet_owned	-0.050*	-0.118*	0.063*	-0.011	0.014	0.211*	0.120*	-0.020	0.046*	-0.095*	0.340*	0.037*
(22) External_Gov	-0.089*	0.004	0.079*	-0.045	-0.045	0.069*	0.028	-0.046*	0.032	0.066*	-0.080*	-0.069*
(23) Restri_activ	-0.043*	-0.204*	0.064*	-0.028	-0.031	0.004	-0.022	-0.014	0.031	0.040*	-0.034*	-0.159*

Table 3: Correlation Matrix (continued)

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
(13) NPL	1.000										
(14) Dept to equity	0.193*	1.000									
(15) Loan_deposit	0.202*	0.136*	1.000								
(16) Log_GDP	0.105*	0.231*	0.018	1.000							
(17) Credit_GDP	0.065*	0.107*	0.042*	0.521*	1.000						
(18) Restruc_power	-0.031	-0.095*	0.028	-0.076*	0.102*	1.000					
(19) Multiple_Sup	-0.146*	-0.120*	-0.054*	0.214*	0.433*	0.225*	1.000				
(20) Moral_Hazard	0.007	0.033	0.061*	0.252*	0.105*	-0.021	0.227*	1.000			
(21) Govermet_owned	0.014	-0.109*	0.015	-0.621*	-0.458*	-0.122*	-0.260*	-0.325*	1.000		
(22) External_Gov	0.011	0.013	-0.052*	0.006	0.053*	0.269*	0.192*	0.048*	-0.191*	1.000	
(23) Restri_activ	-0.108*	-0.232*	-0.043*	-0.327*	-0.084*	0.164*	0.227*	0.031	0.183*	0.146*	1.000

*indicates significance at 5%. SRISK measures systemic risk; CSR is the CSR rating; capital_ratio: Total equity/total assets; Tier1 Ratio: Tier1capital ratio; NPA/assets : Non-performing assets/total assets; ROA: Return on assets; PLL/loans: Loan loss provisions/total loans; Cost to income: Operating cost/operating income; ROE: Return on equity; Net interest margin; Interest expenses to liabilities : Interest expenses to liabilities; Log GDP: Logarithm GDP per capita; Credit_GDP: The ratio of credit to the private sector as a percentage of GDP; Size: Logarithm of total assets; NPL: Non-performing loans; Debt to equity: Total debt/total equity; Loans to

deposits: Total loans/total deposits; Restruc_power : Restructuring of distressed banks rated between 0 and 6; Multiple_sup: Dummy_variable: 1 if banks have multiple supervisors 0 if only one supervisor; Moral_hazard: Rating between 0 and 3; Government Owned: A percentage that measures the assets of the banking system held by the government; External_Gov: Rating between 0 and 19; Restri_activ: Rating between 3 and 12.

We also use country-level control variables. These are the two macroeconomic variables, the logarithm of GDP per capita (*Log_GDP*) and the ratio of private sector credit as a percentage of GDP (*Credit_GDP*).

We include fixed year effects to control unobservable time-specific factors that can influence systemic risk and fixed regional effects to control country factors potentially correlated with systemic risk. Based on Guenster et al. (2011), Marsat and Williams (2013) and Arouri and Pijourlet (2017), we reject the use of fixed bank effects because time variations in CSR performance are limited. All explanatory variables are offset by one year (Iqbal et al., 2018; Becchetti et al., 2015).

Firstly, we estimate the link between the overall CSR score and the measure of systemic risk. The result of this regression is presented in model 1 in table 4. Secondly, we replace the CSR score in equation 7 with the pillars of CSR i.e. governance (*GOV*), social performance (*SOC*) and environmental performance (*ENV*). Models 2, 3 and 4 in Table 4 show the respective results. Finally, Model 5 shows the result of the regression of the three CSR pillars together.

In accordance with our H1 hypothesis, the regression result (column 1) shows that the coefficient of the CSR score is negative and significant at 1%. In other words, a one point increase in the Score_CSR leads to a decline in systemic risk of 131 million. This result highlights the important role of a CSR commitment to reducing banks' exposure to systemic risk.

As noted in previous studies, CSR performance reduces systematic risk (Oikonomou et al., 2012), idiosyncratic risk (Luo and Bhattacharya, 2009), operational risk (Zhao et al. 2016) and credit risk (Shen et al., 2016). Earlier studies show that systemic risk is linked to systematic risk by a cascading effect (Duan and Zhang, 2013) and that systematic risk can be a source of systemic risk (Acharya et al., 2010; Brownlees and Engle, 2012). In addition, SRISK assesses the need for recapitalization of a financial institution in the case of a systemic crisis. However, companies with better CSR performance face lower capital constraints (Cheng et al., 2014). Our result contributes to this literature and shows that banks' exposure to systemic risk can also be reduced by engaging in CSR activities.

Table 4: CSR performance and systemic risk

VARIABLES	(1) SRISK	(2) SRISK	(3) SRISK	(4) SRISK	(5) SRISK
CSR _{t-1}	-131.0*** (28.43)				
Gov _{t-1}		-109.5*** (18.09)			-78.40*** (21.25)
Soc _{t-1}			-104.9*** (18.26)		-77.93*** (29.05)
Env _{t-1}				-73.38*** (16.94)	16.20 (26.24)
C					
Capital ratio _{t-1}	-74,094*** (27,819)	-67,411** (27,718)	-75,354*** (27,627)	-80,205*** (27,733)	-65,465** (27,648)
Tier1 ratio _{t-1}	816.6*** (160.2)	838.6*** (159.5)	785.6*** (159.2)	811.0*** (160.3)	822.9*** (159.4)
A					
ROA _{t-1}	-2,879*** (724.4)	-2,828*** (720.7)	-2,556*** (723.8)	-2,981*** (725.4)	-2,579*** (728.0)
NPA/ assets _{t-1}	-120,991*** (13,395)	-122,738*** (13,328)	-113,628*** (13,401)	-115,828*** (13,457)	-117,934*** (13,402)
PLL/loans _{t-1}	-119,995** (52,299)	-116,900** (51,900)	-105,547** (51,887)	-112,968** (52,239)	-113,856** (51,866)
M					
Cost to income _{t-1}	219.1*** (46.62)	227.6*** (46.38)	223.9*** (46.43)	221.8*** (46.65)	227.4*** (46.26)
E					
ROE _{t-1}	-1.467 (3.865)	-0.423 (3.837)	-1.315 (3.845)	-1.205 (3.866)	-0.944 (3.833)
Net interest margin _{t-1}	209.6*** (52.53)	190.6*** (52.18)	205.0*** (52.26)	205.7*** (52.54)	196.7*** (52.12)
L					
interest expenses/ liabilities _{t-1}	678.2** (277.9)	804.3*** (278.3)	609.2** (275.5)	645.1** (277.6)	756.2*** (278.2)
Financial variables					
Size _{t-1}	8,418*** (592.6)	8,323*** (567.5)	8,755*** (596.2)	8,450*** (601.5)	8,838*** (602.0)
NPL _{t-1}	0.00111*** (8.15e-05)	0.00113*** (8.12e-05)	0.00109*** (8.12e-05)	0.00110*** (8.16e-05)	0.00112*** (8.12e-05)
Dept to equity _{t-1}	-0.724 (1.880)	-0.331 (1.873)	-0.240 (1.877)	-0.832 (1.881)	0.0357 (1.873)
Loan to deposits _{t-1}	47.51 (47.34)	45.73 (47.07)	62.89 (47.07)	42.85 (47.47)	55.65 (47.40)
Macroeconomic variables					
logGDP _{t-1}	-2,232*** (687.9)	-2,370*** (685.2)	-2,467*** (687.8)	-2,284*** (689.4)	-2,537*** (685.3)
credit_GDP _{t-1}	10.56 (14.36)	18.72 (14.41)	9.490 (14.27)	11.57 (14.40)	16.71 (14.42)
Region effects	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes
Constant	-127,606*** (12,905)	-127,270*** (12,713)	-132,795*** (12,939)	-131,152*** (13,158)	-133,384*** (13,049)
Observations	1,478	1,478	1,478	1,478	1,478
R-squared	0.585	0.589	0.588	0.584	0.592

***, ** and * indicate a significance at 1%, 5% and 10% respectively. SRISK measures systemic risk; CSR is the CSR rating; capital_ratio: Total equity/total assets; Tier1 Ratio: Tier1 capital ratio; NPA/assets : Non-performing assets/total assets; ROA Return on assets; PLL/loans: Loan loss provisions/total loans; Cost to income: Operating cost/operating income; ROE: Return on equity; Net interest margin; Interest expenses to liabilities : Interest expenses/total liabilities; Size: Logarithm of total assets; NPL: Non-performing loans; Debt to equity: Total debt/total equity; Loans to deposits: Total loans/total deposits; NPL: Non-performing loans; Debt to equity: Total debt/total equity; Loans to deposits: Total loans/total deposits; Log GDP: Logarithm GDP per capita; Credit_GDP: The ratio of credit to the private sector as a percentage of GDP;

Columns 2, 3 and 4 present the result of the impact of each CSR pillar on banks' exposure to systemic risk. The coefficients of governance and the social and environmental dimensions are negative and very significant at a threshold of 1%.

Previous studies have shown that good governance encourages excessive risk-taking by companies in the financial sector, thus increasing systemic risk (Andries and Nistor, 2016; Iqbal et al., 2018). On the other hand, Ellis et al. (2014) demonstrate that governance plays a role in the workings of financial institutions and their financial stability. Yet we find that governance and the social and environmental dimensions significantly reduce banks' exposure to systemic risk. In other words, a one point increase in governance, social, and environmental scores results in a decrease in systemic risk exposure of 109.5 million, 104.9 million, and 73.38 million, respectively. This confirms our first result and confirms that CSR and its pillars cushion banks' exposure to systemic risk.

Based on the study by Cheng et al. (2014), we study the effect of the three pillars simultaneously in order to precisely explore the pillar that most reduces these banks' exposure to systemic risk. Column 5 of table 4 shows the result of this estimate. We note that the governance and the social dimension coefficients are negative and very significant at 1%. The coefficient of the environmental dimension is insignificant. Based on this finding, we argue that CSR performance reduces banks' exposure to systemic risk through its social pillar and governance. The environmental pillar has no role in reducing systemic risk since the banking sector is not considered a polluting sector (Esteban-Sanchez et al., 2017).

The coefficients associated with the control variables are broadly consistent with the expected signs. With respect to the CAMEL model, we find that a high capital ratio reduces systemic risk. On the other hand, the Tier 1 ratio increases systemic risk with a 1% significance. Varotto and Zhao (2018) explain that regulators can exercise their discretionary power by increasing minimum capital requirements when concerned about bank security or systemic risk. Since there is no problem of

collinearity between the capital ratio and the Tier 1 ratio, the finding of Varotto and Zhao (2018) can explain our result and the inconsistency between the coefficients of these two variables.

The three variables that represent asset quality (ROA, the ratio of non-performing assets and the ratio of provisions to loan losses) negatively impact systemic risk. This result shows that the quality of CSR banks' assets reduces systemic risk.

We find that the coefficient of the cost to income ratio is positive and significant. The ROE coefficient is not significant. This result is consistent with the study by Betz et al. (2014) who found no link between ROE and bank distress.

A high liquidity ratio should reduce bank failure. Bertz et al. (2014) find a positive link between this ratio and bank distress. We find the same result with a significance of 10%. Kleinow and Nell (2015) confirm this positive link and explain that high cash flow indicates lower profitability due to less efficient capital allocation.

We also find that size and credit risk (NPL) increase systemic risk. This result is consistent with the studies of Laeven et al. (2016) and Varetto et al. (2018).

The leverage ratio coefficient is not significant. Kleinow and Nell (2015) find the same result and confirm the non-significance of the link between leverage and systemic risk. They explain that because regulators include this measure in Basel III. Thus, they cannot empirically show the influence of leverage on systemic risk.

As regards macroeconomic variables, low real GDP growth increases banks' distress (Bertz et al. 2014). We find that the GDP log has a negative and significant 1% coefficient. We find no link between credit_GDP and systemic risk.

As indicated in subsection (2.2), the Basel Committee designates the G-SIBs "Global systematically important banks" whose failure could trigger a financial crisis. The committee also classifies banks according to their Tier 1 capital ratio. It lists the Group1 banks that are internationally active and have tier 1 capital in excess of 3 billion euros. G-SIBs are in Group1 and have higher risk-weighted capital and a lower leverage ratio than the other banks in this category. The second category of banks called Group2 banks includes the other banks taking part in the survey and have tier 1 capital of less than €3 billion or are only active on a national level. In 2018, 189 banks in 27 countries participated in the Basel III study, including 106 Group 1 banks and 83 Group 2 banks. In 2014, 224 banks participated in the study, including 98 from Group 1 and 126 from Group 2.

Some of the banks in our sample did not participate in these surveys. We cannot therefore make subsamples of Group1 and Group2. We only identify the G-SIBs, all of which are on the list of banks in our sample. The FSB and BCBS update the list of G-SIBs every year. In our basic regression model (equation 9), we include the interaction between *CSR* variable and *G-SIBs* dummy variable to study the effect of CSR performance on the exposure of G-SIBs to systemic risk. Table 5 presents the results.

The result of Table 5 shows that the coefficient of the interaction between *CSR* variable and *G-SIBs* variable is positive and significant at 1%. The overall effect for global systemic banks is thus positive, as the sum of the two coefficients equals 249. On one hand, analysis of the *CSR* ratings of these large banks shows that the median value is 76.75 and an average of 73.4 during the period of our study. However, the average value for non-systemic banks is 52.89 and the median value is 53.03. These high ratings allow us to that G-SIBs invest more in *CSR* than smaller banks. Previous studies also show that the large banks invest more in *CSR* activity. Chih et al (2010) study 520 financial companies in 34 countries and show that total assets have a positive correlation with *CSR*, indicating that large companies with a high asset size tend to adopt *CSR* and act in a socially responsible manner. Similarly, Scholtens and Dam (2007) argue that *CSR* policy is especially adopted by large banks.

On the other hand, the net positive and significant relationship shows that these banks are exposed to systemic risk despite their engagement in *CSR* activities. This may be interpreted as an overinvestment of G-SIBs in *CSR* activity. By overinvestment, we mean that the positive externalities that relates to *CSR* investment are less efficient than in smaller banks investing in *CSR*.

Table 5: CSR performance, G-SIBs and systemic risk

VARIABLES	SRISK
CSR _{t-1}	-131.6*** (27.33)
G_SIBs* CSR_{t-1}	380.6*** (34.84)
C :	
Capital ratio _{t-1}	-68,777** -26,746
Tier1 ratio _{t-1}	750.2*** (154.1)
A :	
ROA _{t-1}	-2,693*** (696.5)
PLL/Loans _{t-1}	-90,692* -50,344
NPA/ assets _{t-1}	-90,786*** -13,169
M :	
Cost to income _{t-1}	190.1*** (44.89)
E :	
ROE _{t-1}	-0.587 (3.716)
Net interest margin _{t-1}	196.0*** (50.51)
L :	
interest expenses to liabilities _{t-1}	613.1** (267.2)
Financial variables	
Size _{t-1}	8,346*** (569.7)
NPL _{t-1}	0.000795*** (8.36e-05)
Dept to equity _{t-1}	-0.998 (1.808)
Loan to deposits _{t-1}	47.61 (45.51)
Macroeconomic variables	
logGDP _{t-1}	-2,112*** (661.3)
credit_GDP _{t-1}	13.30 (13.80)
Region effects	Yes
Year effects	Yes
Constant	-122,948*** -11,862
Observations	1,478
R-squared	0.617

***, ** and * indicate a significance at 1%, 5% and 10% respectively. SRISK measures systemic risk; CSR is the CSR rating; G_SIBs dummy variable; capital_ratio: Total equity/total assets; Tier1 Ratio: Tier1 capital ratio; NPA/assets : Non-performing assets/total assets; ROA Return on assets; PLL/loans: Loan loss provisions/total loans; Cost to income: Operating cost/operating income; ROE:

Return on equity; Net interest margin; Interest expenses to liabilities : Interest expenses/total liabilities; Size: Logarithm of total assets; NPL: Non-performing loans; Debt to equity: Total debt/total equity; Loans to deposits: Total loans/total deposits; NPL: Non-performing loans; Debt to equity: Total debt/total equity; Loans to deposits: Total loans/total deposits; Log GDP: Logarithm GDP per capita; Credit_GDP: The ratio of credit to the private sector as a percentage of GDP.

4.3 CSR performance, systemic risk and the institutional environment

In this section, we test our second hypothesis that states that the institutional environment plays a role in the relationship between CSR performance and systemic risk. We apply the same regression model (Equation 1) and include interactions between banks' CSR scores and institutional variables.

$$\begin{aligned}
 SRISK_{i,t} = & \alpha_i + \beta_1 (CSR_{i,t-1} * Institutional\ variables_{j,t}) + Bank\ level\ Control_{i,t-1} \\
 & + Country\ level\ control_{j,t-1} + Year_effect + Region_effect + \varepsilon_{ij,t}
 \end{aligned}
 \tag{Eq.10}$$

The results of the regressions are shown in table 6. The first findings show that all the coefficients of the interaction variables are significant. So we confirm our second hypothesis and conclude that an effective institutional environment plays a key role in the relationship between CSR performance and banks' exposure to systemic risk.

The coefficient of the *Restruc_power* variable is positive and significant at 1%. The findings show that a strong supervisory authority has an opposite effect on systemic risk. The findings in previous studies on the ability of a supervisory authority to restructure and reorganize a troubled bank in terms of bank risks are inconclusive. Quintyn and Taylor (2002) find that a strong supervisory authority leads to risky banking behavior and banking inefficiency. Strict supervisory policies do not guarantee more stable financial systems (Laeven and Levine, 2009; Barth et al., 2013; Tabak et al., 2016). On the other hand, Chortareas et al. (2012) and Barth et al. (2013) found that significant supervision improves governance and the efficiency of banking operations, bank profitability and reduces volatility in returns. Our findings indicate that the coefficient of the interaction between *CSR* and *Restruc_power* variable is negative and significant at 5%. Thus, CSR performance mitigates banks' exposure to systemic risk in countries where regulators do not have the incentives or the power to take strong corrective action for troubled banks.

On the other hand, we obtain a positive and significant coefficient at 1% for the interaction between *CSR* and *Multiple_sup* variable. The existence of several supervisors in a country, sharing responsibility for bank oversight, weakens the effectiveness of CSR activities in reducing exposure to systemic risk. Politicians can use their supervisory authorities to attempt to induce banks to lend to privileged borrowers on advantageous terms (Quintyn and Taylor, 2002). So a multitude of supervisory authorities can create conflicts of interest, which can lead to CSR banks being exposed to systemic risk.

Concerning Moral Hazard, we find a positive and significant coefficient at 5% of the interaction between *CSR * Moral_Hazard*. Moral hazard weakens the capacity of CSR performance to reduce banks' exposure to systemic risk. There is abundant literature showing that deposit insurance is associated with moral hazard (Demirguc-Kut and Kane, 2002; Demirguc-Kut and Huizinga, 2004). Laeven et al. (2016) indicate that the existence of a deposit insurance system reflects the government's implicit support for big banks, thereby creating a moral hazard that encourages risky behavior. Our findings are consistent with the study of Anginer et al. (2014) which show that deposit insurance aims to foster depositor trust and prevent bank runs, and has the unintended consequence of encouraging banks to take excessive risks with respect to the ensuing moral hazard. Barth et al. (2004) also confirm that explicit, ill-designed deposit insurance increases the likelihood of banking crises.

With respect to state ownership of assets in the banking system, the coefficient of the interaction between *CSR* and *Government_Banks* variable is positive and significant at 1%. This shows that CSR banks in countries where the state holds the highest percentage of banking system assets are exposed to systemic risks. Barth et al. (2004a) pointed out that economists' views differ on the impact of public ownership on banks. Some argue that governments can

Table 6: CSR performance, systemic risk and institutional environment

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	SRISK	SRISK	SRISK	SRISK	SRISK	SRISK
CSR _{t-1}	68.55 (88.62)	-151.0*** (30.09)	-92.65** (44.94)	-108.8*** (37.18)	1,692*** (399.3)	-296.4*** (101.0)
Restruc_power	5,045*** -1,945					
CSR _{t-1} * Restruc_power	-80.48** (32.95)					
Multiple_sup		-16,432*** -5,972				
CSR _{t-1} *.Multiple_sup		403.8*** (103.1)				
Moral_Hazard			-2,840** -1,224			
CSR _{t-1} *Moral_Hazard			51.11** (22.21)			
Govermet_Banks				-80.40 (89.09)		
CSR _{t-1} *Govermet_Banks				4.758*** (1.407)		
External_Gov					5,218*** (-1,673)	
CSR _{t-1} *External_Gov					-166.2*** (26.35)	
Restri_activ						-26.16 (807.0)
CSR _{t-1} *Restri_activ						25.70* (13.40)
C.A.M.E.L	Yes	Yes	Yes	Yes	Yes	Yes
Financial variables	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic variables	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-129,24*** -13,637	-106,72*** -12,491	-73,49*** -14,801	-81,94*** -12,897	-138,02*** -28,105	-108,81*** -13,441
Observations	1300	1,332	1,087	1,094	761	1,264
R-squared	0.585	0.593	0.605	0.606	0.669	0.601

***, ** and * indicate a significance at 1%, 5% and 10% respectively. SRISK measures systemic risk; CSR is the CSR rating; Restruc_power : Restructuring of distressed banks rated between 0 and 6; Multiple_sup: Dummy_variable: 1 if banks have multiple supervisors 0 if only one supervisor; Moral_hazard: Rating between 0 and 3; Government Owned: A percentage that measures the assets of the banking system held by the government; External_Gov: Rating between 0 and 19; Restri_activ: Rating between 3 and 12.

help banks overcome capital market failures and promote investment, whereas the alternative argument has a less optimistic view of public ownership. Porta et al. (2002) and Barth et al. (2001) found that excessive government ownership of banking assets is associated with less efficient and less developed financial systems. Thus, Shaddady and Moor (2019) indicate that state ownership jeopardizes bank stability. They show that bureaucracy in government agencies can lead to mismanagement, corruption, and misallocation of resources, thus undermining the stability of the banking system. Our findings are consistent with these studies and show that when the government holds a high share of banking system assets, this increases systemic risk for CSR banks.

External governance that monitors the effectiveness of external audits, the transparency of banks' financial reporting practices and assessments of banking activities by rating agencies, all go to enhance banking stability. Fernandez and Gonzalez (2005) show that accounting and audit requirements are effective mechanisms that reduce bank risk. Regulations that encourage and facilitate private control are associated with efficient banking sectors (Barth et al., 2004). Our findings are consistent with these studies and show that the coefficient of the interaction between *CSR* and *External_Gov* variable is negative and significant at 1%, meaning that external governance strengthens the stability of CSR banks in the face of systemic risk.

Economic theory provides conflicting predictions about the effect of banking activity restrictions on bank risk (Barth et al., 2004). On the one hand, Barth et al. (2004) and Laeven and Levine (2009) found that countries with severe restrictions on banking activities have a less stable financial situation. These restrictions reduce the possibility for banks to diversify their portfolio risk outside their main sectors of activity, thereby increasing bank fragility (Claessens and Klingebiel, 2001). On the other, Fernandez and González (2005), Pasiouras et al. (2006) provide empirical evidence that stricter restrictions on banking activities are effective in reducing bank risk. We find that the coefficient for the interaction between the CSR score and restrictions on banking activities *CSR*Restri_activ* is positive and significant at 10%. However, severe restrictions on banking activities reduce the positive effects of CSR performance on systemic risk. This result is in line with the study by Barth et al. (1999) which shows that the banking system is more fragile in countries where banking activities are more restricted. Danisman and Demirel (2019) note that restrictions on banking activities reduce the benefits of diversification and increase bank fragility. Greater restrictions on financial activities could reduce banks' ability to diversify risk, thus undermining their stability (Shaddady and Moor, 2019).

5. Conclusion

Our research aims to study the impact of CSR performance on banks' exposure to systemic risk. The analysis is carried out on an international sample of 297 banks adopting CSR activities over the period 2002 to 2018. We use the SRISK measure developed by Brownlees and Engle (2017) to measure systemic risk.

Our findings show that a strong CSR performance reduces banks' exposure to systemic risk. A separate analysis of the three CSR dimensions, i.e. governance and the social and environmental dimensions, shows that the three pillars mitigate exposure to systemic risk. Another analysis of the three pillars taken together shows that exposure to this risk is reduced mainly by the governance and social dimensions of these banks. Thus, our results highlight the net positive and significant at 1% of the coefficient of the interaction between CSR variable and G-SIBs variable. This may be interpreted as an overinvestment of G-SIBs in CSR activity. By overinvestment, we mean that the positive externalities that relates to CSR investment are less efficient than in smaller banks investing in CSR.

The study also highlights the role of a country's institutional framework in the relationship between banks' CSR performance and systemic risk. An institutional system that requires a supervisory authority and external governance reduces the systemic risk of CSR banks. However, severe restrictions on banking activities, the moral hazard, the presence of several supervisory authorities and high levels of state holdings of banking system assets undermine the ability of a strong CSR performance to reduce systemic risk.

However, our study has limitations that open up further avenues of research. It may be appropriate to consider other systemic risk measures and to re-examine the link between CSR performance and systemic risk in the light of several of these measures. It would also be useful to spread the sample across several regions and study the specificities of this relationship in each region.

The two previous chapters analyze the consequences of banks' engagement in CSR activities at the micro-economic level. The next chapter examines the impact of certain macro-economic factors on banks' CSR performance.

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**Chapter 4: Drivers of CSR activities in the banking industry:
The role of Economic Policy Uncertainty**

1. Introduction¹⁷

This paper contributes to the ongoing debate on the drivers of corporate social responsibility (CSR) activities and aims to better understand why firms are involved in social and environmentally friendly activities. Most research studies have mainly focused on two opposing views of CSR activity foundations. The first view of the neoclassical economists states that the sole objective of a firm is to maximize profits of shareholders. From this perspective, any positive social act undertaken by the firm is associated with costs that would reduce profit and prejudice shareholders (Friedman, 1962). CSR unnecessarily increases a firm's costs, placing it at a position of competitive disadvantage compared to its competitors (Friedman, 1970). Buchanan et al. (2018) find that CSR companies are more impacted than non-CSR companies in terms of firm value during a crisis because the costs of adopting CSR programs can outweigh the benefits when an unexpected crisis occurs. The second view considers that the firm's success depends on stakeholders' satisfaction. CSR can be compatible with profit maximization through effective management of stakeholders in order to realize significant resources to companies (Freeman, 1984). We contribute to this literature by investigating whether economic policy uncertainty (EPU) impacts CSR performance in the banking industry. To the best of our knowledge, the role of EPU as an external driver of CSR activities has never been explored in the economic literature.

There are arguments suggesting EPU should have a negative impact on CSR performance. Previous studies show that uncertainty can negatively affect companies' financial behavior. Uncertainty reduces levels of investment (Gulen and Ion, 2016; Wang et al., 2014; Julio and Yook, 2012; Kang et al., 2014), risk taking by firms (Akey and Lewellen, 2017), it reduces cash holding (Phan et al., 2019), decreases mergers and acquisitions operations (Bonaime et al., 2018 and Nguyen and Phan, 2017), increases risk premiums on stocks (Pastor and Veronesi, 2013) distorts the relation between investment and the cost of capital (Drobetz et al., 2018), increases the cost of financing and intensifies economic contraction (Pastor and Veronesi, 2012). Concerning the banking sector, literature finds that uncertainty affects various bank-level outcomes, such as credit growth (Gissler et al., 2016; Bordo et al., 2016), lending behaviors (Lee et al., 2017), bank liquidity (Berger et al., 2017) and bank earnings opacity (Yiqiang Jin et al., 2019).

¹⁷ Working paper co-authored with the Professor Mohamed Arouri

On the side of research that studies the effects of CSR investments, literature shows that CSR decreases risk (Orlitzky and Benjamin, 2001; Oikonomou et al., 2010; Salama et al., 2011) improves the company's reputation (Fombrun et al., 2000) and reduces the information asymmetry due to high transparency (Cheng et al., 2014). In the banking industry, CSR banks have a much distinguished credibility and reputation than non-CSR banks (Wu and Shen, 2013). Reputation, relationship with stakeholders and other intangible assets provide a competitive advantage to the firm (Branco and Rodrigues, 2006). Jones (1995) affirms that ethical behavior provides competitive advantage to companies. Then, CSR provides an insurance scheme for those resisting economic recession (Minor and Morgan 2011). This is in line with the resource-based view theory (Barney, 1991) which argues that CSR banks possess the potential to deliver superior competitive advantages that it can rely on in cases of uncertainty.

In case of theory, studies link uncertainty and investment via real option theory. The real option model predicts a negative relationship between uncertainty and investment. The companies will defer investment decisions to commit resources until more information is available (Bernanke, 1983; Brennan and Schwartz, 1985; McDonald and Siegel, 1986; Dixit and Pindyck, 1994). However, Husted (2005) considers that corporate social responsibility is a kind of real option, and variables determining the value of the options can be applied to CSR. Therefore, the company will be able to manage the risks associated with an uncertain environment through the real CSR options, and be able to choose the opportunity moment to invest in CSR when a negative event occurs (Cassimon et al., 2016).

In addition, CSR activities are often associated with a commitment to honor implicit and explicit contracts with stakeholders (Deng et al., 2013; Liang and Renneboog, 2017). Therefore, companies can engage in socially responsible activities to signal their commitment to honour the contract in the event of uncertainty shocks (Zhang et al., 2018). Koh et al., (2014) argue that CSR performance is a valuable insurance mechanism for firms against a negative event.

In this paper, we contribute to literature by assessing empirically the impact of EPU on CSR performance in the banking sector. Using an international sample containing 185 banks from 23 countries over the 2002–2018 period, we find that the effect of economic policy uncertainty on CSR performance is highly positive and significant at 1%. We test the robustness of our results by employing different estimation methods. In particular, we run tests of fixed panel, random panel and regressions by categories of variables and we confirm that this relationship is robust and persistent over time. In addition, an analysis of CSR's pillars, namely governance, social and environmental

dimensions, affirm the positive and persistent impact of EPU on CSR pillars. That shows that past uncertainty is a strong incentive for banks to invest more in CSR. We exploit the international dimension of our sample by investigating how the institutional environment affects the relationship between EPU and CSR performance. Analyses of sub samples show that the EPU has a positive impact on the CSR performance in countries that have high GDP per capita. It also appears that the EPU-CSR relationship only holds in countries featuring strict restrictions on banking activities, high capital regulation index and civil law countries. Finally, we find that some governance indicators, such as the corruption control index and the rule of law, have no impact on this relationship.

To the best of our knowledge, our paper is the first study that examines the effect of EPU on CSR. We contribute to the existing literature in several ways. First, none of the studies on CSR has found EPU a driver of CSR activities. We state that competitive advantages provided by CSR investments can be an insurance mechanism that motivates banks to become more engaged in their activities. Second, most previous studies have focused on non-financial institutions; very little research has focused on banks, especially CSR banks. Third, we offer an improvement on prior studies that used limited samples either in dimensions (only governance pillar) or in size of sample.

The paper is organized as follows. In Section 2, we examine the related literature. Section 3 presents the data and methodology. Section 4 introduces empirical analysis and results. The final section concludes the study.

2. Related literature and hypotheses

This section examines the literature on economic policy uncertainty and banks' CSR performance. First, we investigate the research work on the link between economic policy uncertainty and financial behavior. Next, we discuss the main conclusions of previous studies on CSR performance. Finally, we relate the two previous literatures and analyze the relationship between CSR performance and economic political uncertainty.

2.1. Economic Policy Uncertainty and Financial Behavior

There is a great debate about the impact of economic policy uncertainty on corporate financial behavior. Theoretical work on this subject dates at least to Bernanke's (1983) study, which indicates that high uncertainty linked to budgetary and monetary policies, encourages companies to delay their investments. Other studies emphasize that in the uncertainty period, companies slow down their investments to avoid costly mistakes (Brennan and Schwartz, 1985; McDonald and Siegel, 1986; Rodrik, 1991).

In light of this statement, numerous studies link uncertainty and investment via real option theory (Husted, 2005; Bonaime et al., 2018; Baker et al., 2016; Gulen and Ion, 2016; Vo and Le, 2017). Real option models predict that companies will defer an investment decision to commit resources until more information is available or “until after the nature of an uncertain environment has revealed itself” (Husted, 2005. p: 177). This approach is therefore useful if the investments are irreversible and there is some freedom on the timing to make them (Cassimon et al., 2016). However, this theory predicts a negative relationship between uncertainty and investment. Previous research studies confirm this link. According to Gulen and Ion (2016), high economic policy uncertainty has a negative effect on the level of investment. Similarly, Wang et al. (2014) show that managers delay investments when there is a high degree of uncertainty. Julio and Yook (2016) show that election cycles affect foreign direct investment. Kang et al. (2014) note that economic policy uncertainty depresses firms' investment decisions.

Moreover, Drobetz et al. (2018) find that the negative relationship between investment and the cost of capital decreases during periods of high economic policy uncertainty. Uncertainty has other negative effects on risk of the financial markets, volatility of stock prices, cost of capital (Pastor and Veronesi, 2012; Brogaard and Detzel, 2015) and growth of the information asymmetry between managers and stakeholders (Nagar et al., 2019). A high index can also affect inflation and expected risk premiums (Pastor and Veronesi, 2013).

In addition to corporate financial behaviors, Akey and Lewellen (2017) provide empirical evidence for impact of uncertainty on the risk taking of companies that have policy sensitivity and connectivity. They examine the effect of election outcomes on policy sensitive firms. They show that an exogenous shock on the political ties of these companies affects investment, leverage, company value, operational performance, credit default swap spreads and volatility compared to neutral companies.

Policy uncertainty can affect corporate cash holdings. Orens and Reheul (2013), Gulen and Ion (2016) and Demir and Ersan (2017) find that managers are more likely to retain cash when environmental uncertainty is high. Phan et al. (2019) document a positive relationship between EPU and cash holdings, due to investment delays.

Moreover, Bonaime et al. (2018) and Nguyen and Phan (2017) demonstrate that high EPU decreases merger and acquisition activities.

Another branch of the literature examines the effect of EPU in the banking sector. Yiqiang Jin et al. (2019) explain that high EPU increases information asymmetry, leads to greater bank earnings opacity and increases the fluctuation of cash flows. Wisniewski and Lambe (2015) indicate that the price of a credit default swap (*CDS*) reacts significantly to shocks in EPU. Other studies show that a high EPU index reduces bank credit growth (Gissler et al. 2016; Bordo et al. 2016; Nguyen et al. 2019; Hu and Gong, 2019), increases the level of non-performing loans, loan concentrations and the normal loan migration rate (Chi and Li, 2017). Similarly, Lee et al. (2017) note that the EPU modifies the lending behaviors and risk-taking activities of financial institutions. They find that long-term (short-term) EPU can have a positive (negative) impact on the leverage decision of financial institutions and drives financial institutions to reserve more (less) funds to cope with uncertainties. Berger et al. (2018) find that higher EPU results increases a total bank liquidity hoarding.

In contrast, Gissler et al. (2016) indicate that banking system regulation and macro prudential policies can partially solve the problem of the sensitivity of financial institutions to uncertainty. Similarly, Hu and Gong (2019) find that macro prudential and micro prudential policies effectively moderate the unfavorable effect of uncertainty on banks.

2.2 Corporate Social Responsibility

Previous studies on CSR performance are inconclusive. On the one hand, neoclassical economists' argument that CSR unnecessarily increases a firm's costs, placing it at a position of competitive disadvantage compared to its competitors (Friedman, 1970; Aupperle, Carroll and Hatfield, 1985; McWilliams and Siegel, 1997; Jensen, 2002). Lopez et al. (2007) find that the link between firm performance indicators and CSR is negative. In addition, Marsat and Williams (2011) find a negative impact of responsible behavior on corporate market value. Furthermore, the managerial opportunism approach explains that managers reduce social performance spending to increase their personal

remuneration, which negatively influences the financial performance (Preston and O'Bannon, 1997). According to the overinvestment hypothesis, CSR investment is expensive and reduces firm value (Cespa and Cestone, 2007; Barnea and Rubin, 2010). Similarly, Buchnan et al. (2018) find that CSR companies are more affected than non-CSR companies in terms of firm value during the crisis because the costs linked to the adoption of CSR programs can outweigh the benefits when an unexpected crisis emerges.

On the other hand, a number of researchers defend the advantages of companies adopting a CSR policy. Meta-analyses by Orlitzky et al. (2003), Margolis and Walsh (2003), Margolis et al (2009) and Wang et al. (2016) suggest a positive association between CSR performance and financial performance. Furthermore, CSR reduces the cost of capital (Sharfman and fernando, 2008; El Ghouli et al., 2011; Girerd-Potin et al., 2014; Cheng et al., 2014), decreases risk (McGuire et al., 1988; Feldman et al. 1997; Orlitzky and Benjamin, 2001 ; Husted, 2005; Godfrey et al., 2009; Oikonomou et al., 2010; Salama et al., 2011), improves the company's reputation (Fombrun et al., 2000) and reduces the information asymmetry due to high transparency (Cheng et al., 2014; El Ghouli et al., 2011) and determines a firms' financial structure (Girerd-Potin et al., 2011).

Regarding the banking sector, CSR banks have better credibility and reputation as well as a high performance compared to non-CSR banks (Wu et al. 2017; Shen et al. 2016; Yen, 2014). Banking CSR can reduce the cost of debt (Goss and Roberts, 2011) and improve financial performance (Siueia et al., 2019). Esteban-Sanchez et al. (2017) confirm that CSR banks are more attractive to investors.

2.3 CSR and Economic Policy Uncertainty

Husted (2005) believes that companies often abandon CSR investments because they apply traditional valuation techniques to analyze the costs and benefits of CSR and ignore the strategic value of CSR. In the traditional approach to examining corporate investment behavior, investments occur when the net present value (NPV) is zero or more (Folta and O'Brien, 2004). This approach ignores the two principles of real option theory. First, managerial flexibility, since managers can adapt and revise their strategies when the market has developed in an unexpected direction. Second, the strategic dimensions of investment projects (Cassimon et al., 2016).

Husted (2005) considers that corporate social responsibility is a kind of real option. The company defers the investment when the value of waiting, as captured by the real option value, exceeds the

value of investing now (NPV). There are 5 variables determining the value of the options and can be applied to CSR: (i) the share price which is the present value of the benefits expected from the CSR project; (ii) the exercise price which the underlying asset can be acquired is the investment cost of the CSR project; (iii) volatility is now measured as the standard deviation of the expected return from the CSR project; (iv) the time to maturity is the actual lifetime of the real option or the window of opportunity; (v) Finally, the risk-free interest rate is also important, with the same interpretation in both cases.

Cassimon et al. (2016) extend Husted's analysis and includes the opportunity cost variable to capture the entire dynamics of the CSR decision process and determine empirically the optimal time to invest in CSR during the period of uncertainty. The company will be able to manage the risks associated with an uncertain environment through the real CSR options (Cassimon et al., 2016). Therefore, the real option approach can be applied to uncertainty periods. So the question that arises is not whether or not to invest in CSR, but rather when to invest and to have flexibility in terms of investment decision in order to detect opportunities. Although future opportunities may be uncertain, the exercise of an option by a firm to invest can enhance its competitive advantage and erode the value of the option to wait by rival firms (Kulatilaka and Perotti, 1998).

In addition, the resource-based view theory can be used to defend the idea that CSR banks could rely on competitive resources in uncertainty cases. This theory indicates that a firm can perform better than its competitors if it has valuable, rare, inimitable and non-substitutable resources (Barney, 1991). As part of this theory, resources that may lead to competitive advantage include intangible assets such as corporate culture, reputation and the long-term relationship with stakeholders (Barney, 1986; Teece, 1998). Other researchers confirm this statement (Branco and Rodrigues, 2006; Hsu, 2012; Porter and Kramer, 2006). For Edmans (2011), engagement in CSR is a long-term investment in intangible assets that responds to a wide range of stakeholder interests. Hillman and Keim (2001, p: 125) demonstrate that "building better relationships with key stakeholders such as employees, customers, suppliers and communities could lead to increased shareholder wealth by helping firms to develop intangible and precious assets which can be sources of competitive advantage". In addition, Jones (1995) shows that ethical behavior provides a competitive advantage to the firm, including stakeholder relationships. Chih et al. (2010) studied 520 financial companies in 34 countries and find that large firms, where industries are extremely competitive, tend to invest in CSR activities in order to strengthen their competitive advantage. Firms may not invest heavily in such technology, because it is expensive to develop it. However, when one firm deviates from the norm by adopting

environment-friendly production technology, it can gain a competitive advantage over others (Flammer, 2015).

On the basis of the real option and resources based view, we assume that companies will be encouraged to invest in CSR in periods of uncertainty.

Zhang et al. (2018) find a positive and significant relationship between the EPU index and the investment in CSR of Chinese firms. They explain that firms prove their commitments to honor implicit contracts by investing in CSR activities during greater uncertainty periods. For these companies, CSR is considered as an ex-ante insurance mechanism. Similarly, Koh et al. (2014) argue that CSR performance is a valuable insurance mechanism for firms against a negative event. Borghesi et al. (2019) find a positive relationship between CSR intensity and firm value only when global economic policy uncertainty is high. They explain that investments in social capital in the form of CSR serve as insurance in that they can mitigate the negative effects of times of uncertainty. In other words, CSR principles generate positive moral capital among stakeholders, including credibility, reputation, employee engagement, community legitimacy, supplier trust, and shareholder reliability (Godfrey et al., 2009; Luo and Bhattacharya, 2009). This moral capital can mitigate negative judgments by stakeholders when negative events occur (Godfrey, 2005).

Economic policy uncertainty may increase stakeholders' concern in a firm's ability to fulfill its implicit contractual obligations (Zhang et al., 2018). Thus, companies can use CSR investment to signal their commitment to respecting contracts (Bowen et al., 1995; Deng et al., 2013; Dou et al., 2013; Raman and Shahrur, 2008). In addition, because it is expensive to develop such technology, firms may not invest heavily in it. However, when one firm deviates from the norm by adopting environment-friendly production technology, it can gain a competitive advantage over others in the product market (Flammer, 2015). Although future opportunity can be contestable and uncertain, the exercise of an option by a firm to invest can enhance its competitive advantage (Kulatilaka and Perotti, 1998).

However, uncertainty in economic policy can increase stakeholder concerns about a company's ability to meet its implicit contractual obligations (Zhang et al., 2018). Thus, companies can rely on CSR to signal their commitment to fulfill their implicit contracts and to maintain a relationship of trust with stakeholders (Bowen et al., 1995; Deng et al., 2013; Dou et al., 2013; Raman and Shahrur, 2008)

Thus, CSR engagement send a strong signal of dependability and stability if a negative event occurs. In other words, the social capital generated by higher CSR enables the creation of a competitive

advantage. CSR performance could be seen as an insurance protection for banks and their stakeholders in the face of an uncertain environment. This leads to the following hypothesis:

Hypothesis: When economic policy uncertainty is high, a firm increase its CSR investment.

3. Data and methodology

3.1 Sample selection

The sample consisted of 181 CSR banks from 23 countries. We have selected the countries for which EPU indices and Banks' CSR data are available. On the basis of financial data on EPU index, we have a sample of 3062 observations over a period going from 2002 to 2018. The sample contains banks with a high and low CSR score. Table 1 presents the repartition of banks by country. 21% of banks are from North America, 28% are from Europe and 37 % from Asia.

Table 1: Distribution of covered banks across countries

Country	Observation	Banks	Country	Observation	Banks
Australia	119	7	Italy	170	10
Brazil	68	4	Japan	476	28
Canada	119	7	Korea	136	8
Chile	102	6	Mexico	68	4
China	187	11	Netherland	34	2
Colombia	68	4	Russia	51	3
France	68	4	Singapore	51	3
Germany	85	5	Spain	153	9
Greece	68	4	Sweden	68	4
Hong Kong	68	4	UK	170	10
India	170	10	USA	527	31
Irland	51	3	Total	3 077	181

Notes: Data cover the period 2002-2018. EPU data are sourced from www.policyuncertainty.com. CSR data are obtained from ASSET4 Thomson Reuters

3.2 EPU measure

We adopt the EPU index proposed by Baker et al. (2016) as the independent variable. This index is a weighted average of three components of uncertainty that include the frequency of press articles containing key terms related to policy matters and economic uncertainty, future changes in the tax codes and a measure of disagreement between forecasters regarding future monetary and fiscal policies, represented by important macroeconomic variables. Baker et al. (2016) find that the EPU index increases before elections, a war period and in economic crises. It decreases when macroeconomic stability indicators are low.

3.3 CSR measure

CSR variable data were collected from ASSET4 *Thomson Reuters*. This database is one of the most trustworthy of CSR data (Stellner et al., 2015). Analysts collect 900 data points per company to calculate 250 key performance indicators (KPIs) which are grouped into 18 categories within four pillars (Environmental, Social, Governance and Economic). In year t , a company receives a z-score for each of the pillars, comparing its performance to the rest of the companies (Cheng et al., 2014). The resulting percentage is therefore a measure of performance, z-score and normalized between 0 and 100%.

3.4 Control variables

We are interested in studying the role of EPU as an external driver of CSR activities after controlling for banks' characteristics. We build on previous literature on banks to identify control variables. Our control variable list includes bank size (*Size*), profitability (*ROA*), liquidity (*Liq*), leverage (*Lev*) and Market to Book ratio (*MTB*). These variables are extracted from the *DataStream* database. In addition, we include macroeconomic variables specific to each country from the WDI (World Development Indicator) database in order to control the heterogeneity of the countries we are covering. *log_GDP* captures the level of economic development of countries *Credit_GDP* refers to the ratio of credit to the private sector over gross domestic product GDP (Wu et al., 2017) and is included to consider the

influence of the country's financial sector development on bank performance. Table 2 provides the full description and calculation method for the control variables.

Table 2: Description of variables

Variables	Description	Source
Independent variable:		
EPU	Economic political Uncertainty index	www.policyuncertainty.com
Dependent variable:		
CSR	Corporate social responsibility score	Asset4Thomson Reuters
Financial characteristics:		
Size	Natural logarithm of total assets	Datastream
ROA	Return on asset	Datastream
LEV	Leverage: debts / total assets	Datastream
Liq	Liquidity: total loan to total assets	Datastream
MTB	Market to Book ratio	Datastream
Macroeconomic variables:		
Log_GDP	Natural logarithm GDP per capita	WDI
Credit_GDP	Domestic credit to private sector/GDP	WDI

4. Empirical Analysis

4.1 Summary statistics results

Table 3 provides descriptive statistics for all the variables we consider in this study. The average CSR score in our sample is 54.73 and the median is 55 with a standard deviation of 19.22. The EPU has a mean of 131.7, a median of 111.76 and a standard deviation of 76.93.

Table 4 presents the correlation matrix. The variables are not strongly correlated except for the two macroeconomic variables Log_GDP and Credit_GDP, which have a coefficient of 0.64. The low correlation coefficients exclude the problem of multi-collinearity in our model. Interestingly, the correlation between the EPU index and the CSR score is positive and significant. This result corresponds to our hypothesis that states that policy uncertainty could be a significant driver of CSR activities.

Table 3: Descriptive statistics

Variables	Obs	Mean	Max	Min	Median	Standard deviation
EPU	3062	131.796	468.746	36.824	111.763	76.930
CSR	1672	54.731	90.01	18.09	55.005	19.228
Size	2518	17.968	21.712	13.223	18.080	1.937
ROA	2175	1.217	7.3	-1.71	1.01	1.246
LEV	2306	19.620	62.31	0.24	17.035	15.019
Liq	2357	0.641	0.918	0.203	0.656	0.138
MTB	2314	1.401	5.21	0.04	1.17	0.923
Log_GDP	2896	10.033	11.040	6.144	10.496	1.100
Credit_GDP	2791	127.341	206.3	21.2	132.8	50.00

All financial variables are winsorized at the 1% and 99% level. EPU is Economic political Uncertainty index. CSR is Corporate social responsibility score. Size is natural logarithm of total assets. ROA is return on asset. LEV is leverage (total debts / total assets). Liq is liquidity (total loan to total assets). MTB is Market to Book ratio. Log _ GDP is natural logarithm GDP per capita. Credit_GDP is domestic credit to private sector/GDP.

Table 4: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) EPU	1.000								
(2) CSR	0.156*	1.000							
(3) ROA	-0.064*	0.040	1.000						
(4) Size	0.118*	0.520*	-0.205*	1.000					
(5) LEV	-0.020	0.290*	0.139*	0.220*	1.000				
(6) Liq	-0.057*	-0.163*	-0.039	-0.307*	0.036	1.000			
(7) MTB	-0.152*	0.064*	0.345*	-0.171*	0.001	0.024	1.000		
(8) Credit_GDP	0.040*	-0.075*	-0.433*	-0.106*	-0.273*	0.117*	-0.176*	1.000	
(9) Log_GDP	0.084*	0.130*	-0.341*	0.024	0.021	0.133*	-0.194*	0.640*	1.000

* significant at the 5% level. EPU is Economic Political Uncertainty index. CSR is Corporate Social Responsibility score. Size is natural logarithm of total assets. Liq is liquidity (total loan to total assets). MTB is Market to Book ratio. LEV is leverage (total debts / total assets). ROA is return on asset. Credit_GDP is domestic credit to private sector/GDP. Log_GDP is natural logarithm GDP per capita

4.2 EPU and CSR performance

We regress the CSR score of banks on an EPU index and a set of control variables. Our baseline model is constructed as follows:

$$CSR_{i,j,t} = \alpha_i + \beta_1 EPU_{j,t} + \beta_2 SIZE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 LEV_{i,t} + \beta_5 Liq_{i,t} + \beta_6 MTB_{i,t} + \beta_7 Log_GDP_{j,t} + \beta_8 Credit_GDP_{j,t} + \varepsilon_{i,j,t} \quad (Eq. 1)$$

In which i, t, j represent bank, year and country, respectively. EPU denotes Economic Political Uncertainty index. CSR is Corporate Social Responsibility score. We control size by the natural logarithm of total assets (Size). We use return on asset (ROA). Leverage is total debts / total assets (LEV). Liq is liquidity is measured by total loans to total assets (Liq). We include Market to Book ratio (MTB). We include natural logarithm GDP per capita (Log_GDP) We use domestic credit to private sector/GDP (Credit_GDP).

Table 5 presents the results of the estimation of equation (1). We estimate a regression on a fixed effect panel (column 1), and a random effect panel (column 2). In order to test the persistence over time of the effect of EPU on CSR, we include the variable EPU lagged by one year (column 3).

Following Guenster et al. (2011) and Arouri and Pijourlet (2017), we reject the use of firm-fixed effects because temporal variations in CSR performance are limited.

Table 5: EPU and CSR performance

VARIABLES	(1)	(2)	(3)
	CSR	CSR	CSR
	Fixed effect	Random effect	Fixed effect
EPU	0.0101*** (0.00377)	0.0156*** (0.00377)	0.00826** (0.00377)
EPU t-1			0.0123*** (0.00396)
Size	8.839*** (1.242)	7.798*** (0.504)	8.268*** (1.251)
ROA	-0.257 (0.407)	0.253 (0.396)	-0.211 (0.401)
LEV	-0.291*** (0.0465)	-0.0961** (0.0393)	-0.282*** (0.0466)
Liq	10.50** (5.128)	11.10** (4.378)	12.27** (5.130)
MTB	-0.689* (0.407)	-0.859** (0.401)	-0.369 (0.411)
Log_GDP	4.050* (2.215)	3.692*** (0.995)	3.156 (2.209)
Credit_GDP	0.0847*** (0.0199)	0.0250 (0.0157)	0.0947*** (0.0197)
Constant	-163.6*** (15.71)	-138.6*** (12.45)	-148.3*** (16.87)
Observations	1306	1306	1281
Nb of bank	163	163	163
R-squared	0.299	0.284	0.277

***, ** and * denote significance at the 1%, 5% and 10% level respectively. EPU is Economic political Uncertainty index. CSR is Corporate social responsibility score. Size is natural logarithm of total assets. ROA is return on asset. LEV is leverage (total debts / total assets). Liq is liquidity (total loans to total assets). MTB is Market to Book ratio. Log _GDP is natural logarithm GDP per capita..Credit_GDP is domestic credit to private sector/GDP.

Column (1) shows that the effect of economic policy uncertainty on CSR performance is highly positive and significant at 1%. Column (2) reports estimation for random effect panel and confirms the significant positive impact of EPU on CSR activities. These results confirm the robustness of a positive and significant link between the two main variables of our study. This finding is consistent with our assumption that banks tend to invest more in CSR activities when uncertainty increases. It is in line with Zhang et al. (2018) who find that companies invest in CSR in uncertainty periods to signal to stakeholders their commitments to respect implicit contracts.

Coefficients associated with control variables are almost identical in column 1 and 2 and it is in line with literature. Size is positively related to CSR score. This result joins a set of studies which demonstrate that large banks engage more in CSR because they have the necessary resources to allocate to these activities (Margolis and Walsh, 2003; Wu and Shen, 2013 et Esteban-Sanchez et al., 2017). Leverage is negatively linked to CSR performance. The level of liquidity positively affects the CSR score, which shows that banks with a high level of liquidity have more financial resources to invest in CSR. Macroeconomic variables have a positive impact on CSR scores. A comfortable macroeconomic situation encourages banks to engage in CSR (Li and Zhang, 2010).

Column (3) shows that the coefficient of EPU and EPU_{t-1} is positive and significant at 1%. This coefficient is high compared to the instantaneous effect suggesting that the effect of economic political uncertainty on the CSR performance is mainly delayed and persistent over time.

In order to test the robustness of the relationship between the EPU index and CSR in the banking industry, we estimate other models of regressions. Regression results are summarized in Table 6. Model 1 only includes EPU index as an explanatory variable. Model 2 includes financial characteristics indicators. Model 3 includes macroeconomic control. Results show that the EPU index positively impacts CSR performance and that this link is statistically significant in all of the models. Despite the change in the categories of the control variable, the result is similar. These results further confirm our hypothesis and the robustness of the relationship between economic political uncertainty and CSR performance. We state that banks increase their investment in CSR activities in uncertainty periods. In a period of uncertainty, stakeholders may lose trust in the company. Thus, CSR can be considered as a strong signal of reliability and stability. Strong stakeholder relationships built over time via CSR activities may represent valuable resources during downturns (Borgheshi et al., 2019). In other words, social and moral capital reserves generated via CSR activities act as insurance and they can mitigate the negative effects of uncertainty times (Godfrey, 2005; Borgheshi et al., 2019).

These intangibles can be as a competitive advantage the company can build on in times of uncertainty. According to resource theory, banks use their competitive advantage, in particular responsible social activities, as an insurance mechanism in a period of high uncertainty. Also, CSR activities are often associated with a stronger reputation (Martínez-Ferrero et al., 2016). CSR can also be a powerful form of reputational insurance when an uncertain event occurs. Minor and Morgan (2011) measure reputation in terms of stock price reaction following an event and they find strong evidence of the link between a firm's CSR activities and its stock price response following an adverse event. Koh et al. (2014) corporate social activities can also help protect firms against negative events whose causes are purely external. Additionally, we can consider that CSR is a real option for banks that achieve favorable results (McGrath, 1997; Husted, 2005; Cassimon et al., 2016).

In sum, CSR banks maintain solid relationships with their stakeholders, provide a good reputation, and social and moral capital. These competitive advantages can be an insurance mechanism that motivates banks to become more engaged in their activities

4.3 Accounting for CSR's pillars

As indicated in the results of the previous regressions (Table 5) the delayed effect is more important than the instantaneous effect. Thus, we assess the persistence of impact of the EPU on the different categories of banks' CSR activities. We make use of the scores of each CSR pillar, namely the environment, social and governance. The results are presented in Table 7 and show that all the pillars are positively linked to the EPU delayed at $t-1$. This result shows that the effect of uncertainty is persistent over time for the three pillars of CSR and that past uncertainty strongly encourages banks to invest more in CSR.

Table 6: EPU and CSR performance: by categories of variables

VARIABLES	(1)	(2)	(3)
	Score_CSR	Score_CSR	Score_CSR
EPU	0.0348*** (0.00338)	0.00908** (0.00353)	0.0259*** (0.00341)
Size		11.97*** (0.675)	
ROA		-0.194 (0.382)	
LEV		-0.201*** (0.0410)	
Liq		11.61** (4.672)	
MTB		-1.083*** (0.381)	
Log_GDP			15.25*** (1.421)
Credit_GDP			0.0853*** (0.0164)
Constant	49.90*** (0.516)	-172.1*** (13.12)	-114.1*** (13.71)
Observations	1671	1439	1529
R-squared	0.067	0.289	0.192
Number of bank1	178	168	176

***, ** and * denote significance at the 1%, 5% and 10% level respectively EPU is Economic political Uncertainty index. CSR is Corporate social responsibility score. Size is natural logarithm of total assets. ROA is return on asset. LEV is leverage (total debts / total assets). Liq is liquidity (total loans to total assets). MTB is Market to Book ratio. Log _ GDP is natural logarithm GDP per capita..Credit_GDP is domestic credit to private sector/GDP.

Table 7: Persistence of the effect of EPU on banks' CSR pillars and EPU

VARIABLES	GOV	ENV	SOC
EPU t-1	0.00988** (0.00501)	0.0204*** (0.00674)	0.0134** (0.00565)
Size	13.27*** (1.840)	18.50*** (2.476)	14.65*** (2.076)
ROA	0.350 (0.601)	-0.990 (0.809)	1.007 (0.678)
LEV	-0.268*** (0.0694)	-0.302*** (0.0934)	-0.177** (0.0783)
Liq	38.82*** (7.699)	7.738 (10.36)	-2.141 (8.689)
MTB	-1.003 (0.611)	-0.0454 (0.822)	0.259 (0.689)
Log_GDP	-2.855 (3.314)	0.891 (4.460)	-2.007 (3.740)
Credit_GDP	0.167*** (0.0296)	0.0420 (0.0399)	0.0807** (0.0334)
Constant	-222.3*** (24.93)	-307.0*** (33.55)	205.6*** (28.14)
Observations	1281	1281	1281
R-squared	0.231	0.184	0.151
Number of bank	163	163	163

***, ** and * denote significance at the 1%, 5% and 10% level respectively. EPU is Economic political Uncertainty index. CSR is Corporate social responsibility score. Size is natural logarithm of total assets. ROA is return on asset. LEV is leverage (total debts / total assets). Liq is liquidity (total loans to total assets). MTB is Market to Book ratio. Log _GDP is natural logarithm GDP per capita..Credit_GDP is domestic credit to private sector/GDP.

4.4 Subsamples analysis

To further analyze the effect of economic policy uncertainty on banks' CSR activities, we split the whole study sample into subsamples. We use the median values of EPU index to divide our sample into high and low uncertainty periods. Column 1 and 2 of Table 8 report regression results for the high EPU and low EPU subsamples, respectively. The result shows that a high EPU index has a positive impact on the CSR performance of banks, a low EPU index affects negatively the CSR

performance. This result shows that banks CSR performance is sensitive to the level of economic policy uncertainty of a country. Increased uncertainty encourages banks to increase their CSR performance in order to obtain CSR benefits to reduce the negative effects of uncertainty.

Next, column 3 and 2 for Table 8 reports regression results for a subsample with a high CSR rating (quartile 75) and a low rating (quartile 25), respectively. The regression shows that the effect of EPU on higher CSR is positive and significant. There is no effect of EPU on CSR of banks which have low engagement in socially responsible activities. According to Zhang et al. (2018), firms invest considerably in CSR during high uncertainty periods. CSR activities are associated with a stronger commitment to honour implicit contracts (Deng et al., 2013), especially when a negative event occur.

We also explore whether the level of economic development has an impact on the relationship between CSR performance and economic policy uncertainty. We split our sample according to the sample median value of countries' level of GDP per capita (Columns 4 and 5). We show that EPU has a positive and significant impact on CSR performance for banks located in countries with high GDP per capita. People in richer countries are more likely to care about sustainability (Liang and Renneboog, 2017). This is in line with the argument positing that a minimum level of wealth is necessary for post-materialist values promoting awareness of CSR among stakeholders to emerge (Berthe and Elie, 2015; Scruggs, 1998). Companies situated in countries with more open and globalized economies, have a higher level of CSR practices (Liang and Renneboog, 2017). The same was found by Wu et al. (2016) who argue that banks in countries with growing GDP tend to engage more in CSR activities.

4.5 Institutional environment

The existing literature shows that banking regulations and the institutional system impact CSR performance as well as economic political uncertainty. Çolak et al. (2018) explain that certain institutional characteristics offset some negative outcomes of economic policy uncertainty. Regulation mitigates the adverse effect of uncertainty on bank credit (Hu and Gong, 2019) and improves the stability and resilience of the financial system (Galati and Moessner, 2018).

In addition, studies show that the legal framework applicable in the country is strongly correlated with the CSR practices of companies (Liang and Renneboog, 2017). Some researchers consider the legal system to be a determinant of CSR (Ioannou and Serafeim, 2012). Alos, La Porta et al. (1999) show that there is a link between corporate governance and the country's institutional environment.

From these observations, we study the role of the institutional system in the EPU-CSR relationship. We split the sample according to two proxies for bank regulations as in Barth et al. (2004) and Laeven and Levine (2009): (1) *Banking activity restrictions index* that measures the regulatory restrictions on banking activities, namely securities, insurance and real estate activities; and (2) *Capital regulation index* concerns the requirements linked to the capital held by banks. High scores of variables correspond to strict regulatory policies.

We use median value of *banking activity restrictions index* and the *Capital regulation index* to separate our sample. Column 1 and 2 of Table 9 report estimates for a subsample with high and low *banking activity restrictions index*, respectively. We find that the EPU index has a positive impact on the CSR score in countries with severe restrictions on banking activities. On the other hand, there is no link between our main variables in the case where the restrictions are weak.

Column 3 and 4 give estimates with high and low *Capital regulation index*, respectively. The conclusions remain the same. Although, capital stringency and restrictions on banking activities are regulatory instruments that aim to reduce banking risk (Barth et al., 2004), increase bank efficiency (Barth et al., 2013) and promote stability banking system (Danisman and Demirel, 2019). A well-regulated environment encourages banks to invest more in CSR and dampens the negative effects of an uncertain situation, hence our results which show that banks, located in countries with strong regulatory measures invest more in CSR activities when a period of high uncertainty arises.

Table 8: subsample analysis

	(1)	(2)	(3)	(4)	(6)	(5)
VARIABLES	High EPU	Low EPU	High CSR	Low CSR	high GDP	low GDP
EPU	0.00852** (0.00408)	-0.0373* (0.0212)	0.00789** (0.00319)	0.00610 (0.00746)	0.0144** (0.00593)	0.00749 (0.00530)
Size	10.14*** (1.930)	7.099*** (2.102)	-1.381 (1.409)	-4.974** (2.332)	4.929** (2.010)	10.33*** (1.721)
ROA	-0.0518 (0.528)	-0.393 (0.701)	-0.463 (0.452)	0.202 (0.578)	0.444 (0.685)	-0.147 (0.514)
LEV	-0.230*** (0.0677)	-0.352*** (0.0806)	-0.151*** (0.0487)	-0.0964 (0.0757)	-0.181** (0.0725)	-0.284*** (0.0691)
Liq	10.51 (7.533)	8.131 (8.166)	-7.907 (6.054)	11.44 (8.610)	12.61* (7.434)	5.940 (7.706)
MTB	-1.225** (0.539)	-0.597 (0.673)	-0.907** (0.411)	0.626 (0.750)	0.00235 (0.634)	-1.009* (0.576)
LogGDP	-1.643 (3.319)	7.385* (3.858)	3.104 (2.531)	3.545 (3.916)	0.105*** (0.0282)	0.101*** (0.0368)
Credit_GDP	0.0744*** (0.0271)	0.118*** (0.0374)	0.0603*** (0.0182)	0.120** (0.0519)	2.890 (4.128)	3.819 (3.094)
Constant	-129.8*** (24.77)	-162.5*** (25.57)	76.25*** (17.88)	59.21** (25.76)	-91.29*** (31.29)	-182.7*** (24.18)
Observations	680	626	311	336	604	702
R-squared	0.256	0.250	0.147	0.074	0.134	0.303
Number of bank	153	129	56	80	102	120

***, ** and * denote significance at the 1%, 5% and 10% level respectively EPU is Economic political Uncertainty index. CSR is Corporate social responsibility score. Size is natural logarithm of total assets. ROA is return on asset. LEV is leverage (total debts / total assets). Liq is liquidity (total loans to total assets). MTB is Market to Book ratio. Log _ GDP is natural logarithm GDP per capita..Credit_GDP is domestic credit to private sector/GDP.

Table 9: EPU, CSR performance and regulation

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	High restriction	Low restriction	High capital regulation	Low capital regulation	Civil Law	Common Law
EPU	0.0109*** (0.00404)	0.00396 (0.00632)	0.0106*** (0.00394)	0.00407 (0.00659)	0.0127*** (0.00385)	-0.00244 (0.00695)
Size	9.237*** (1.755)	8.519*** (1.824)	12.42*** (1.587)	2.860 (2.170)	8.886*** (1.513)	6.134*** (2.273)
ROA	-0.238 (0.633)	-0.200 (0.465)	-0.262 (0.530)	-0.0504 (0.576)	0.103 (0.452)	-1.524* (0.876)
LEV	-0.385*** (0.0681)	-0.175*** (0.0653)	-0.207*** (0.0617)	-0.383*** (0.0812)	-0.391*** (0.0542)	0.0192 (0.0953)
Liq	2.097 (6.664)	22.50*** (8.121)	17.71** (7.103)	-7.067 (7.700)	3.357 (6.254)	20.53** (9.001)
MTB	0.323 (0.609)	-1.873*** (0.562)	-1.300** (0.537)	-0.568 (0.628)	-0.819* (0.496)	-0.599 (0.684)
Log_GDP	2.337 (3.176)	5.883* (3.292)	0.804 (2.710)	6.961* (3.979)	1.389 (2.689)	11.99*** (3.925)
Credit_GDP	0.138*** (0.0440)	0.0460* (0.0243)	0.0532* (0.0296)	0.0769*** (0.0278)	0.146*** (0.0301)	0.0315 (0.0259)
Constant	-160.6*** (22.67)	-170.2*** (22.89)	-196.6*** (19.22)	-75.12*** (28.86)	-140.2*** (21.09)	-191.1*** (22.26)
Observations	834	472	696	610	938	368
R-squared	0.264	0.372	0.428	0.122	0.292	0.391
Number of bank	111	52	94	69	99	64

***, ** and * denote significance at the 1%, 5% and 10% level respectively. EPU is Economic political Uncertainty index. CSR is Corporate social responsibility score. Size is natural logarithm of total assets. ROA is return on asset. LEV is leverage (total debts / total assets). Liq is liquidity (total loans to total assets). MTB is Market to Book ratio. Log _GDP is natural logarithm GDP per capita..Credit_GDP is domestic credit to private sector/GDP.

LaPorta et al. (2008: 326) claim that “legal origins — broadly interpreted as highly persistent systems of social control of economic life — have significant consequences for the legal and regulatory framework of the society, as well as for economic outcomes”. Liang and Renneboog (2017) study this assertion. They find that legal origins seem to be the strongest predictors that explain the difference in corporate commitment to CSR between countries. Firms with a civil law origin score significantly lower on various CSR ratings than common law firms. These researchers explain that the level of CSR in a country is the result of a tradeoff concerning the rights and preferences of

shareholders and stakeholders. Common law is widely known as a more discretion-oriented system that supports private market outcomes, places fewer ex-ante restrictions on managerial behavior and favours shareholder protection. Civil law is known for the propensity of the state to intervene in economic life through rules and regulations and by adopting a "stakeholder vision"(Liang and Renneboog, 2017). Then, firms with a common law origin score significantly lower on various CSR ratings than civil law firms.

From this statement, we try to assess the influence of the legal origins in the relationship between CSR performance and economic political uncertainty. We divide our sample into two subsamples. The first subsample contains the civil law countries (column 5 of Table 9) and the second subsample contains common law countries (column 6 of Table 9). The estimations show a positive and significant link between CSR performance and EPU in civil law countries. The link is not significant in the common law countries. This result is in line with Liang and Renneboog (2017), who find that companies in civil law countries are more responsive than those in common law countries in terms of upgrading their CSR practices when exogenous scandals and disasters occur. Given that banks in Civil law countries are more committed to CSR, they signal their commitment to honour the contract with stakeholders during periods of high economic policy uncertainty.

Another result presented in Table 10, which deals with the effects of political institutions on the relationship between EPU and banks' CSR performance. To address these issues, we use *rule of law index* which “indicates the extent to which officers trust and abide by societal rules, and in particular reflects the quality of contract enforcement, property rights, the police, the courts, and the likelihood of crime and violence ” (Kaufman et al 2009, p.6) and the *Corruption Control Index* which “expresses the abuse of public power for personal gain, while including both petty and grand corruption, as well as embezzlement of state property by elites and private interests”(Kaufman et al 2009, p.6). These variables were used in the literature to assess the extent to which institutions preserve the rights of stakeholders (Yung and Root, 2019; Arouri and Pijourlet, 2017; Drobetz et al. 2010). These indexes are extracted from *Worldwide Governance Indicators*.

To analyze their effects, we split our sample into subsamples based on high and low of *rule of law index* (Columns 1 and 2 of Table 10) and high and low *corruption control index* (Columns 3 and 4). We notice that there is a positive and significant relationship between the EPU and the CSR

performance for all the subsample estimations. In other words, the effect of EPU on banking CSR is not influenced by governance indicators of a country. In line with these results, Liang and Renneboog (2017) find that corruption control is not strongly associated with corporate CSR.

Our results show that CSR banks preserve the rights of their stakeholders and invest more in CSR in times of uncertainty regardless of the level of governance measures taken by countries. These banks use CSR investment to signal their commitment to honor their implicit contracts with their stakeholders.

Table 10: EPU, CSR performance and political institutions

VARIABLES	Rule of law		Corruption control	
	(1) High index	(2) Low index	(3) High index	(4) Low index
EPU	0.0103* (0.00585)	0.00794* (0.00435)	0.00926* (0.00548)	0.00906** (0.00424)
Size	5.797*** (2.068)	10.04*** (1.706)	4.204** (1.958)	10.99*** (1.690)
ROA	-0.857 (0.860)	0.0833 (0.465)	-0.611 (0.760)	0.171 (0.474)
LEV	-0.205*** (0.0723)	-0.305*** (0.0688)	-0.0887 (0.0707)	-0.355*** (0.0674)
Liq	8.675 (6.837)	7.852 (7.841)	12.43* (6.647)	11.42 (7.796)
MTB	-0.744 (0.644)	-0.538 (0.549)	-0.930 (0.601)	-0.906 (0.581)
Log_GDP	10.58*** (3.791)	-0.351 (3.035)	10.96*** (3.344)	0.872 (3.052)
Credit_GDP	0.0731*** (0.0242)	0.133*** (0.0365)	0.0677*** (0.0233)	0.120*** (0.0395)
Constant	-175.8*** (22.39)	-145.5*** (23.22)	-155.5*** (20.70)	-172.6*** (23.76)
Observations	592	714	643	663
R-squared	0.360	0.253	0.299	0.305
Number of bank	97	94	103	96

***, ** and * denote significance at the 1%, 5% and 10% level respectively. EPU is Economic political Uncertainty index. CSR is Corporate social responsibility score. Size is natural logarithm of total assets. ROA is return on asset. LEV is leverage (total debts / total assets). Liq is liquidity (total loans to total assets). MTB is Market to Book ratio. Log _GDP is natural logarithm GDP per capita..Credit_GDP is domestic credit to private sector/GDP.

5. Conclusion

This article studies the impact of economic policy uncertainty on banks' CSR performance. To our knowledge, the role of EPU as an external driver of CSR activities has never been explored in the economic literature. For this purpose, we use an international sample of 181 banks in 23 countries over the period 2002 to 2018. We use as a measure of uncertainty the EPU index proposed by Baker et al., (2016). We collect CSR data from the *Asset4 Thomson Reuters* database. Several results emerge from this study.

Firstly, we find that economic policy uncertainty has a positive and significant impact on CSR performance. This result shows that banks invest more in CSR in times of high uncertainty to signal to stakeholders their commitments to respect implicit contracts at a time when stakeholder relationships can be compromised. According to resource based view theory, CSR can be seen as a valuable resource of competitive advantage for banks in the event of a negative event. Banks rely on this competitive advantage, which provides an assurance at the time of uncertain events.

Secondly, the results highlight that the relationship between CSR performance and EPU is persistent over time. An analysis of all the dimensions of CSR, namely governance, the social and environmental pillars, affirms that past uncertainty is a strong incentive for banks to invest more in CSR.

Thirdly, analyses conducted on sub-samples report other findings. Economic policy uncertainty has a positive and significant impact on banks' CSR performance only in countries with high GDP per capita, in countries where restrictions on banking activities and capital regulation are strict and in civil law countries.

Fourth, governance indicators such as the corruption control and rule of law index have no impact on the relationship between EPU and banks' CSR performance.

However, we argue that our study has some limitations that will provide opportunities for further research. We use the index of economic policy uncertainty designed from the press. Nevertheless, future research can investigate the impact of shocks of policy uncertainty on banks' decision to invest in CSR.

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Conclusion générale

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A l'ère de la libéralisation, de la mondialisation et de l'extension des marchés financiers, les banques ont élargi leurs activités et leurs filiales. Elles deviennent de plus en plus grandes, complexes et interconnectées. Ainsi, leur défaillance peut déclencher un risque systémique. Les banques étaient au cœur de la crise financière de 2008-2009. Les répercussions de cette dernière et certains comportements contraires à l'éthique ont soulevé une crise de confiance de la part des consommateurs (Pomering et Dolnicar 2009) et des investisseurs. Ceci a déclenché la nécessité d'une refonte majeure de leur réputation à travers un engagement dans la RSE et une attention particulière pour les dimensions socio-éthiques de leur activité (Esteban-Sanchez et al., 2017). L'importance de construire et de gérer une réputation dans le secteur bancaire est d'autant plus élevée plus que dans les autres secteurs en raison de la nature intangible des produits et du besoin de consolider la confiance de leurs parties prenantes (Perez et al., 2013).

Le concept de la RSE prend de plus en plus d'ampleur dans le secteur bancaire. La banque socialement responsable devient un concept fort.

L'objectif de cette thèse est de contribuer à la littérature et analyser les conséquences d'un engagement des banques dans la RSE. Ainsi, nous nous sommes intéressés à des sujets de recherche non explorés, à notre connaissance, jusqu'à ce jour. Plus précisément, nous avons analysé (1) l'impact de la performance RSE sur l'efficacité technique des banques ; (2) le rôle que peut jouer la performance RSE dans l'exposition des banques au risque systémique ; (3) et la relation entre l'incertitude de la politique économique du pays et la performance RSE des banques.

Dans cette conclusion, nous rappelons les principaux résultats de ces trois questions de recherche et nous expliquons les contributions de notre travail doctoral. Enfin, nous présentons les limites de notre recherche qui constitueront des perspectives de recherche.

Le premier chapitre se focalise sur une revue de la littérature de notre champ de recherche. Nous avons exposé les travaux théoriques et empiriques qui portent sur les fondements de la RSE ainsi que sur ceux de l'économie bancaire. Nous avons pu constater qu'il existe des théories et des approches abondantes et divergentes qui tentent de définir et cerner ce concept de RSE. Nous avons utilisé les

travaux de Gond et Mullenbach-Servayre (2004) qui distinguent trois corpus théoriques : la théorie des parties prenantes, la théorie du contrat entreprise-société et la théorie néo-institutionnelle. Quant à Garriga et Melé (2004), ils identifient quatre groupes de théories : les théories éthiques, les théories instrumentales, les théories politiques et les théories intégratives. Suite à ce foisonnement théorique, les résultats des travaux antérieurs qui étudient l'impact de la performance RSE sur la performance financière (PF) ne sont pas concluantes. La RSE peut avoir un effet positif sur la PF de l'entreprise, tout en ayant un effet négatif ou nul.

Ce chapitre aborde également la littérature sur l'économie bancaire. Nous définissons le métier de la banque le rôle des banques dans l'économie, le concept de l'efficience, les risques encourus par les banques et la réglementation qui a été mise en place pour pallier ces risques. Les travaux antérieurs montrent que les banques s'engagent dans des activités RSE pour des raisons stratégiques. L'image de marque, la fidélisation des clients, la bonne réputation et la maximisation des profits sont les motifs qui poussent les banques à intégrer la RSE. Ainsi, ces activités augmentent la performance financière des banques et atténuent les effets négatifs des risques encourus par ce secteur.

L'analyse de cette littérature nous a permis d'identifier des champs de recherche inexploités qui ont fait l'objet de nos trois essais.

Le deuxième chapitre (1^{er} essai) se propose d'étudier la relation entre la performance RSE des banques et leur efficience. Nous utilisons le modèle *DEA Network Dynamique* pour estimer l'efficience technique des banques RSE. Nos résultats révèlent que la RSE des banques est positivement liée à l'efficience technique. Plus précisément, nous montrons qu'une augmentation de 1% du score RSE d'une banque est associée à une augmentation de 0.13% de son efficience. En outre, nous montrons que l'impact positif de la RSE sur l'efficience bancaire dépend de divers facteurs économiques et institutionnels. Plus précisément, il apparaît que la RSE n'augmente l'efficience des banques que dans les pays développés, alors qu'elle n'a aucun impact sur l'efficience des banques situées dans les pays en développement. Il apparaît également que la relation RSE - efficience n'est positive que dans les pays présentant un niveau élevé de protection des investisseurs et les pays qu'un degré élevé d'orientation du pays vers les parties prenantes.

Ce chapitre contribue à la littérature à différents niveaux. Nous avons étudié pour la première fois dans la littérature la relation entre la performance RSE des banques et leur efficience en utilisant la méthode *DEA Network Dynamique*. Traditionnellement, la performance bancaire est mesurée selon une approche comptable par une estimation des ratios. Cependant, de nombreux chercheurs ont critiqué cette approche pour son analyse limitée. L'activité bancaire est complexe. Les banques

utilisent plusieurs inputs pour produire plusieurs outputs. C'est la raison pour laquelle, nous adoptons la méthode DEA Network Dynamique qui nous a permis de prendre en compte le changement dynamique de l'efficacité entre deux périodes et estimer l'efficacité de chaque sous-étapes dans le processus de production. Aussi, nous avons étudié un échantillon international de banques. Cela nous a permis de différencier les pays développés des pays en développement et prendre en compte l'impact des spécificités des pays dans la relation entre la performance RSE et l'efficacité technique des banques.

Cet essai comporte certaines limites qui offrent des pistes pour des recherches futures. Premièrement, notre étude se concentre sur une période relativement courte (2009-2015) en raison de contraintes de données. Des études futures pourraient donc étudier la relation RSE-efficacité sur une période prolongée, couvrant idéalement la période d'avant la crise (avant 2008) afin de déterminer si l'occurrence de la crise peut impacter le lien entre la performance RSE et l'efficacité bancaire. Prolonger la période d'étude serait également intéressant car la mise en œuvre des politiques de RSE peut prendre plusieurs années pour produire des résultats valorisants. Deuxièmement, notre étude se concentre sur le score global de la RSE. En conséquence, les études futures pourraient se concentrer sur les dimensions de la RSE afin de déterminer plus précisément quelle dimension a le plus d'impact direct sur l'efficacité des banques.

Le troisième chapitre (2ème essai) a été consacré à l'étude de l'impact de la performance RSE sur l'exposition des banques au risque systémique. Nous adoptons la mesure du risque systémique SRISK avancée par Browleens et Engle (2017). Nos résultats montrent que la performance RSE réduit l'exposition des banques au risque systémique. Nous trouvons la même relation entre les trois dimensions de la RSE, à savoir la gouvernance, la dimension sociale et environnementale et le risque systémique. Plus précisément, l'exposition des banques RSE au risque systémique est réduite par le biais de la gouvernance et la performance sociale. Dès lors que les grandes banques d'importance systémique *GSIBs* amplifie le risque systémique, ces banques surinvestissent dans les activités de RSE. Mais elles restent exposées à ce risque malgré leur engagement dans des activités de RSE. Nous trouvons également que l'environnement institutionnel joue un rôle dans la relation entre la performance RSE et le risque systémique. Certaines spécificités institutionnelles diminuent l'exposition des banques RSE au risque systémique, tandis que d'autres caractéristiques réglementaires peuvent rendre ces banques vulnérables face à un risque systémique.

L'apport de cet essai est double. Cette étude souligne que la RSE peut être un des mécanismes qui peut réduire l'exposition des banques au risque systémique. À notre connaissance, cette relation n'a pas été explorée. Deuxièmement, nous prolongeons les travaux d'Andries et Nistor (2016) et Iqbal et al. (2018) qui examinent la relation entre la gouvernance et le risque systémique des banques situées dans l'Europe centrale et les USA, respectivement. Nous utilisons un échantillon étendu sur une échelle internationale et nous analysons l'impact de la gouvernance, la dimension sociale et environnementale de la RSE individuellement et simultanément sur le risque systémique.

Cependant, cette étude présente des limites qui constitueront des perspectives de recherche. Il pourrait convenir d'adopter d'autres mesures du risque systémique (MES, CoVaR...) et réétudier le lien entre la performance RSE et le risque systémique en comparant les résultats obtenus. Il convient également de répartir l'échantillon en plusieurs régions et étudier les spécificités de cette relation dans chaque région.

Enfin, le quatrième chapitre de cette thèse (3ème essai) a étudié l'impact de l'incertitude de la politique économique sur la performance RSE des banques. Ce travail est, à notre connaissance, le premier à analyser cette relation. Nous constatons que l'effet de l'incertitude de la politique économique sur la performance RSE. L'EPU peut être un moteur des investissements RSE. Dans une période d'incertitude accrue, les banques investissent davantage dans la RSE. Nous montrons également que cette relation positive est persistante dans le temps. Une analyse des piliers de la RSE confirme cette relation positive et persistante. Le contexte réglementaire et institutionnel influence cette relation. Plus précisément, nous constatons que l'EPU a un impact positif sur la performance RSE des banques seulement dans les pays développés, les pays où la réglementation du capital et les restrictions sur les activités bancaires sont strictes ainsi que les pays du droit civil. Nous affirmons ainsi que certains indicateurs de gouvernance notamment l'indice de contrôle de la corruption et l'application des lois n'ont aucun impact sur cette relation. Les apports de cet essai sont double. Premièrement, le lien entre l'EPU et la performance RSE des banques n'a jamais été exploré. Aucune des études antérieures n'a trouvé que l'EPU comme moteur de la RSE. Deuxièmement, nous avons mené une étude sur un échantillon international composé des banques situées dans 23 pays. Or, la plupart des études portant sur l'EPU explorent un seul pays ou une seule région.

Nos trois essais ont des implications managériales intéressantes pour les banques, les gouvernements et les investisseurs. Cette thèse met en lumière certains effets positifs de la performance RSE non étudié jusqu'à présent.

Les managers des banques peuvent apercevoir de nos résultats que l'investissement dans des activités RSE permet de générer des avantages financiers et améliorer l'efficacité des banques. Une estimation de l'efficacité par une méthode de la frontière efficiente permet aux managers de repérer les banques *benchmarks* qui ont les meilleures pratiques. Ainsi cette méthode permet aux gestionnaires de la banque d'identifier les étapes du processus de la production qui sont inefficaces et qui nécessitent une amélioration dans la gestion des inputs et des outputs. En effet, nos conclusions tendent à montrer que les dépenses RSE des banques ne représentent pas un gaspillage de ressources mais peuvent plutôt conduire à une meilleure utilisation des ressources. Cette recherche devrait inciter les managers à s'engager davantage dans la RSE dans une période de crise systémique ou une période d'incertitude de la politique économique. À travers un échantillon international, nous avons pu montrer que la performance RSE réduit l'exposition des banques au risque systémique. Nous avons constaté également que les banques s'engagent davantage dans la RSE dans une période d'incertitude.

Cette étude présente également un intérêt pour les décideurs politiques dans la mesure où elle montre que le cadre institutionnel est un élément-clé qui peut modéliser l'impact des activités RSE sur les résultats financiers et économiques des banques. Cette thèse montre que certaines spécificités des pays tels que le niveau de développement économique, le système légal, certains indicateurs de gouvernance qui régissent les droits des parties prenantes, semblent estomper les effets positifs de la performance RSE ou décourager les banques à investir dans des activités RSE. Les gouvernements et les autorités de surveillance doivent s'intéresser davantage aux mesures qui encadrent et encouragent la mise en œuvre des activités RSE surtout dans les pays où nous avons constaté que les liens entre la RSE et l'efficacité ou l'incertitude de la politique économique sont insignifiants. Les régulateurs devraient adapter les mesures réglementaires qui pourront renforcer la stabilité des banques et surtout réduire les mesures drastiques qui pourront avoir un effet inverse sur la performance des banques.

Notre étude a également des implications pour les investisseurs dans la mesure où la performance en RSE est un facteur important dans les décisions d'investissement. La politique RSE d'une banque peut avoir un impact sur son mode de fonctionnement et sur l'efficacité de ses activités. Une bonne performance RSE augmente l'efficacité de ses banques et par conséquent leur rentabilité sur le long terme. Ces banques efficaces et socialement responsables répondent aux attentes des investisseurs qui intègrent des critères éthiques et morales, plus que la rentabilité, dans leur choix d'investissement. Nous avons montré que la performance RSE des banques réduit leur exposition au risque systémique. Aussi, les banques s'engagent davantage dans des activités RSE dans un contexte d'incertitude de la politique économique du pays en raison des effets positifs constatés de cette performance. Tout cela devrait encourager les investisseurs à orienter leur choix d'investissements vers la RSE.

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