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THÈSE

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« *L'université n'entend ni approuver,*

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Résumé

Cette thèse étudie l'impact de la réputation des agences de notation sur la perception de leurs annonces par les investisseurs, ainsi que sur leur propre comportement à divulguer des informations précises et ponctuelles. Elle est constituée de quatre chapitres. Dans les premier et second chapitres, nous étudions comment la perception des investisseurs des notations des agences change suite à l'observation d'une erreur de notation. Les résultats montrent que les investisseurs réagissent peu ou pas aux changements d'annonce après avoir observé des notations erronées, ce qui suggère que la mauvaise performance des agences de notation affecte négativement leur réputation. Dans les troisième et quatrième chapitres, nous étudions les déterminants de la ponctualité et de la précision des annonces de notation financière. Il ressort que la réputation de l'agence de notation affecte la qualité des notations. En particulier, plus la réputation est élevée, et plus la note semble surévaluée et non-ponctuelle.

Mots-clefs : Agences de notation, Erreurs de notation, Réaction des investisseurs, Réputation, Ponctualité, Précision, Compétition.

Abstract

This thesis studies the impact of the reputation of rating agencies on investors' perception of ratings, and on rating agencies' ability to disclose accurate and timely information. It consists of four chapters. In the first and second chapters, we study changes in investors' perception of rating agencies' ratings following the observation of rating failures. The results show that investors either ignore or react less to ratings after such failures, which suggests that rating agencies' poor performance affects negatively their reputation. In the third and fourth chapters, we study the determinants of ratings' timeliness and accuracy disclosed by credit rating agencies. The results suggest that the reputation of the rating agency affects the quality of ratings. In particular, the higher the rating agency's reputation, the less accurate and timely the rating is.

Keywords : Rating Agencies, Reputation, Rating Failures, Investors' Reaction, Reputation, Timeliness, Accuracy, Competition.

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Sommaire

Introduction générale

1 Contexte Général de la recherche

Les agences de notation ont pour rôle de réduire l'asymétrie d'information entre investisseurs et entreprises émettrices de titres financiers et d'assurer un suivi permanent de l'activité de cet émetteur. Elles sont engagées par les émetteurs afin de signaler aux investisseurs leur capacité financière à honorer leurs engagements. En ce sens, les agences de notation analysent et synthétisent un ensemble de données concernant les émetteurs en une notation. En réduisant l'asymétrie d'information entre émetteur et investisseur, cette notation permet à l'émetteur un accès facilité aux différentes sources de financement. De plus, les agences de notation s'engagent à surveiller et à synchroniser la note attribuée avec la situation de l'entreprise. Ainsi, elles permettent de réduire l'aléa moral entre émetteurs et investisseurs en assurant la tâche de rapporteur et de surveillant au service de l'investisseur.

L'activité des notations financières est régulée sur le marché américain par l'attribution par la SEC *(Securities and Exchange Commission)* du statut de NRSRO *(Nationally Recognized Statistical Rating Organization)* qui constitue un certificat de qualité des notations financières attribuées par les agences de notations. Sur le marché européen, depuis Juillet 2011, c'est le rôle de l'autorité

européenne des marchés financiers *(ESMA pour European Securities and Markets Authority)* de reconnaitre les organismes externes d'évaluation de crédit (OEEC). Ainsi, la SEC a donné un cadre réglementaire à l'activité des agences de notation. De plus, la loi sur la sécurité financière *"Regulation Fair Disclosure"*[1] promulguée en août 2000 par la SEC et la réglementation prudentielle établie par le comité Bâle II[2] accordent une légitimité aux agences de notation et forgent ainsi leur réputation dans un marché financier de plus en plus complexe pour des investisseurs à la recherche d'un signal simple et précis. L'agence de notation est devenue une véritable puissance sur le marché, ce qui rejoint le constat de Thomas Friedman: *"There are two superpowers in the world today in my opinion. There's the United States and there's Moody's Bond Rating Service. The United States can destroy you by dropping bombs, and Moody's can destroy you by downgrading your bonds. And believe me, it's not clear sometimes who's more powerful."*[3]

Cependant, les scandales liés aux faillites d'Enron (2001), WorldCom (2002) et Lehmann Brothers (2008) dévoilent que ces producteurs d'information peuvent divulguer des informations erronées. La faillite d'Enron a engendré des critiques quant à la fiabilité des annonces de notation financière faites par les agences de notation financière. Ces dernières ont été plus sévèrement critiquées suite à la crise des Subprimes pour leur incapacité à évaluer les produits complexes en leurs attribuant des notations surévaluées. De plus, le rapport de la SEC (2008)[4] sur les agences de notation recense plusieurs erreurs commises par ces agences : "Premièrement, le fait que la quantité et la complexité des contrats à étudier ont accablé les ressources humaines des agences

[1] La loi interdit aux entreprises de privilégier la communication des informations privées et confidentielles favorisant certains acteurs du marché au détriment d'autres. Ainsi, la loi oblige ces entreprises à communiquer ses informations privées uniquement aux agences de notation. http://www.sec.gov/rules/final/33-7881.htm

[2] Bâle II propose d'utiliser les notations des agences, certifiées par la SEC sur le marché américain et par la ESMA sur le marché européen, dans le cadre de l'approche standard de l'évaluation des risques.

[3] Thomas Friedman est éditorialiste au New York Times, article du New York Times 22 Février 1995. http://www.nytimes.com/1995/02/22/opinion/foreign-affairs-don-t-mess-with-moody-s.html

[4] http://www.sec.gov/news/studies/2008/craexamination070808.pdf

de notation conduisant ainsi à l'erreur et à la négligence de certaines procédures. Deuxièmement, le non-respect du processus de notation notamment en ce qui concerne la collecte des informations suffisantes pour permettre au comité de notation de prendre des bonnes décisions, ainsi que le manque de vérification des documents transmis par l'émetteur. Enfin, l'inefficacité de l'audit interne des agences de notation qui n'a pas permis de révéler les insuffisances dans le respect des procédures de fonctionnement."

Face aux critiques qui ont suivi la faillite d'Enron, les agences de notation ont rejeté la faute des notations erronées sur les cabinets d'audit responsables de vérifier la véracité des informations comptables publiées et sur lesquelles se base leur jugement. Cependant, la crise des Subprimes et les critiques qui l'ont suivie ont clairement posé la question de la qualité de l'information produite par les agences de notation et leur incitation à révéler de manière sincère les informations dont elles disposent. Un argument souvent mis en avant par les agences de notation est celui de leur réputation, qui suffirait à garantir la qualité et la sincérité des notes. Cet argument a été cité par Standard & Poor's suite à la faillite d'Enron en 2002 *"The ongoing value of Standard & Poor's credit ratings business is wholly dependent on continued market confidence in the credibility and reliability of its credit ratings."*[5] Le directeur de l'agence de notation Moody's se défend également de tout comportement opportuniste en arguant que leur réputation et leurs notations constituent leur principal capital, *"Our ratings and research are our only products, and our reputation is our only capital."*[6]

Le dysfonctionnement des agences de notation semble être né du secret professionnel et de

[5]Standard & Poor's Ratings Service, U.S. Securities and Exchange Commission Public Hearing-November 15, 2002 Role and Function of Credit Rating Agencies in the U.S. Securities Markets http://www.sec.gov/news/extra/credrate/standardpoors.htm

[6]Sam Jones, Financial Times, October 17 2008. http://www.ft.com/cms/s/0/65892340-9b1a-11dd-a653-000077b07658.html#axzz3DBYEfUw4

la difficulté d'accéder aux informations des agences de notation puisqu'elles ne divulguent pas la source de leurs informations. De plus, l'activité de notation est caractérisée par deux procédures qui peuvent inciter l'agence de notation à être laxiste. La première procédure est "la clause de renégociation de contrat" qui consiste à accorder le droit à l'émetteur de refuser ou de faire appel de la note initialement attribuée par l'agence de notation, permettant à l'émetteur de réexaminer son dossier. Entre-temps, il a le droit de consulter une autre agence de notation : cette procédure est connue sous le nom de *"rating shopping"*. Enfin, l'émetteur choisit de payer et de publier la note la plus élevée. Ces deux éléments peuvent altérer le rôle et le fonctionnement des agences de notation. De ce fait, il est nécessaire d'examiner si la réputation est un mécanisme d'incitation suffisant pour encadrer l'activité de notation et obliger les agences de notation à divulguer des informations précises et sincères.

Dans ce qui suit nous présentons la littérature théorique concernant la raison d'être de l'activité de notation et ses mécanismes d'incitation à produire des informations fiables.

2 Cadre théorique

Dans cette section, nous présentons les grandes idées de la littérature financière qui expliquent la raison d'être des agences de notation et ses mécanismes d'incitation à produire des informations fiables. Ensuite, pour chaque chapitre, nous rappelons la littérature financière plus spécifique qui traite le problème étudié.

La littérature financière montre que l'asymétrie d'information entre investisseurs/prêteurs et émetteurs/emprunteurs pose deux problèmes : celui de l'aléa moral et de l'anti-sélection. Ces problèmes peuvent être résolus soit par la capacité des investisseurs à dépister, *"screening"*, et à

surveiller, *"monitoring"*, les emprunteurs, soit par la capacité des émetteurs à signaler leur qualité, soit enfin par la délégation de la tâche de la collecte et de la production de l'information à une tierce partie productrice d'information (certificateur, auditeur, banque, agence de notation...). La littérature financière a longtemps considéré que ces producteurs d'information sont honnêtes et ne manipulent pas l'information divulguée. D'ailleurs, c'est ce qui explique en partie la délégation croissante de la collecte des données par les investisseurs aux producteurs d'information et particulièrement aux agences de notation.

Akerlof (1970) est le premier à mettre en évidence le phénomène d'anti-sélection, nommé aussi sélection adverse, en cas d'asymétrie d'information. Pour ce faire, il prend l'exemple du marché des voitures d'occasion. Il distingue sur ce marché deux types de véhicule, les véhicules de très mauvaise qualité dits "lemons" et ceux de bonne qualité. Seuls les vendeurs ont l'information sur la nature du véhicule. Face à cette asymétrie, les acheteurs ne sont pas prêts à payer un prix trop élevé à cause de la présence de mauvais véhicules. Ceci peut décourager les vendeurs de voitures de bonne qualité. Ainsi, dans certains cas, le seul équilibre est celui dans lequel les prix sont bas et seules les mauvaises voitures sont présentes sur le marché. Si personne n'est intéressé par ces voitures, il y a effondrement du marché, d'où la nécessité d'un signal pour distinguer les deux types de véhicule et limiter l'asymétrie d'information.

Dans ce cadre, Rothschild et Stiglitz (1976) étudient comment la partie non informée pourra résoudre le problème d'asymétrie d'information par un mécanisme de dépistage (screening). Le screening consiste pour la partie non informée (par exemple : assureur, prêteur, investisseur) à proposer à la partie informée sur son type (par exemple : assuré, emprunteur, entrepreneur) différents types de contrats de façon à inciter chaque type informé à choisir le contrat qui lui est destiné. Par ce processus d'autosélection, la partie informée révèle son type à la partie non-informée. Outre le

problème de sélection des entreprises à financer, lié à une asymétrie d'information ex-ante, les investisseurs ou prêteurs peuvent faire face à une asymétrie d'information ex-post. Diamond (1984) montre que l'emprunteur est incité à déclarer un rendement inférieur à celui gagné afin de réduire la somme du profit à partager avec les investisseurs. La solution à ce problème serait de surveiller la performance de l'entreprise. Sauf que la multiplication des investisseurs créerait soit une multiplication des coûts de surveillance si tous les investisseurs choisissent de surveiller l'entreprise, soit l'apparition du phénomène de passager clandestin si les investisseurs choisissent de déléguer la surveillance à leurs homologues, ce qui engendre l'absence de surveillance. De ce fait, il montre qu'afin de réduire les coûts de surveillance, les investisseurs peuvent déléguer cette tâche à un intermédiaire financier. Ce dernier est incité à ne pas manipuler les rendements des projets afin d'éviter les pénalités imposées par l'intermédiaire financier. Diamond (1984) montre que la diversification des projets financés par l'intermédiaire financier lui permet de réduire les coûts d'obtention des informations. Par conséquent, les investisseurs/prêteurs délèguent la tâche de surveillance et de collecte de données à un seul intermédiaire financier afin d'optimiser leur profit et réduire le problème d'asymétrie d'information ex-post.

En revanche, si c'est la partie informée qui joue en premier, elle aura besoin d'un mécanisme de marché qui lui permettra de transmettre et de révéler son type à la partie non-informée. En ce sens, Spence (1973) introduit la notion de signal sur le marché du travail. Il montre que, sur ce marché, l'ignorance des compétences réelles des candidats amène l'entreprise à s'appuyer sur des signaux émis par le candidat. Ces signaux peuvent être le diplôme obtenu, qui reflète la qualité du candidat. On peut supposer en effet que les individus qui ont de fortes capacités, et qui sont plus productifs, obtiennent des diplômes plus facilement. Les bons candidats sont donc prêts à investir en éducation plus que les autres afin de signaler leur qualité aux employeurs. Le diplôme constitue

donc une mesure de la productivité individuelle et un signal sur la qualité du candidat à l'emploi. Ainsi, le candidat produit lui-même le signal qui lui permettra de résoudre le problème d'asymétrie d'information.

Sur les marchés financiers, il existe plusieurs manières pour les entreprises de signaler leur qualité aux investisseurs. Leland et Pyle (1977) montrent qu'un entrepreneur peut signaler la qualité de son projet en gardant des parts dans le capital de son entreprise. En effet, la part de l'entrepreneur reflète un signal sur la qualité et la viabilité du projet qui pourra inciter les investisseurs à investir dans le projet. La part détenu par l'entrepreneur constitue dans le modèle de Leland et Pyle (1977) le signal qui reflète la qualité du projet.

Dans ce cadre de la théorie de signal, Crawford et Sobel (1982) étudient la transmission d'un signal gratuit ou sans coût d'un émetteur (entrepreneur) à un récepteur (investisseur) qui agit après avoir reçu le signal et dont l'action affecte les utilités de deux agents. Crawford et Sobel (1982) montrent que la qualité de l'information transmise par l'émetteur varie en fonction de la similitude de leurs intérêts. Dans le même esprit, Sobel (1985) analyse la transmission d'une information gratuite entre un émetteur et un récepteur. Le récepteur est incertain des préférences de l'émetteur à transmettre un message honnête. De plus, le récepteur ne tient compte de l'information transmise que s'il juge l'émetteur suffisamment crédible. La crédibilité de l'émetteur est définie par l'envoi successif par l'émetteur de messages honnêtes et précis. Or, le récepteur ne peut pas distinguer si l'information est erronée parce que l'émetteur est malhonnête ou parce qu'il possède une information imprécise. De ce fait, toute information erronée affecte les croyances du récepteur concernant la crédibilité de l'émetteur et induit le récepteur à discréditer l'émetteur. Dans ce cadre, un agent malhonnête n'est motivé à envoyer un message que s'il juge que sa réputation future à une valeur inférieure au gain actuel. Les travaux de Crawford et Sobel (1982) et Sobel (1985) montrent que

le vendeur (l'émetteur) n'est pas suffisamment incité à transmettre honnêtement ses informations à l'acheteur (le récepteur), ainsi l'asymétrie d'information persiste. Dans ce contexte, ils suggèrent que seul un intermédiaire dont les intérêts sont alignés avec ceux des récepteurs (acheteurs ou investisseurs) permet de diminuer l'asymétrie d'information. Ceci justifie l'émergence d'organismes certificateurs dont le rôle est de réduire l'asymétrie d'information entre acheteur et vendeur. Le certificateur constitue une tierce partie crédible et honnête auquel vendeur et acheteur acceptent de déléguer la responsabilité de collecter et divulguer de manière crédible l'information concernant le produit vendu.

Dans ce cadre Ramakrishnan et Thakor (1984) analysent un modèle dans lequel une entreprise fait appel à un producteur d'information, dont l'effort n'est pas parfaitement observable, afin de certifier sa valeur et remédier au problème d'asymétrie d'information. De plus, ils conditionnent le paiement des frais de certification par l'entreprise à un signal ex-post révélant l'effort de l'intermédiaire d'information. Cette condition permet d'inciter l'intermédiaire d'information à produire une information précise et fiable. Ramakrishnan et Thakor (1984) montrent que former une coalition entre les intermédiaires d'information afin de créer un large intermédiaire financier dont les membres se surveillent mutuellement est mieux pour eux qu'opérer individuellement. En effet, la diversification par division du risque entre les membres de l'intermédiaire financier permet de réduire les coûts de la production de l'information. Dans ce sens, l'exemple des agences de notation formées par un ensemble diversifié d'analystes financiers et de producteurs d'information illustre parfaitement la suggestion de Ramakrishnan et Thakor (1984).

Par conséquent, la raison d'être des agences de notation est de résoudre les problèmes d'asymétrie d'information avant et après la signature du contrat entre acheteurs/prêteurs et vendeurs/emprunteurs. En effet, elles permettent à la fois aux entreprises d'éviter l'anti-sélection en certifiant leurs produits

et aux investisseurs d'éviter l'aléa moral en assurant le suivi et la surveillance des entreprises.

Cependant, si la délégation de la collecte des informations à un intermédiaire peut réduire l'asymétrie d'information, elle peut également être à l'origine d'autres problèmes d'asymétrie d'information. Ces problèmes peuvent être liés aux incitations de l'intermédiaire à faire l'effort de produire des informations fiables et précises. Plus spécifiquement, les agences de notation peuvent adopter un comportement stratégique dans le but de maximiser leur profit. Une première question concerne la décision des agences de notation de divulguer toute ou une partie de l'information produite. Une deuxième question concerne l'impact du fonctionnement des agences de notation sur leur décision de divulguer des informations précises. Enfin, une troisième question concerne le rôle de la réputation comme mécanisme d'incitation des agences de notation à divulguer des informations fiables et précises. De ce fait nous présentons, dans ce qui suit, la littérature soulevant ces questions.

Lizzeri (1999) analyse les choix stratégiques de la divulgation d'information produite par un intermédiaire. Pour ce faire, il propose un modèle de certification où se confrontent un vendeur, un intermédiaire et deux acheteurs. Le résultat principal est que plus l'intermédiaire d'information a un grand pouvoir de marché, plus il est incité à manipuler l'information. Ainsi, un intermédiaire qui bénéficie d'une situation de monopole sur le marché est incité à divulguer le minimum d'information sur le vendeur. A contrario, dans le cadre d'un marché oligopolistique, la concurrence entre les intermédiaires sur le marché pousse l'intermédiaire à divulguer toute l'information. Ainsi, l'auteur présente la compétition comme un mécanisme d'incitation des agences de notation pour divulguer toute l'information disponible. Plus proche du mode de fonctionnement des agences de notation, Faure-Grimaud, Peyrache, Queseda (2009) proposent de tenir compte de la clause de "renégociation de contrat" et du fait que le paiement des frais de notation est contin-

gent à la publication de la note. Ils montrent que l'agence de notation qui jouit d'une situation de monopole divulgue toute l'information. En revanche, dans le cadre d'un marché oligopolistique, la divulgation complète de l'information est entre les mains de l'entreprise. Ainsi, la divulgation de l'information est sélective et l'agence de notation ne divulgue pas toute l'information. L'autre phénomène est étudié par Skreta et Veldkamp (2009) qui montrent que l'activité de *"rating shopping"*, qui consiste à donner le droit aux entreprises de contacter plusieurs agences de notation pour obtenir une notation et de ne divulguer que la meilleure notation attribuée par l'une des agences, conjointe à la compétition, affecte négativement la précision des annonces de notation. Ainsi les études de Faure-Grimaud, Peyrache, Queseda (2009) et de Skreta et Veldkamp (2009) montrent que la compétition détériore la qualité des notations et ne représente pas un mécanisme d'incitation des agences de notation.

Enfin, un courant de recherche théorique a exploré dans quelle mesure la réputation d'un producteur d'information discipline son comportement et l'incite à divulguer une information sincère et précise. Etendant le modèle de Sobel (1985) aux producteurs d'information dont les annonces affectent les cours boursiers des entreprises, Benabou et Laroque (1992) modélisent la relation pourvoyeur d'information-récepteur d'information dans un jeu infiniment répété. Ils distinguent deux types de pourvoyeur d'information: soit honnête, c'est à dire engagé à annoncer la vérité, soit opportuniste, c'est-à-dire capable de manipuler l'information afin de maximiser son profit. L'information de ce pourvoyeur d'information n'a d'impact que si ce dernier est considéré comme crédible sur le marché. Autrement dit, le signal d'un pourvoyeur d'information dont la réputation est égale ou proche de zéro n'aura pas d'impact sur le marché même s'il renferme des informations privilégiées et privées. Ils montrent que la capacité des pourvoyeurs d'information à manipuler l'information est limitée dans le long terme par la capacité du public à réévaluer leur

crédibilité. Cependant, si plusieurs pourvoyeurs d'information adoptent le même comportement, il devient difficile de reconnaître l'opportuniste parmi eux laissant ainsi une marge de manipulation de l'information. En conséquence, sur un marché oligopolistique, si plusieurs pourvoyeurs d'information adoptent un comportement malhonnête, alors la concurrence semble réduire l'effet de la réputation comme mécanisme d'incitation à la divulgation d'information précise.

L'étude de Mathis, Mc Andrews et Rochet (2009) s'appuie sur l'étude de Benabou et Laroque (1992) pour développer un modèle qui analyse, plus spécifiquement, le comportement d'une agence de notation en fonction de sa réputation, de son revenu provenant de l'activité de notation et de son revenu provenant des autres activités. Ils montrent que la réputation incite les agences de notation à produire des notations précises et fiables, si le revenu de l'agence de notation est assuré en grande partie par d'autres sources que l'activité de notation. A contrario, si l'activité de notation assure la majeure partie du revenu de l'agence de notation, cette dernière se montre plus laxiste quand sa réputation est suffisamment élevée pour lui assurer la confiance des investisseurs. Cette réputation se maintiendra tant que le marché n'observera pas un signal d'un comportement opportuniste de l'agence, comme la faillite d'un projet bien noté. De ce fait, les résultats de ces auteurs suggèrent que l'agence de notation choisit sa stratégie de divulgation d'information en fonction de sa réputation auprès des investisseurs.

3 Questions et objectifs de la recherche

Les études présentées ainsi que les déclarations des agences de notation, suggèrent que la réputation constitue un mécanisme d'incitation des agences de notation étant donné que les investisseurs ont la possibilité d'évaluer la véracité de l'information divulguée. En effet, la réputation de l'agence

de notation serait alors l'ensemble des croyances des investisseurs quant à leur capacité à produire des informations fiables et précises. Nous proposons dans cette thèse d'étudier dans quelle mesure la réputation des agences de notation est prise en compte par les investisseurs à travers leur réaction aux changements de note, et dans quelle mesure la réputation de ces agences affecte en retour leur comportement. Plus précisément, nous cherchons à étudier les questions suivantes : En cas d'événement signifiant que les agences de notation ont commis des erreurs de jugements, les investisseurs prennent-ils en compte ces éléments dans leur appréciation des notations suivantes attribuées par ces mêmes agences ? La réputation dont jouissent les agences de notation sur le marché a-t-elle un effet sur leur standard de notation (ponctualité et précision des notes) ? Ces questions nous conduisent à analyser la réaction des investisseurs suite à la publication d'information incorrecte par l'agence de notation. Egalement, elle nous impose d'étudier le comportement de l'agence de notation à travers le temps et d'identifier si la réputation a un impact positif sur la précision et la fiabilité de ces annonces de notation.

En premier lieu, nous soutenons l'hypothèse selon laquelle la divulgation d'information erronée par les agences de notation aurait un effet néfaste sur leur réputation et ainsi sur leur impact sur le marché. Notre objectif est alors d'étudier dans quelle mesure la divulgation d'information erronée affecte la réputation de l'intermédiaire d'information. Pour ce faire, nous proposons de profiter du contexte de crise et des scandales liés à la divulgation d'information erronée afin d'étudier l'effet de la réputation sur la perception des investisseurs. Cet angle d'approche nous permettra de savoir si réellement la divulgation d'une information erronée affecte la réputation de producteur d'information.

La divulgation d'information erronée peut être le résultat de deux types de situation différente. Elle peut résulter du comportement opportuniste où l'agence de notation accorderait sciemment

une note surévaluée. Elle peut, également, être due au fait que même si l'agence de notation est sincère, elle ne détient pas la technologie lui permettant de divulguer une information fiable et précise. N'ayant pas la possibilité d'affirmer si un changement de réaction de l'investisseur est lié à l'une ou l'autre explication, nous proposons d'étudier deux types d'agence de notation aux systèmes de paiement différents et aux incitations différentes. En ce sens, nous proposons d'étudier la présence de l'effet de la réputation indépendamment du modèle de paiement de l'agence de notation largement critiqué dans la littérature académique (Mathis et al. (2009), Skreta et Veldkamp (2009)). En effet, le mode de paiement des agences de notation contingent à la publication de la notation qui est elle-même contingente à l'acceptation de l'entreprise de la note, peut altérer et affaiblir leur mécanisme de discipline et les inciter à accorder une note surévaluée. Ainsi, si les frais de notation ne sont pas payés par l'entreprise notée, ceci inciterait l'agence de notation à ne pas manipuler les notations. En ce sens, la divulgation d'information erronée refléterait seulement que l'agence de notation ne détient pas la technologie lui permettant de divulguer une information fiable et précise. L'intuition est d'examiner la réaction des investisseurs suite à la survenance d'événements signifiant que cette agence de notation a commis une erreur de jugement dans le but de vérifier si les investisseurs rejetteraient cette erreur de jugement sur l'entreprise notée, en continuant à réagir aux annonces de notation, ou si les investisseurs sanctionneraient l'agence de notation, en ignorant ses annonces de notation. L'idée est de vérifier que l'effet de la réputation peut être un mécanisme d'incitation indépendamment du mode de financement des agences de notation. Dans un premier temps, nous étudions l'impact de la crise financière sur la réaction des investisseurs aux annonces de notation financière. Si l'impact des annonces de notation est contingent à la réputation des agences de notation, nous nous attendons à un changement dans la réaction des investisseurs aux annonces de notation pendant la crise financière. Dans un second temps, nous étudions la réac-

tion suite à la divulgation d'information erronée par l'agence de notation extra-financière KLD. L'agence de notation KLD utilise un modèle de paiement par les investisseurs. Pour ce faire, nous utilisons la faillite de l'entreprise Enron et le scandale comptable, humain et environnemental qui a accompagné cette faillite afin de mesurer la perception des investisseurs des annonces de KLD après la faillite. L'agence de notation extra-financière KLD accordait en effet à l'entreprise Enron une note de leader dans le domaine environnemental et la gestion des ressources humaines. De plus, KLD ne signalait aucune réserve concernant le mode de gouvernance et l'éthique de l'entreprise Enron. Ainsi, la faillite d'Enron offre un cadre privilégié pour étudier l'effet de la réputation en comparant la perception des investisseurs des annonces de KLD avant et après la faillite d'Enron.

En second lieu, nous étudions la question de recherche concernant l'effet de la réputation sur la précision et la ponctualité des notations. En effet, le rapport de l'Association for Financial Professionals (AFP, 2002) souligne que les deux critères les plus importants pour les utilisateurs de la notation sont sa précision et sa ponctualité. La précision de la note recouvre la capacité de l'agence de notation à divulguer une note qui résume fidèlement la situation actuelle de l'entreprise à honorer ses engagements. La ponctualité de la note reflète la volonté ou la capacité de l'agence de notation à effectuer un changement de note dès qu'elle obtient l'information d'un éventuel changement dans la situation financière de l'entreprise. Selon ce rapport, 65% des professionnels considèrent que les notations de leurs entreprises sont précises. Cependant, seuls 22% des professionnels considèrent que le changement de notation est survenu moins d'un mois après le changement de la situation de l'entreprise. De ce fait, l'étude menée examine l'effet de la réputation sur la volonté des agences de notation à produire des notations précises et ponctuelles. L'objectif de cette seconde partie de la thèse est aussi d'apporter un éclairage grâce à une étude quantitative aux propos des agences de notation sur le rôle de la réputation dans leur industrie. Nous proposons pour cela deux études

distinctes afin d'examiner l'effet de la réputation sur la ponctualité et sur la précision de la notation.

4 Structure de la Thèse

Cette thèse est composée de quatre chapitres qui présentent quatre études originales, rédigées en anglais, autour de la réputation des agences de notation. Chaque étude est tirée d'un article de recherche qui s'inscrit dans une démarche hypothético-déductive. En ce sens, nous formulons des hypothèses réfutables à partir des conceptualisations théoriques existantes. Ainsi, nos travaux de recherche sont construits en deux étapes. La première étape consiste à faire émerger les hypothèses de recherche en se basant sur une revue de la littérature théorique sur la problématique et le sujet étudié. La deuxième étape consiste à mobiliser un cadre empirique et une stratégie empirique en adéquation avec le sujet étudié et les données collectées.

Pour construire notre thèse, nous scindons notre travail en deux parties comportant chacune deux chapitres. La première partie présente deux études concernant l'effet de la réputation des agences de notation sur la perception des investisseurs de ses annonces. La deuxième partie consiste à étudier l'effet de la réputation des agences de notation sur leur propre comportement.

Dans ce qui suit nous décrivons plus en détail les deux parties et leurs chapitres respectifs.

4.1 L'effet de la réputation sur la perception des investisseurs

Dans cette partie, notre objectif est d'évaluer la réaction des investisseurs lorsqu'ils ont observé qu'une agence de notation a divulgué des informations incorrectes. Nous supposons que les investisseurs sont rationnels, c'est-à-dire que leur réaction aux annonces de notation reflète la crédibilité qu'ils accordent au producteur de l'information. Dans ce cadre, nous proposons d'évaluer

l'impact de la crise des Subprimes et des scandales financiers sur la réputation des agences de notation à travers la comparaison de la réaction des investisseurs aux annonces de notation avant et après ces scandales. Si nous observons une moindre réaction des investisseurs après la crise par rapport à avant la crise, nous pourrons considérer qu'il y a perte de réputation de l'agence de notation.

Dans cette première partie, nous proposons de juger la perception des investisseurs de deux producteurs d'information, une agence de notation financière et une agence de notation extra-financière, ayant deux systèmes de paiement différents et deux modes de fonctionnements différents. Le processus de notation de l'agence de notation financière Standard & Poor's peut se résumer ainsi. Un émetteur décide d'engager l'agence de notation afin de lui attribuer une note qui ne sera rendue publique qu'avec son accord. Une fois que les deux parties, émetteur et agence de notation, ont signé un contrat, la procédure commence par désigner les analystes chargés de l'étude du dossier. Les informations demandées par l'analyste à l'entreprise peuvent être soit publiques soit confidentielles. Puis, les analystes effectuent des réunions avec les dirigeants de l'entreprise dont le but est de mieux cerner l'activité de l'émetteur, sa position dans le secteur et la structure financière de l'entreprise à long terme. Ces réunions ne constituent en aucun cas d'opération d'audit ni de vérification des documents et renseignements qui ont été fournis. Suite à ces réunions, la décision de la note est une décision collective prise au niveau du comité de notation qui engage l'agence de notation dans son ensemble. La note finale votée par le comité et les raisons qui la fondent sont envoyées au client. Ce dernier se réserve le droit d'accepter la publication de la note ou de la refuser. Ce refus peut être soit catégorique et dans ce cas les deux parties effacent toute trace de la procédure, soit l'entreprise fait appel et dans ce cas elle apporte des nouveaux éléments pour renforcer sa position et à l'issue d'un deuxième vote du comité de notation l'émetteur n'a plus

que deux choix : accepter ou refuser et dans ce cas il n'y a plus d'appel. Si l'émetteur accepte la note, alors il paie la commission demandée par l'agence de notation et la publication se fera dans les différents supports de communication utilisés par l'agence de notation. Enfin, une fois la note publiée, elle fait l'objet d'un suivi continu de la part de l'analyste responsable sans que l'émetteur n'ait le droit, cette fois, d'accepter ou de refuser le changement de notation. Cette note doit rester crédible et répercuter la capacité de l'émetteur à faire face à ses engagements.

En revanche, le processus de notation de l'agence de notation extra-financière KLD est déclenché par la volonté de l'agence de notation à émettre une note à une entreprise cotée en bourse, note qu'elle pourra vendre plus tard aux investisseurs. Ensuite, KLD s'engage à divulguer un suivi annuel de la note attribuée à l'entreprise. Ce suivi de notation n'obéit pas à la même règle que celle pratiquée par les agences de notation financière. En effet, KLD annonce ses notations au cours du mois de janvier de chaque année incluant à la fois les notes initiales ainsi que les mises à jour des notes précédemment attribuées.

En résumé, l'agence de notation financière, Standard & Poor's, utilise un mode de paiement par les émetteurs (*issuer-pays model*) où le paiement des frais de notation est contingent à l'acceptation de la note. Ensuite, une fois la note publiée, l'agence de notation s'engage à modifier la notation émise dès qu'elle juge que la capacité financière de l'entreprise à rembourser ses dettes a été modifiée. A contrario, l'agence de notation extra-financière, KLD, utilise un mode de paiement par les investisseurs (*investor-pays model*). De plus, elle s'engage à divulguer une mise à jour de la notation extra-financière de chaque entreprise notée uniquement à la fin de chaque année civile.

Le point commun entre ces deux agences est qu'elles sont jugées sur leur capacité à produire des informations précises. De ce fait, notre objectif est de savoir si la divulgation d'une information erronée sera sanctionnée par les investisseurs indépendamment de la structure de rémunération de

l'agence. Nous proposons d'étudier si les investisseurs sous-réagissent aux annonces de notation après ces scandales.

Dans le premier chapitre, nous utilisons le contexte particulier de la crise financière afin de juger l'effet de la réputation sur les agences de notation financière via l'étude de la réaction des investisseurs à leurs annonces de notation sur le marché financier.

Nous proposons d'utiliser le contexte de la crise des Subprimes afin d'étudier deux interprétations possibles dans la littérature des perceptions des investisseurs des changements de notation. En effet, une branche de la littérature montre que la perception des investisseurs dépend de la réputation du producteur de l'information (Benabou et Laroque (1992), Mathis et al. (2009) et Bolton et al. (2012)). Cette littérature développe l'idée selon laquelle l'incapacité des agences de notation à émettre des notations fiables et crédibles devrait affecter négativement leur crédibilité et leur réputation. Par conséquent, durant la crise financière, les investisseurs devraient ignorer les annonces de changement de notation. Une autre branche de la littérature, prenant l'hypothèse que l'agence de notation est sincère, montre que la perception des investisseurs dépend de la capacité de l'agence de notation à coordonner les comportements des émetteurs et des investisseurs (Boot et al. (2006)). L'intuition est que les notations amènent les investisseurs à choisir uniquement les entreprises ayant des notes élevées. Ainsi, les agences de notation coordonnent les actions des entreprises en les incitant à faire des efforts pour améliorer leur capacité financière et éviter la dégradation de leur notation. Ce rôle de coordination est amplifié en période d'incertitude puisque les annonces de notation servent de point de convergence qui coordonne les multiples croyances des investisseurs et émetteurs. Selon cette théorie, nous devrions trouver que les investisseurs réagissent plus aux changements de notes en période de crise.

La question posée dans ce premier chapitre est d'évaluer si la perception des investisseurs des

changements de notation pendant la crise financière est liée au rôle de la réputation des agences de notation ou au rôle de coordinateur entre émetteur et investisseur joué par les agences de notation.

Cette étude propose d'examiner l'impact des annonces de notation financière des dettes à long terme des entreprises européennes et américaines sur les rendements des actions sur deux périodes : avant la survenance de la crise des Subprimes et pendant cette crise. Notre objectif est de comparer l'ampleur de la réaction du marché sur ces deux périodes. Pour ce faire, nous utilisons la base de données Reuters Xtra 3000 afin d'identifier les annonces de notation effectuées par Standard & Poor's pour les entreprises européennes cotées à l'indice Dow Jones Stoxx 600 Europe et les entreprises américaines cotées à l'indice S&P 1500. De plus, nous utilisons la base de données Factiva afin de supprimer les annonces contaminées par des événements importants comme des affaires de fraude ou des opérations de fusion-acquisition. Les données des valeurs boursières quotidiennes sont issues de la base de données Datastream. Finalement, nous divisons notre base de données en deux sous échantillons suivant le rapport émis par la Financial Crisis Inquiry Commission (2011). Le premier échantillon correspond à la période avant crise de janvier 2005 à Décembre 2007 et le deuxième échantillon correspond à la période crise des Subprimes d'Avril 2007 à Décembre 2009.

Dans un premier temps, nous adoptons une méthodologie standard d'étude d'événement pour comparer l'ampleur de l'impact des changements de notation sur les cours boursiers entre la période avant crise et pendant la crise des Subprimes. Cependant, cette méthodologie peut s'avérer peu fiable en période de crise notamment à cause des nombreux facteurs qui pourraient affecter directement ou indirectement le cours des actions, rendant ainsi difficile la séparation entre l'impact des annonces de notation et l'impact d'autres facteurs sur les cours boursiers. Par conséquent, nous effectuons, dans un second temps, une estimation par différences-de-différences afin d'éviter ce problème d'endogéneité. L'objectif de l'étude par différences-de-différences est de mesurer si

l'impact d'un changement de notation est différent entre les périodes avant et pendant la crise, en comparant les rendements anormaux des entreprises ayant subi un changement de notation avec ceux des entreprises similaires n'ayant pas subi un changement de notation. Cette méthodologie est préférable à une simple différence entre les rendements anormaux des entreprises ayant subi un changement de notation avant et pendant la crise car elle prend en compte tous les facteurs qui pourrait influencer les rendements de l'entreprise en période d'incertitude et de crise. Avant la crise, l'étude d'événement montre que les annonces négatives produisent des rendements anormaux négatifs et significatifs sur les deux marchés américain et européen. De plus, nous constatons que les annonces positives créent des rendements anormaux positifs et significatifs sur les deux marchés. Cependant, durant la crise, seules les annonces négatives continuent à avoir un effet négatif et significatif mais uniquement sur les cours boursiers des entreprises européennes. Enfin, l'estimation par différences-de-différences nuance ce résultat : l'effet des annonces de notation sur les cours boursiers des entreprises n'est pas significatif sur les deux marchés américain et européen pendant la crise. Ce résultat confirme l'hypothèse que les investisseurs négligent les annonces de notation pendant la crise et considèrent qu'elles ne véhiculent pas des informations fiables et crédibles. De ce fait, nous confirmons que l'effet des agences de notation sur le marché est contingent à leur réputation. De plus, le contexte de crise nous a permis de constater que les investisseurs sanctionnent les agences de notation pour leur incapacité à déclarer des informations honnêtes et fiables.

Ce travail s'inscrit dans le champ des recherches empiriques qui étudient le rôle des agences de notation sur les marchés boursiers. Certaines études ont pu démontrer un rôle informationnel effectif à travers l'étude de l'impact des changements de notation sur les marchés américain et européen. Holthausen et Leftwich (1986) et Hand et al. (1992), étudient l'impact des changements de notation sur les cours boursiers américains, et Barron et al. (1997), Iankova et al. (2006)

et François-Heude et Paget-Blanc (2004), étudient l'impact des changements de notation sur les cours boursiers européens, trouvent des rendements anormaux négatifs et significatifs suite à une baisse de la note et des rendements anormaux non significatifs suite à une hausse de la note.[7] Notre étude contribue à cette riche littérature empirique en utilisant le contexte de crise afin de percevoir l'effet de la réputation des agences de notation sur leur rôle informationnel. Nos résultats sont comparables à ceux présents dans l'étude de Han et al. (2010) qui étudient les rendements des obligations émises au Japon et comparent les rendements des obligations certifiées uniquement par les agences de notation japonaises avec les rendements des obligations certifiées par (au moins) une agence internationale (S&P ou Moody's). Han et al. (2010) trouvent que les investisseurs exigent un rendement plus élevé pour les obligations certifiées par une agence internationale.

Le premier chapitre permet de constater que les investisseurs jugent et sanctionnent les agences de notation financière pendant la crise des Subprimes pour leur incapacité à divulguer des informations honnêtes. Le deuxième chapitre étend cette question aux agences de notation extra-financière. Précisément, nous étudions l'impact de l'incapacité de KLD à divulguer une information précise concernant Enron sur la perception des investisseurs de ses annonces. KLD est un certificateur d'information payé par les investisseurs soucieux du niveau de la responsabilité sociétale des entreprises. De ce fait, les motivations de KLD à produire une information sincère sont alignées avec celle de ses clients. Cependant, la faillite d'Enron en 2001 peut amener les investisseurs à remettre en question la capacité de KLD à produire des informations précises relatives au niveau réel de RSE au sein de l'entreprise.

[7]Nous présentons les résultats des études empiriques de l'impact des changements de notation sur les marchés américain et européen dans un tableau en annexe.

La question posée dans ce second chapitre est d'évaluer si la perception des investisseurs des changements de notations publiées annuellement par KLD a été modifiée par le scandale d'Enron. Un cadre théorique analogue à celui du premier chapitre est mobilisé afin d'étudier l'effet de l'incapacité de l'agence de notation KLD à divulguer des informations fiables et précises concernant l'entreprise Enron.

L'étude est menée sur l'ensemble des entreprises non-financières notées par l'agence KLD entre 1997 et 2009. En premier lieu, nous obtenons les notations RSE des entreprises notées par l'agence KLD via la base de données *KLD Stats*. En second lieu, nous fusionnons ces annonces de notation RSE avec les valeurs boursières quotidiennes extraites de la base de données *Center for Research in Security Prices*, et les données financières issues de la base de données *Compustat North America*.

Les notations Environnementales, Sociétales et de Gouvernance (ESG) de KLD comprennent 7 dimensions (communauté, gouvernance d'entreprise, diversité, relations avec les employés, environnement, droits de l'homme, produit), chacune d'elles composée d'indicateurs positifs et négatifs. Nous proposons de normaliser les notations de chaque dimension par des nombres annuels correspondant aux indicateurs. De plus, nous résumons l'information via le calcul d'une note globale qui résume les notations des 7 dimensions. Nous obtenons ainsi 8 notations RSE pour chaque entreprise présente dans notre échantillon entre 1997 et 2009. L'étude débute par une analyse de l'effet des changements de notation KLD sur la performance financière des entreprises notées présentes dans notre échantillon. Ensuite, nous comparons l'effet des changements de notation KLD sur la performance financière des entreprises avant et après la faillite d'Enron afin d'étudier l'effet du scandale d'Enron sur l'appréciation de la notation. Pour chaque étude, nous réalisons trois types d'analyse. Tout d'abord, nous formons des portefeuilles équipondérés en fonction de la nature des changements de notations KLD. Deuxièmement, nous effectuons une régression de

Fama-MacBeth (1973) afin de tester l'effet direct des changements de notation sur les rendements boursiers mensuels des entreprises notées sur l'ensemble de l'échantillon. Enfin, nous suivons les recommandations de Petersen (2009) et Thompson (2011) sur la régression de données de panel et effectuons une régression linéaire, avec *clustered standard errors by time* afin de tester l'effet direct des changements de notation KLD sur les *Book-to-Market ratios* trimestriels des entreprises.

Nos résultats montrent que les changements de notation de KLD affectent les rendements sur le marché. Cependant, si on fractionne les données avant et après le scandale Enron, nous trouvons qu'avant la faillite, les annonces de notation de KLD affectent significativement les rendements sur le marché. Cet effet disparaît après le scandale Enron. Ces résultats suggèrent que l'impact de KLD sur le marché est très lié à sa capacité à produire des informations précises. De plus, nos résultats sont conformes à l'hypothèse de réputation qui prédit la baisse de réputation de producteur d'information suite à la divulgation d'informations imprécises. Ces résultats mettent en exergue que suite au scandale d'Enron, les investisseurs considèrent que les annonces ne contiennent pas d'information précise et capable de prédire le comportement socialement responsable des entreprises.

Peu de travaux empiriques étudient la capacité des agences de notation extra-financière à affecter les perceptions des investisseurs et à transmettre des informations fiables, précises et informatives. En concordance avec notre étude, Chatterji et al. (2010) évaluent la capacité de l'agence de notation KLD à produire des informations qui prédisent le comportement socialement responsable des entreprises. Chatterji et al. (2010) examinent la capacité des notations KLD attribuées aux entreprises dans la dimension environnementale à résumer le passé et à prédire le futur. Leur étude montre que les notations KLD résument les informations passées. Néanmoins, elles ne constituent pas de prédictions précises du comportement de l'entreprise dans l'avenir. Notre étude

suppose que les investisseurs se fient aux annonces de notation uniquement s'ils perçoivent que les notations transmettent des informations précises et prédictives. Nos résultats suggèrent que les investisseurs ont mis à jour leurs croyances concernant le pouvoir prédictif des annonces de notation KLD suite à la faillite d'Enron. De ce fait, nos résultats corroborent ceux de Chatterji et al. (2010) et soulignent que les investisseurs estiment que les notations KLD ne constituent ni des informations précises sur la situation RSE actuelle de l'entreprise ni des prédictions sur son comportement RSE dans le futur.

Nous concluons cette première partie en affirmant que nous trouvons un effet de réputation sur les agences de notation financière et extra-financière. Cet effet de réputation a été observé suite à un changement de la réaction des investisseurs à leurs annonces de notation soit pendant la crise pour l'agence de notation financière ou après la faillite d'Enron pour l'agence de notation extra-financière.

4.2 L'effet de la réputation sur le comportement des agences de notation

Nous avons observé dans la première partie que les investisseurs réagissent et mettent à jour leur croyance concernant la fiabilité des annonces du producteur d'information suite à la divulgation d'information imprécise. De plus, la première partie nous a permis de constater que l'effet de la réputation est présent indépendamment de la structure de rémunération des agences. Suivant l'analyse des modèles de réputation, la capacité des investisseurs à évaluer et à sanctionner les déclarations erronées constitue un mécanisme d'incitation des agences de notation à produire des notations fiables. En ce sens, les résultats de la première partie posent la problématique sur le comportement de ces agences de notation en fonction de leur réputation. La question générale de cette deuxième partie, est d'examiner en quoi le comportement des agences de notation est

affecté par leur réputation sur le marché. Plus précisément, nous cherchons à savoir dans quelle mesure la réputation joue un rôle de mécanisme de gouvernance des agences de notation. Les agences de notation ajustent-elles les standards de notation en fonction de leur réputation ? Notre objectif, dans cette deuxième partie, est d'étudier l'effet de la réputation des agences de notation financière sur la ponctualité et la précision des notations. La ponctualité des annonces de notation peut être définie comme étant la capacité et la volonté des agences de notation à annoncer un changement de notation dès qu'elles ont connaissance d'un changement dans la capacité financière de l'entreprise. La ponctualité résume la capacité de l'agence de notation à anticiper et à prédire le défaut de paiement des entreprises. Le deuxième critère étudié est la précision de la notation qui représente la capacité de l'agence de notation à divulguer fidèlement la situation financière actuelle de l'entreprise. Nous étudions séparément l'effet de la réputation et d'autres facteurs sur ces deux critères.

Dans le troisième chapitre, nous étudions l'effet de la réputation sur la ponctualité des annonces effectuées par l'agence de notation Standard & Poor's. Les agences de notation ont tendance à défendre leur manque de ponctualité à modifier la notation d'une entreprise avant sa faillite en évoquant l'application d'une règle de notation qui réagit peu aux cycles économiques, selon l'expression *"rating through-the-cycle"*. De manière cohérente avec cette règle annoncée, les travaux de Ferri et al. (1999) et Benmelech et Dlugosz (2010) trouvent que les agences de notation ont été réticentes à baisser les notations des entreprises respectivement au début de la crise asiatique et au début de la crise des Subprimes. Ensuite, cette période d'attente a été suivie d'une période de dégradation massive des notations des entreprises. L'objectif de ce chapitre est d'étudier si ce changement de comportement est affecté par la réputation de l'agence de notation ou par d'autres facteurs externes liés à la situation financière de l'entreprise ou aux conditions du cycle économique

du pays.

L'étude empirique est menée sur un échantillon global de 802 entreprises non financières. Nous conduisons notre étude sur la période 1996-2011. Les données des annonces de notation effectuées par l'agence de notation Standard & Poor's sont extraites de la base de données *Reuters Xtra 3000*. Enfin, les données des valeurs boursières quotidiennes et les données financières sont issues de la base de données *CRSP/Compustat merged database*.

Notre stratégie empirique est inspirée des travaux de Posch (2011) et Altman et Rijken (2004). Nous proposons d'étudier la ponctualité des annonces de changement de notation en étudiant les facteurs de non-ajustement de la notation malgré la modification de la capacité financière de l'entreprise. L'intuition est de calculer les points de friction à partir desquels l'agence de notation effectue un changement de notation. Les points de friction, dits aussi seuils de changements, représentent l'écart de probabilité entre la probabilité de défaut estimée et celle suggérée par la note attribuée à partir duquel l'agence de notation effectue une baisse ou une augmentation de la notation. Ainsi, si l'agence de notation effectue des changements de notation dès qu'elle observe une modification dans la capacité financière de l'entreprise, ces seuils sont nuls. Plus l'agence attend avant de ratifier sa note, plus ces seuils augmentent. De ce fait, notre étude empirique nécessite trois étapes. En premier lieu, nous estimons une probabilité de défaut libre de toutes fluctuations temporaires liées aux cycles d'exploitation en se basant sur les données financières trimestrielles des entreprises. En second lieu, nous utilisons le modèle Tobit avec friction décrit par Posch (2011) afin d'estimer les seuils de friction en comparant les variations des probabilités de défaut estimées et celles assignées par la notation de l'agence de notation. Enfin, nous étudions l'impact des facteurs macroéconomiques et des proxies de la réputation de l'agence de notation sur ces seuils de friction.

Nos résultats montrent que les annonces de notation sont plus ponctuelles en période d'expansion économique qu'en période de récession économique. De plus, nous trouvons que la réputation de l'agence de notation affecte négativement la ponctualité des annonces de notation. En effet, nos résultats suggèrent que plus la réputation de l'agence de notation est élevée, plus l'agence de notation se montre réticente à modifier les notations des entreprises.

La plupart des études empiriques lient la ponctualité des annonces de notation aux cycles économiques. Nickell et al (2000) étudient les liens entre les probabilités de la matrice de transition des notes avec les cycles économiques. Amato et Furfine (2004) proposent d'étudier l'impact des cycles économiques sur les niveaux de notation en incluant dans le modèle probit ordonné des données financières. Les deux travaux se complètent et permettent uniquement de conclure que le cycle économique affecte négativement le niveau de notation. En ce sens, on devrait observer une augmentation des dégradations de notation et une diminution des augmentations de notation en période de récession et vice versa. Cependant, ces travaux ne nous permettent pas de comprendre si les annonces de baisse de notation ont été ponctuelles, anticipant la détérioration de la situation financière de l'entreprise, ou ont été effectuées par l'agence de notation longtemps après la détérioration de la situation financière de l'entreprise. De ce fait, notre étude tient compte de la situation financière et du cycle d'exploitation de l'entreprise afin de mieux examiner la synchronisation du changement de la note avec le changement de situation de l'entreprise. Nous constatons que les annonces de notation sont plus ponctuelles en phase d'expansion économique qu'en phase de récession. Ainsi, nos résultats ne sont pas cohérents avec ceux de Nickell et al (2000) et Amato et Furfine (2004). En effet, nos résultats suggèrent qu'en période de récession économique ou de crise, l'agence de notation observe une période d'attente avant de procéder aux changements de notation. Cette période d'attente peut s'expliquer par leur volonté de garder leur notation stable et

éviter d'augmenter la volatilité des notations.

Rare sont les travaux empiriques ayant fait le lien entre la réputation de l'agence de notation et ses standards de notation. Récemment, Cheng et Neamtiu (2009) ont comparé certains critères des notations (la ponctualité, la précision et la volatilité) avant et après la faillite d'Enron dans le but de mesurer l'effet de la réputation sur le comportement de l'agence de notation. Les auteurs trouvent que les agences de notation ont augmenté la ponctualité et la précision des notations tout en baissant leur volatilité durant la période 2003-2005. Ils interprètent ce résultat par le fait que les agences de notation ont amélioré la ponctualité de leurs annonces à cause des nombreuses critiques reçues suite à la faillite non-anticipée d'Enron. Nos résultats sont en accord avec ce travail empirique. Ils suggèrent que plus la réputation de l'agence de notation est faible, plus l'agence de notation se montre réactive à modifier les notations des entreprises. Une interprétation possible est que l'agence de notation agit ainsi dans l'optique d'améliorer ou de reconstruire sa réputation auprès des investisseurs et émetteurs.

Dans le quatrième chapitre, nous étudions les facteurs affectant la précision de la notation accordée par l'agence de notation. En effet, la crise des Subprimes a mis en lumière le problème des notations imprécises et particulièrement celui de l'inflation des notes. L'inflation des notes consiste à accorder à une entreprise une note supérieure à sa note réelle.

La littérature théorique dénombre plusieurs facteurs ayant un impact sur la précision de la note. S'appuyant sur ces études théoriques, notre objectif est d'étudier l'impact des facteurs suivants : la concentration du marché (représentée par le nombre d'entreprises notées par l'agence de notation), la réputation de l'agence de notation auprès des investisseurs (représentée par la valeur boursière de l'agence de notation) et l'augmentation de la concurrence dans l'industrie de la notation (représentée par les parts de marché de l'agence de notation Fitch), sur la précision des annonces de notation

accordées par l'agence de notation.

Notre échantillon est composé des notations des entreprises à long terme attribuées par l'agence Standard & Poor's. L'échantillon contient 912 entreprises non-financières et couvre la période allant du premier trimestre de l'année 1995 au dernier trimestre de l'année 2011. Les données des annonces de notation et les données financières trimestrielles sont extraites de la base de données *Compustat North American*, et les données des valeurs boursières quotidiennes sont issues de la base de données *Center for Research in Security Prices*.

Nous utilisons deux approches pour évaluer les déterminants de la précision des annonces de notation. La première approche consiste à étudier l'effet direct de l'ensemble des facteurs sur le niveau de la notation de l'entreprise. Ainsi, si les facteurs ont un effet positif et significatif sur le niveau de notation, ceci suggère que ces facteurs ont incité l'agence de notation à accorder des notations surévaluées. Cependant, les notes attribuées peuvent à la fois affecter et être affectées par le nombre des entreprises notées et la réputation de l'agence de notation. En effet, il n'est pas très clair si c'est le fait que l'agence de notation attribue des notes surévaluées qui conduit à l'augmentation du nombre des entreprises notées ou l'inverse. Ainsi cette première analyse souffre d'un problème d'endogénéité essentiellement dû à la causalité inverse entre la variable dépendante et les variables explicatives. La deuxième approche tente d'éviter ce problème d'endogénéité en proposant une stratégie empirique inspirée de la méthodologie des études d'événement. Cette méthodologie nécessite trois étapes. Dans un premier temps, nous estimons les paramètres du modèle Probit ordonné expliquant la notation de l'entreprise par une liste de ratios financiers de l'entreprise sur une fenêtre d'analyse entre le premier trimestre de 1995 et dernier trimestre de 1999. Puis dans un deuxième temps, ces paramètres estimés sont appliqués aux observations de la période 2000-2011 afin de prédire les notations de l'entreprise. L'objectif de cette méthode est

d'obtenir des notations indépendantes et non-entachées par les facteurs étudiés. Dans un troisième temps, nous estimons une mesure d'erreur directionnelle en calculant la différence entre la note de l'entreprise prédite par le modèle Probit et la notation de cette entreprise attribuée par S&P sur la période 2000-2011. Enfin, nous effectuons une série de régressions avec plusieurs niveaux de contrôle. Cette dernière étape vise à estimer les effets de la concentration du marché, de la réputation de l'agence de notation auprès des investisseurs et de la concurrence dans l'industrie de la notation, sur la mesure de l'erreur directionnelle.

Nos résultats montrent que la concurrence et la réputation de l'agence de notation affectent positivement et significativement l'inflation des notations. En revanche, nous constatons que l'augmentation du nombre d'entreprises notées par l'agence de notation conduit à l'attribution de notations rigoureuses. Ainsi plus la concurrence dans l'industrie de notation est forte ou plus la réputation de l'agence de notation est élevée, plus cette dernière attribue de notations élevées. Une explication possible de l'effet de l'augmentation du nombre d'entreprises notées est que cela permet à l'agence de notation de diversifier son portefeuille de revenu et de divulguer des notations rigoureuses et précises dans le but de construire une réputation crédible. En effet, rares sont les entreprises ayant fréquemment recours au marché pour se financer. Les résultats suggèrent ainsi que l'agence de notation se montre plus rigoureuse avec ceux ayant un volume de dette faible et n'ayant pas souvent recours au marché pour se financer. Ainsi, nos résultats suggèrent que les entreprises qui dépendent fortement du financement par emprunt reçoivent une notation surestimée. Enfin, il ressort de cette étude que l'agence de notation semble opérer un arbitrage entre sa réputation et la précision de ses notations.

L'effet de la concurrence sur la surévaluation des notes a récemment été mis en avant par Becker et Milbourn (2011). Nos résultats concernant le facteur de la concurrence sont cohérents avec ceux de Becker et Milbourn (2011). Notre étude complète la leur en tenant compte de l'effet de

l'augmentation du nombre des entreprises notées et de la réputation de l'agence de notation, qui s'avèrent avoir un impact significatif sur la précision de la note.

Cette deuxième partie permet de confirmer qu'il semble exister un effet de la réputation sur le comportement des agences de notation. De plus, l'étude menée suggère que la concurrence dans l'activité de notation peut conduire les agences de notation à produire des notations surévaluées.

En conclusion, nos études montrent certes que les agences de notation modifient leurs comportements de notation en fonction de leur réputation mais ce mécanisme d'incitation comporte également des limites. En effet, d'autres facteurs semblent favoriser l'attribution de notations surévaluées.

5 Contributions de la recherche

Notre recherche permet de proposer un certain nombre de contributions à la littérature financière et d'apporter des éléments de discussion sur le fonctionnement de cette industrie. Notre étude a pour ambition de confronter les résultats de la littérature théorique aux données empiriques, en examinant l'effet de la réputation comme mécanisme d'incitation pour les agences de notation. En ce sens, les études menées visent à observer l'impact de la réputation des agences de notation sur la qualité de leurs notations et, également, sur l'appréciation des investisseurs des annonces de notation. De plus, l'étude menée sur l'agence de notation extra-financière contribue de manière indirecte à la littérature empirique étudiant le lien entre le niveau de la responsabilité sociétale des entreprises (RSE) et leur rendement financier en questionnant la fiabilité de l'utilisation des annonces de notation de l'agence KLD. Cette étude examine un changement éventuel dans la perception des investisseurs des annonces de KLD suite aux déclarations erronées concernant Enron

et WorldCom. De ce fait, elle questionne aussi la fiabilité d'utiliser les notations KLD comme proxy du niveau de RSE. La grande hétérogénéité des résultats de la littérature (Margolis et al. (2009) et Allouche et Laroche (2005)) étudiant la liaison entre la performance RSE et la performance financière, pourrait s'expliquer par une perception différente de la qualité de cette note par les investisseurs. Ceci impliquerait de reprendre ce type d'études en tenant compte explicitement de cet effet.

D'un point de vue méthodologique, un autre apport de cette recherche est de mobiliser une grande diversité de méthodes empiriques.

En premier lieu, nous proposons d'étudier la réaction des investisseurs au changement de notation dans un environnement particulièrement bruité par les informations qui est la crise des Subprimes. L'utilisation du contexte de crise pour répondre à notre question de recherche nous permet de recueillir la réaction des investisseurs dans une période particulièrement troublée par les rumeurs et les critiques envers les agences de notation. Afin d'isoler l'impact des annonces de notation sur la perception des investisseurs des autres informations circulant sur le marché, l'étude menée utilise une estimation de différences-de-différences. L'idée proposée est de comparer les rendements anormaux des cours boursiers des entreprises ayant subi un changement de notation, dites entreprises de l'échantillon de traitement, avec ceux des entreprises similaires n'ayant pas subi un changement de notation, dites de l'échantillon de contrôle sur les deux périodes avant et pendant la crise.

En second lieu, la troisième étude, concernant l'impact de la réputation sur la ponctualité de la note, a posé la problématique du choix de la probabilité de défaut la plus adéquate et la plus proche des modalités de notation. Pour ce faire, nous avons comparé deux modèles d'estimation de probabilité de défaut, le modèle logit et le modèle KMV (Kealhofer, McQuown and Vasicek). L'un se base sur les états financiers de l'entreprise et l'autre fondé sur le modèle structurel de Merton (1974) se base

sur les états financiers et les cours boursiers de l'entreprise. Par souci de précision et de stabilité dans l'estimation de la probabilité et afin d'être proche des normes utilisées par les agences de notation, nous avons opté pour l'estimation des probabilité de défaut par le modèle logit libéré de toute fluctuation de cycle d'exploitation de l'entreprise en utilisant le filtre proposé par Hodrick and Prescott (1997). Ainsi, cette étude nous permet de suggérer l'utilisation de modèle logit, si la base de données contient suffisamment d'incidents de faillite, qui permet une estimation de probabilité de défaut légèrement plus précise que celle du modèle KMV et particulièrement stable par rapport à celle de ce modèle.

En troisième lieu, la quatrième étude, concernant l'impact de la réputation sur la précision de la note, utilise une méthodologie inspirée des études d'événement, en raison de l'endogénéité causée par la causalité simultanée entre certaines variables explicatives et la note. Nous proposons d'éviter cette endogénéité via une méthodologie originale qui consiste à appliquer le principe des études d'événement sur un modèle Probit ordonné afin de détecter les notations imprécises et d'examiner leurs facteurs déterminants. Ainsi, l'étude considère une fenêtre d'estimation et une fenêtre d'événement. Puis, elle compare les valeurs estimées avec celles observées afin de détecter les notations imprécises.

Enfin, les résultats de cette recherche ont également un intérêt pour l'industrie elle même, en particulier pour les régulateurs afin de mieux réglementer l'activité de notation. Ainsi, ces études permettent de mettre en lumière les effets de la réputation, du cycle économique, de la concurrence et du nombre d'entreprises notées sur la précision de la note. L'analyse montre en particulier que la concurrence peut avoir un effet néfaste dans l'activité de notation. De plus, l'étude met en exergue le fait que l'agence de notation tient compte de sa réputation vis à vis des investisseurs et ajuste la qualité de ses notations en fonction de sa réputation. De ce fait, le régulateur pourrait inciter

les agences de notation à accentuer la transparence de leur méthode afin de vérifier la véracité des notations accordées. Ainsi le régulateur pourrait réduire l'effet négative du phénomène de *"rating shopping"* et mettre fin à la clause de renégociation de contrat qui, associée à la concurrence, affecte négativement la précision de la notation.

6 Annexes

Table 1: Les études empiriques de l'impact des changements de notation sur les marchés américain et européen

Marchés	Etudes	Base de données	Principaux résultats
Américain	Holthausen et Leftwich (1986)	1977-1982: 1014 changements de notation de Moody's et S&P. 1981-1983: 256 ajouts à la liste Mise sous surveillance de S&P.	Les rendements anormaux (RA) des cours boursiers sont négatifs et significatifs suite à une baisse de la note. Les rendements anormaux sont non significatifs suite à une hausse. Les RA sont plus élevés en cas de changement inter-catégorie qu'en cas de changement intra-catégorie. L'ampleur de l'impact de la dégradation de la note dépend de la raison de cette décision.
Américain	Hand, Holthausen et Leftwich (1992)	1977-1982: 1100 changements de note par Moody's et S&P. 1981-1983: 250 ajouts à la liste de mise sous surveillance.	Les RA des cours boursiers sont négatifs et significatifs suite à une baisse de la note. Les RA sont non significatifs suite à une hausse.
Américain	Goh et Ederington (1993)	1984-1986: 1078 changements de notation par Moody's.	Décompose la base de données en 3 groupes selon les raisons du changement de note: performance financière, hausse de levier et autre raison. L'impact de la baisse de la note est plus significatif en cas de changement à cause de la performance financière.

Américain	Goh et Ederington (1999)	1984-1990, 1526 changements de note par Moody's.	La réaction à l'annonce de la diminution de la note est négative. L'impact de la diminution de la note est négativement et significativement plus élevé si le changement s'opère en catégorie spéculatif et/ou en cas de changement de catégorie.
Anglais	Barron, Clare et Thomas (1997)	1984-1992: 87 entreprises anglaises	Les RA des cours boursiers sont négatifs et significatifs suite à une baisse de la note.
européen	Goyeau, Sauviat et Tarazi (2000)	1988-2000: impact des annonces de notation sur un échantillon de banques européennes.	Les RA des cours boursiers sont négatifs et significatifs suite à une baisse de la note. En revanche, les RA sont non-significatifs suite à une augmentation ou confirmation de la note.
italien	Linciano Nadia (2002)	1991-2003, 299 changements de notation des émetteurs italiens des trois agences de notation.	Les RA sont négatifs et significatifs suite à une baisse de la note et à une mise sous surveillance négative. En revanche, les RA sont non-significatifs suite à une augmentation de la note.
français	François-Heude et Paget-Blanc (2004)	2001-2003: 279 changements de notation.	Seules les mises sous surveillance négatives ont un impact négatif et significatif sur les cours boursiers le jour de l'annonce.
français	Iankova, Pochon, Teiletche (2006)	1990-2004: 401 changements de notation par les trois agences (S&P, Moody's, Fitch) concernant 68 entreprises françaises.	Les prix des actions réagissent plus fortement à la dégradation de la note ou à sa mise sous surveillance négative qu'à son relèvement ou à sa mise sous surveillance positive. Les prix des actions anticipent les décisions des agences.

français	Dallocchio, Hubler et Raimbourg (2006)	2000-2004: 35 changement de notation effectués par Moody's et S&P.	Seul les baisses de notation sont accompagnées d'une réaction des investisseurs sur le marché des obligations. Cependant, les augmentations de notation n'ont aucun impact sur le marché.
français	Ory, Raimbourg et Salvi (2011)	1999-2005: 360 baisses de notation et 273 mise sous surveillance négative effectué par les trois agences de notation (S&P, Moody's, Fitch) concernant des entreprises appartenant à 13 pays européens.	La mise sous surveillance négative a le même effet que la baisse de la note par un incrément. Cependant, une baisse de la notation au-délà d'une note provoque un effet plus important.

Première partie

L’effet de la réputation sur la perception des investisseurs

Introduction de la première partie

Cette première partie est composée de deux chapitres, rédigés en anglais, concernant l'effet de la réputation des agences de notation sur la perception des investisseurs de ses annonces. Le premier chapitre concerne l'effet de la réputation des agences de notation financière et le deuxième chapitre concerne l'effet de la réputation des agences de notation extra-financière.

Dans cette partie, notre objectif est d'évaluer la réaction des investisseurs lorsqu'ils ont observé qu'une agence de notation a divulgué des informations incorrectes. Nous supposons que les investisseurs sont rationnels, c'est-à-dire que leur réaction aux annonces de notation reflète la crédibilité qu'ils accordent au producteur de l'information. Ainsi, nous proposons d'examiner dans quelle mesure la réputation des agences de notation est prise en compte par les investisseurs à travers leur réaction aux changements de note. Plus spécifiquement, nous cherchons à étudier la question suivante : En cas d'événement signifiant que les agences de notation ont commis des erreurs de jugements, les investisseurs prennent-ils en compte ces éléments dans leur appréciation des notations suivantes attribuées par ces mêmes agences ? Nous proposons d'évaluer l'impact de la crise des Subprimes et des scandales financiers sur la réputation des agences de notation à travers la comparaison de la réaction des investisseurs aux annonces de notation avant et après ces scandales. Si nous observons une moindre réaction des investisseurs après la crise par rapport à avant la crise,

nous pourrons considérer qu'il y a perte de réputation de l'agence de notation.

Dans le premier chapitre, nous utilisons le contexte particulier de la crise financière afin de juger l'effet de la réputation sur les agences de notation financière à travers la comparaison de la réaction des investisseurs à leurs annonces de notation sur le marché financier avant et pendant la crise financière. Le deuxième chapitre étend cette question de recherche à l'agence de notation extra-financière KLD. Précisément, nous comparons la réaction des investisseurs aux annonces de notation de KLD avant et après la faillite d'Enron qui a dévoilé l'incapacité de KLD à divulguer des informations précises.

Chapitre 1

Impact of the Subprime Crisis on the reputation of Credit rating agencies

1 Introduction

"The story of the credit rating agencies is a story of colossal failure" Henry Waxman (California), Chairman of the House Committee, Wall Street Journal, October 23, 2008.

The ratings industry has been regulated since 1975, but ratings bias on financial markets only emerged recently as a concern. The collapse in recent years of highly-rated firms such as Enron (2001), Worldcom (2002) and Lehmann Brothers (2008) has cast doubt on the reliability of credit ratings. The apparent inability of Credit Rating Agencies (CRAs) to rate complex products also calls into question their role as agencies for gathering and releasing information. These failures may be due to opportunistic behavior by CRAs strategically choosing to conceal bad news, or caused by their inability to generate truthful information that coordinates issuer and investor behaviors. This chapter studies how investors perceive the failures of high credit ratings, by measuring stock

market reactions to changes in credit ratings before and during a crisis. The main objective is to assess whether investors' perceptions of ratings announcements during the subprime crisis are related to the reputation or coordination role of CRAs.

There is a widely-held view that reputation concerns prevent CRAs from opportunistic behavior. The CRAs themselves claim that their ratings only reflect their private information. They argue that any opportunistic behavior, such as issuing inflated or lenient ratings, would damage their reputation. A report by Standard & Poor's to the SEC in 2002 states, "The ongoing value of Standard & Poor's credit ratings business is wholly dependent on continued market confidence in the credibility and reliability of its credit ratings." [1] However, the SEC (2008) and the Financial Crisis Inquiry Commission reports (2011) both point to the CRAs' responsibility in the failure of highly-rated mortgage-backed securities and the occurrence of the Subprime crisis.[2] In this chapter we thus use the crisis context to evaluate the perceived reliability of CRAs' ratings announcements during the crisis, in order to see whether changes in market reactions before and during the crisis can be attributed to changes in CRAs' reputations.

There is evidence in one stream of literature that investors' perceptions of agency ratings depends on the CRA's reputation, which is the belief of investors about the CRA's ability to produce truthful, accurate information. CRAs are also presumed to have the appropriate technology to produce accurate information when assessing the quality of so-called simple products. For the purposes of this article, we therefore assume that a CRA's reputation on the stock market depends only on its honesty, or its propensity to release truthful information. Therefore, if it is true that investors

[1] Standard & Poor's Ratings Service, U.S. Securities and Exchange Commission Public Hearing-November 15, 2002 Role and Function of Credit Rating Agencies in the U.S. Securities Markets http ://www.sec.gov/news/extra/credrate/standardpoors.htm

[2] "The three credit rating agencies were key enablers of the financial meltdown.[...] the crisis could not have been marketed and sold without their seal of approval. Investors relied on them, often blindly. [...]This crisis could not have happened without the rating agencies." The Financial Crisis Inquiry Commission (2011) page *xxv*

believe the failure of a highly-rated complex product is due to opportunistic behavior by CRAs, as suggested by the SEC (2008) and the Financial Crisis Inquiry Commission (2011), they can be expected to adjust their beliefs about CRAs' reputations and react less strongly to their ratings announcements during the subprime crisis than in normal times.

However, there is another possible interpretation of investors' perceptions of rating changes. A different branch of literature shows that investors' perceptions of CRA ratings depends on the CRAs' ability to coordinate issuer and investor behaviors. This coordination role is amplified in periods of uncertainty : during a crisis, CRAs' ratings announcements serve as a focal point that coordinates issuer and investor behaviors. Therefore, if the CRAs' role on the market is to provide such coordination, investors may react more strongly to rating changes in a crisis period than in normal times.

To assess the impact of the crisis on CRAs' reputations, we analyze the observed market reaction to an issuer's stock price following a change in credit rating. Using a standard event study methodology, this study compares the market reaction before and during the subprime crisis. A general concern with event studies during a crisis period is that many factors could indirectly affect stock prices, making it difficult to attribute price reaction to a rating change alone. We therefore conduct a Difference-in-Differences (DID) study in order to avoid this endogeneity issue. The purpose of the DID study is to assess whether the impact of a rating change differs before and during the subprime crisis, by comparing the market reaction of firms affected by a rating change with the reaction of otherwise similar firms unaffected by a rating change. This methodology is preferred over a simple difference between outcomes before and during the crisis, as the DID takes explicitly into account all factors[3] that could affect the firm's returns even if it does not experience a rating

[3] Investors' perception can change due to both external and internal factors i.e. frequent arrival of information, their

upgrade or downgrade.

We find statistically significant negative stock market reactions to rating downgrades before the crisis on both the American and European stock markets. Significant positive market reactions to rating upgrades before the crisis are also observed on both stock markets. These findings provide evidence that CRA ratings have an impact on the stock market. During the crisis, downgrades had a significant negative effect on the European stock market only, while rating upgrades had statistically non-significant effects on both stock markets. In contrast with the results reported by Joo and Pruitt (2006) for the Korean crisis, this study finds that the subprime crisis did not strengthen the effects of a rating downgrade, which suggests a loss of reputation effect is at work. Finally, in the DID methodology, the DID estimator is non-significant for *both* the European and American stock markets in the case of *both* downgrades and upgrades. These findings support the view that investors ignore rating changes during the Subprime crisis period, and consider that they no longer convey reliable information. The CRAs' impact on the market is therefore entirely dependent on their reputation

Much research has been conducted on the information content of credit rating changes. Holthausen and Leftwich (1986) and Hand et al (1992) on the American stock market and Barron et al. (1997), Iankova et al. (2006) and François-Heude and Paget-Blanc (2004) on the European stock market find significant negative stock price reactions to downgrades but no significant reaction to upgrades. Moreover, Dallocchio et al. (2006) find similar results on the French bond market. They find no reaction to upgrades and significant negative reaction to downgrades.This shows that downgrades may have more information content than upgrades. Hence, downgrades include private information unknown to the public. Using data released after the Regulation Fair Disclosure was

risk tolerance, their return expectation (Hoffman et al. 2013)

implemented in 2000,[4] Jorion et al. (2005) find that upgrades also have significant informational content. These results are confirmed by May (2010) using data from September 2002 to March 2009. These studies confirm the view that CRAs disclose private information and rating changes have informational content in normal times. They also reflect the wider use of credit ratings in recent years due to the increasing reference to ratings in financial regulation and contracting (Basel II). Our study confirms these past results, showing that before the subprime crisis CRAs had an impact on both the European and American stock markets in the case of both downgrades and upgrades. However, our objective is to determine whether the subprime crisis event affected CRAs' reputations, by comparing investors' perceptions of rating changes before and during the crisis.

Very few papers investigate the impact of a financial crisis on the perceived value of ratings issued by CRAs. Joo and Pruitt (2006) study the impact of bond rating changes on the Korean stock market during the Korean crisis. The major finding of their study is that bond downgrades result in a strikingly more negative stock price reaction during the crisis than either before or after it, suggesting that the role of CRAs is perceived by investors as even more important in uncertain times. That finding is not confirmed by our results concerning the subprime crisis, suggesting that the Korean crisis actually had no effect on CRAs' reputations .

Closer in time to this study, recent independent research by Han et al. (2010) compares the yield on new yen-denominated plain vanilla bonds issued in Japan and rated only by Japanese rating agencies with the yield on bonds rated by at least one global rating agency (Moody's or S&P). They find evidence that the firms rated by global CRAs had a higher yield than firms rated only by Japanese rating agencies during the crisis, and interpret this result as an indication of a decline

[4]Regulation Fair Disclosure implemented on October 23, 2000, prohibits U.S. public companies from making selective, nonpublic disclosures to favored investment professionals within the exception of CRAs. As a result, CRAs have access to confidential information not available to other equity analysts.

in the credibility and reputation of CRAs. Our own results also confirm the decline in reputation of a global CRA (S&P), and show that the subprime crisis affects reactions to both downgrades and upgrades. Duff and Einig (2009) study market participants' perception of credit ratings. Using a questionnaire administered in April 2006, they find that CRAs' reputations, followed by rating methodology robustness, are the two most important technical qualities for these actors. Our results confirm that a CRA's reputation is the most important technical quality perceived by investors, which suggests that CRAs' impact on the market is highly contingent on their reputation.

Finally, our findings support the predictions of theoretical papers that link CRAs' effect on the market to their reputation, for example Benabou and Laroque (1992) and Mathis, Mc Andrews and Rochet (2009).

The rest of the chapter is organized as follows. Section 2 presents our hypotheses. Sections 3 and 4 describe our data and empirical strategy . Section 5 reports our results, and Section 6 concludes the chapter.

2 Hypotheses

A credit rating [5] is an opinion on the creditworthiness of an issuer, i.e. its ability to meet its financial commitments, as determined by a CRA after careful analysis of the issuer's situation. Once an initial rating has been assigned, if the CRA perceives a change in the firm's creditworthiness, it announces a rating change. The theoretical research presents different channels through which the CRA affects investor demand. Two approaches can be distinguished.

The first approach builds on the assumption that a firm's decision to default is endogenous.

[5] See table (1.10) in the appendix.

Manso (2013) shows that the issuer's optimal choice to default depends on the cost of capital, i.e the interest rate paid by the issuer, indexed on the rating assigned by the CRA. A higher cost of capital (low rating grade) leads the issuer to opt a high default risk while a lower cost of capital (high rating grade) leads the issuer to opt a low default risk. A change in the CRA's rating affects both the issuer and the investor and provides a coordination mechanism. Boot et al (2006) show that credit ratings present a focal point for investors when multiple equilibria are possible, under the assumption that institutional rigidities (i.e. regulation such as Basel II) coordinate the actions of some investors and lead them to choose high-quality firms . Assuming that CRAs are honest and do not conceal information, they show that CRAs have a belief-coordinating role. The value of this role will depend on how divergent and uncoordinated the beliefs of investors in the market are. CRAs are most valuable when analyst expectations are divergent in uncertain times. This implies a stronger negative (respectively positive) stock market reaction to downgrades (respectively upgrades) during a crisis.

Assuming that rating agencies affect investors' perceptions through coordination and/or regulation channels , we predict in this study that the effect of the crisis should strengthen the stock market's reaction to credit rating announcements in the same direction .

Hypothesis 1 *During the subprime crisis , investors react more strongly to rating changes than in normal times*

The second approach builds on the assumption that the decision to default is exogenous and only CRAs have the technology to screen private information perfectly. CRAs themselves argue that they avoid opportunistic behavior and truthfully report the observed information, since their reputation is at stake. CRAs' reputations can thus be defined as investors' belief that CRA ratings are reliable.

However, the subprime crisis casts doubt on CRA behavior, particularly regarding their rating of complex products. At this point it is useful to briefly review theoretical investigations into the disciplinary role played by CRAs' reputations, and the validity of their argument.

Benabou and Laroque (1992) study how informed agents whose announcements influence prices (journalists, financial gurus and corporate executives) can build a reputation and ultimately cash in on it by manipulating market prices in one direction and trading in the opposite direction. But rational traders, if they believe that the intermediary is opportunistic, will do the opposite to the intermediary's recommendations. As a result, the ability of opportunistic intermediaries to manipulate information is limited in the long run by outsiders' constant reassessment of their credibility. Benabou and Laroque (1992) therefore suggest that if investors believe CRAs can adopt opportunistic behavior, they will adjust their belief and react accordingly .

Mathis, Mc Andrews and Rochet (2009) show that the conflict of interest generated by the fact that CRAs receive their income from issuers is not solved by reputation concerns. In their model, a CRA builds up a reputation in order to cash in on it, and all else being equal, the CRA's reputation has three phases. In the first phase the CRA builds up its reputation on the market and provides accurate ratings. In the second phase, once its reputation is high enough on the market, the CRA becomes more lax (will give a good rating to a bad project) and the risk of default by the rated firm increases. In the third phase, the CRA's opportunism is detected when a highly-rated project fails, investors on the market lose confidence, and the CRA's reputation falls to zero.

Relatedly, Bolton et al (2012) show that CRAs may inflate the quality of a firm when there are more naive investors on the market (defined as investors who do not understand the CRA's incentives and take ratings at face value) or when the CRA's expected reputation costs are lower. Investors link ratings accuracy to the CRA's reputation and punish the CRA by reducing its reputation if it

issues inaccurate ratings.

Therefore, the information released by a CRA affects investors if and only if investors consider the CRA's ratings reliable. The reliability of a CRA's rating depends on its ability to assess the quality of the rated product accurately and release the information truthfully. Assuming that CRAs have the adequate technology to assess a simple product's quality[6], we predict that the failure of a highly-rated product is treated by investors as an indication that the CRAs' ratings are inaccurate. The subprime crisis could be interpreted as a signal that the CRAs cheated in their ratings. Standard & Poor's 2009 Annual Global Corporate Default Study and Rating Transitions Report states that there was a rise in default rates[7] to 1.72% in 2008 (14 investment-grade defaults and 88 speculative-grade defaults) and 3.99% in 2009 (11 investment-grade defaults and 223 speculative-grade defaults). The failure of high-grade firms may be a signal that the CRA was opportunistic. One way to measure whether investors update their beliefs about a CRA's rating accuracy is to look at whether rating changes generate different reactions during a crisis. We expect to find that during the subprime crisis investors reacted less strongly to rating changes than in the period before the crisis.

Hypothesis 2 *During the subprime crisis , investors react to rating changes less strongly than in normal times.*

[6]Skreta and Veldkamp (2009) consider that the asset-issuer can shop for rating. They show that rating shopping is contingent on the asset complexity which causes a bias on ratings. When the asset is simple, each rating is perfectly precise (unbiased) and there is no benefit in seeking another rating.

[7]The default rates in 2005 was 0.57% in 2005 and 0.45% in 2006. Annual corporate defaults are reported in figure 1.

3 Data

To assess the impact of a crisis on the reputation of CRAs, we analyze the market reaction and issuer stock price following a credit rating change before and during the subprime crisis. We focus on the change in long-term issuer credit ratings, reflecting the CRA's opinion of a debtor and its overall capacity to pay its financial obligations in the long term. The chosen crisis period begins in April 2007 and ends in December 2009. According to the Financial Crisis Inquiry Commission report of January 2011, "In February [2007], New Century reported bigger-than-expected mortgage credit losses and HSBC, the largest subprime lender in the United States, announced a 1.8 $ billion increase in its quarterly provision for losses. In March, Fremont stopped originating subprime loans after receiving a cease and desist order from the Federal Deposit Insurance Corporation. In April, New Century filed for bankruptcy". The choice of this period is driven by the reputational model showing that a CRA's reputation should fall at the first collapse of a highly-rated product. The pre-crisis period runs from January 2005 to December 2006. We use the Reuters Xtra 3000 database to identify changes in Standard & Poor's long-term issuer credit ratings for European firms belonging to the Dow Jones Stoxx 600 index, and changes in long-term issuer credit ratings for American firms belonging to the S&P 1500 index. We also use Factiva to search for other non-rating news about the firms. If an article published in this period contains contaminating information (significant events such as fraud cases, mergers and acquisitions, for example), we remove the firm concerned from the database. The final sample is presented in the following table.

TABLE 1.1 – Summary statistics of the database

Issuer long term credit rating changes by Standard&Poor's										
American stock market										
	Downgrades					Upgrades				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
AA				6	3	1	3	1	4	
A	8	8	8	11	12	13	15	13	6	3
BBB	25	22	20	35	47	27	26	18	21	19
BB	15	16	20	25	27	26	26	17	34	14
B	9	8	8	14	27	5	5	7	7	6
CCC					5					5
CC										1
all	57	54	56	91	121	72	75	56	72	48
European stock market										
	Downgrades					Upgrades				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
AA	2		3	9	3	3	7	4	3	
A	6	7	11	18	29	7	6	10	7	6
BBB	4	9	13	20	25	9	4	9	7	5
BB	2	5		4	5	2	4	3	1	1
B					3	2				1
all	14	21	27	51	65	23	21	26	18	13

4 Empirical strategy

First, we use a simple event study to capture the effect of CRA rating changes before and during the crisis. One way to estimate the effect of a financial crisis on investor's perceptions is simply by the difference between abnormal returns before and during a crisis. However, during a crisis investors are exposed to an unusual volume of unexpected news, and furthermore, abnormal returns can be caused by several different factors. Investors' perception of a firm could change even if the firm's credit rating remained the same. An alternative strategy to deal with this endogeneity issue is to examine abnormal returns for similar groups that did not experience rating changes before and

during the crisis. We therefore use the Difference-in-Differences (DID) approach to do so. This provides the best estimation of the CRA's crisis impact by avoiding the problem of endogeneity.

4.1 Event study

Using a standard event study methodology (Mackinlay, 1997), the market model is run using the estimation period $[-210,-31]$.

$R_i = \alpha + \beta R_m + \varepsilon$

where R_i is the log return of stock i and R_m is the log return of the market index. The estimated parameters are used to compute the abnormal returns in the event window [-30, + 30]. Event days are reported in the Reuters Xtra 3000 database.

$AR_i = R_i - \widehat{\alpha} - \widehat{\beta} R_m$

Abnormal returns are aggregated in order to summarize inferences for the rating change events. The aggregation is along two dimensions, through time and across events.

The average abnormal return, AAR, represent the aggregation across events ($AAR_{i,t} = \frac{1}{N} \sum_{i=1}^{i=N} AR_i$), the cumulative abnormal returns, CAR, represent the aggregation through time ($CAR_{i,t} = \sum_{t=t_0}^{t=t_1} AR_i$) and the cumulative abnormal average returns (CAAR) represent the aggregation through time and across events ($CAAR_{i,t} = \frac{1}{N} \sum_{i=1}^{i=N} CAR_{i,t}$)

The tables will report CAAR for the window trading days $[-20,-1]$, $[-10,-1]$, $[-1,0]$, $[0,1]$, $[0,10]$, $[0,20]$ and $[-20,20]$ in line with previous studies.

Finally, in addition to a parametric statistical test (the t-statistic) a non parametric statistical test (Wilcoxon signed-rank) is calculated to check the significance and robustness of the CAAR.

4.2 Difference-in-differences estimation

The conventional difference-in-differences (DID) estimation is defined by Bertrand et al. (2004) as follows :"DID estimation consists of identifying a specific intervention or treatment [...]. One then compares the difference in outcomes after and before the intervention to the same difference for unaffected groups." The control group is used to show the outcome without the "treatment". Many variables other than the treatment could affect the outcome, and the DID estimation studies the impact of these other variables by examining the outcome of the control group.

In order to find out how the crisis affects investors' perceptions of CRA ratings, we measure the real effect of rating announcements during the crisis using the DID estimation. In other words, we seek to separate the subprime crisis' impact on the response to rating changes from the impact(s) of other events. To compare abnormal returns between a firm that experienced rating changes and a firm that did not, we construct a control group using a matched sample similar to the firms that experienced rating changes, and calculate abnormal returns for both groups. For the control group, abnormal returns are calculated using the same event date as the treatment group, to be certain that any change is due to the impact of factors other than rating changes. A negative abnormal return thus reflects the effect of the crisis on firms with no rating changes, allowing us to estimate the real effect of the crisis on investors' perceptions of changes in CRA ratings. In our case, the "treatment" is the rating changes and the "time trend" is the subprime crisis. The DID estimation compares the difference in outcomes during the crisis between the treatment group and control group with the corresponding difference before the crisis. The difference between the impact of rating changes during the crisis and the impact of rating changes during normal times thus gives the impact of the crisis on investors' perception of CRA ratings.

The outcome explained by this analysis is the aggregated abnormal return through time, and the cumulative abnormal returns, calculated over a two-day event window (0,+1). Hence, we consider two groups of firms indexed by the treatment status change=(0,1) where 0 indicates firms which did not experience rating changes, making up the Control group, and 1 indicates firms which did experience a rating change, making up the Treatment group. The firms are observed in two periods, Crisis=0,1, where 0 indicates the time period before the crisis, named the pre-crisis period, 2005-2006, and 1 indicates a time period during the crisis, named the crisis period, April 2007- December 2009. The control sample of firms that did not experience a rating change is constructed using matched samples, based on market capitalization in a similar approach to Desai and Jain (1995) in their the study of performance of analyst recommendations. Like them, we select control firms with the same two-digit SIC code as the treatment firm to take into account the fact that the subprime crisis may have had a more negative impact on some sectors than others. This methodology is also in line with previous event studies using matched samples based on market capitalization and industry sector (see Barber and Lyon, 1996). Last, the matched sample is limited to firms listed on the relevant market indexes (S&P1500 and DJ Stoxx 600) and not contaminated by other significant events.

The dependent variable is the cumulative abnormal return calculated over a two-day event window (0,+1).

$$CAR_{i,t} = \alpha + \beta_1 Change + \beta_2 Crisis + \beta_3 Change * Crisis + \varepsilon \tag{1.1}$$

The parameters of equation (1.1) can be interpreted as follows. The constant term corresponds to the mean CAR for the control group during 2005-2006. The first coefficient β_1 refers to the

treatment group specific effect (to account for average permanent differences between the treatment and control group). This coefficient indicates the impact of a rating change over time and is the first difference between the two groups before the crisis.

$$\beta_1 = [E(CAR_{i,t}/Change = 1, crisis = 0) - E(CAR_{i,t}/Change = 0, crisis = 0)] \quad (1.2)$$

The second coefficient β_2 represents the time trend common to the control and treatment groups and indicates the impact of the crisis within the group. It corresponds to the difference in the control group's CAR before and during the crisis.

$$\beta_2 = [E(CAR_{i,t}/Change = 0, crisis = 1) - E(CAR_{i,t}/Change = 0, crisis = 0)] \quad (1.3)$$

Finally, the third coefficient β_3 compares the difference in CAR before and during the crisis for groups that experienced rating changes with the difference in CAR before and during the crisis for groups that did not experience rating changes. This difference-in-differences will eliminate the time trend effect. The crucial assumption of this difference-in-differences estimation is that the time trend in the treatment group is the same as the time trend in the control group.

$$\begin{aligned} \beta_3 = &[E(CAR_{i,t}/change = 1, crisis = 1) - E(CAR_{i,t}/change = 1, crisis = 0)] \\ &-[E(CAR_{i,t}/change = 0, crisis = 1) - E(CAR_{i,t}/change = 0, crisis = 0)] \end{aligned} \quad (1.4)$$

The basic procedure is to compute the average outcome for each of the two groups in the two periods. These averages are shown in a table comparing the groups by row and the time periods by column. The table presented in the following section can be read in two different ways : the

columns focus on the difference between groups over time, while the rows focus on the impact of the crisis on the two groups. These results are obtained using the regression equation to test the robustness of findings. The estimates are reported in the tables in the following section.

5 Results

5.1 Event study

TABLE 1.2 – Stock price response to rating downgrades on both markets before and during the crisis period

	$2005-2006$						$2007-2009$					
	American			European			American			European		
Window trading days												
	CAAR (%)	p-value	Wilcoxon	CAAR (%)	p-value	Wilcoxon	CAAR (%)	p-value	Wilcoxon	CAAR (%)	p-value	Wilcoxon
$[-20.-1]$	-1.347	0.059*	0.054*	0.627	0.580	0.441	-2.276	0.109	0.278	-0.146	0.900	0.524
$[-10.-1]$	-0.906	0.117	0.082*	0.910	0.185	0.179	-2.525	0.016**	0.170	0.209	0.820	0.741
$[-1.0]$	-0.673	0.138	0.450	-0.343	0.282	0.238	-0.471	0.406	0.063*	-0.515	0.232	0.312
[0]	-0.261	0.337	0.478	-0.421	0.069*	0.083*	-0.185	0.502	0.363	-0.345	0.236	0.278
[0.1]	-0.343	0.293	0.345	-0.426	0.311	0.422	0.027	0.940	0.859	-1.408	0.026**	0.010***
[0.10]	-1.046	0.057*	0.134	-0.838	0.363	0.280	1.755	0.046**	0.055*	-0.213	0.846	0.858
[0.20]	-0.962	0.244	0.314	-0.759	0.468	0.623	2.399	0.077*	0.030**	1.097	0.475	0.417
$[-20.20]$	-2.309	0.052*	0.016**	-0.132	0.935	0.831	0.123	0.951	0.556	0.950	0.636	0.562

*1%***. 5%** and 10%**

Table (1.2) summarizes the abnormal stock returns observed after a rating downgrade before and during the crisis period on the American and European stock markets. Daily abnormal returns across securities are reported in figures 2 and 3. In normal times, we find that rating changes have a significant negative impact on both stock markets. This finding is in line with previous studies that find a significant negative impact of rating downgrades. However, during the crisis, rating changes are observed to have an asymmetric impact on the two stock markets. First, we find an immediate significant negative impact on the European stock markets. This finding suggests that investors

neither react more strongly to nor ignore rating downgrades, but continue to consider that they convey additional information and play a coordination role. Second, we find a significant negative stock price response to downgrades prior to the day of the announcement, and a significant positive response afterwards.

These findings for the two markets contrast with the findings of Joo and Pruitt (2006) and Jorion et al. (2005). Jorion et al (2005) show that the recession period between March 2001 and November 2001 brought the effect of rating downgrades close to zero.

TABLE 1.3 – Stock price response to rating upgrades on both markets before and during the crisis period

	$2005-2006$						$2007-2009$					
	American			European			American			European		
Window trading days												
	CAAR (%)	p-value	Wilcoxon	CAAR (%)	p-value	Wilcoxon	CAAR (%)	p-value	Wilcoxon	CAAR (%)	p-value	Wilcoxon
$[-20.-1]$	0.596	0.400	0.365	-1.157	0.197	0.225	0.402	0.665	0.716	-1.550	0.126	0.161
$[-10.-1]$	0.109	0.796	0.619	-0.330	0.598	0.506	0.171	0.769	0.737	-0.214	0.716	0.760
$[-1.0]$	0.225	0.244	0.344	0.612	0.051*	0.102	0.217	0.433	0.524	0.132	0.537	0.871
[0]	0.145	0.288	0.638	0.351	0.068*	0.070*	-0.128	0.545	0.544	-0.010	0.954	0.592
[0.1]	0.351	0.071*	0.146	0.196	0.453	0.414	-0.333	0.233	0.933	0.397	0.164	0.176
[0.10]	0.327	0.414	0.986	-0.257	0.679	0.981	-0.251	0.693	0.943	-0.428	0.454	0.346
[0.20]	0.095	0.858	0.830	-1.029	0.372	0.583	-0.625	0.452	0.349	-1.405	0.076*	0.077*
$[-20.20]$	0.692	0.457	0.310	-2.186	0.144	0.243	-0.224	0.874	0.619	-2.955	0.040**	0.018**

*1%***. 5%** and 10%**

Table (1.3) summarizes the abnormal stock returns following a rating upgrade, both before and during the crisis, on both the American and European stock markets. Daily abnormal returns across securities are reported in figures 4 and 5. In normal times, we find an immediate significant positive impact of rating upgrades on both markets. This finding is in line with previous studies. Jorion et al (2005) and May (2010) also find that rating upgrades have an immediate, significant positive effect. Surprisingly, during the crisis the CAAR is negative, non-significant and similar in magnitude on both markets after the rating upgrade announcement over a ten-day event window. These crisis period findings are in line with the analysis of a recession by Jorion et al. (2005).

Our results show that investors ignored rating upgrades during the crisis, in some cases even

reacting contrary to the announcement. The most important finding is that during the crisis, rating upgrades did not have a positive impact on stock prices. A crisis appears to reduce upgrade effects to zero, or even make them negative.

5.2 Difference-in-Differences estimation

TABLE 1.4 – Compute the DID estimate of the effect of rating downgrades on American stock market

		Time		
		2005-2006	2007-2009	Difference between periods
Mean CAR[0, 1]	Treatment Group	-0.00343	0.027%	0.3697%
	Control Group	0.00787%	0.463%	0.4548%
	Difference between groups	-0.351%	-0.436%	-0.0850% *DID estimate*

TABLE 1.5 – Compute the DID estimate of the effect of rating downgrades on European stock market

		Time		
		2005-2006	2007-2009	Difference between periods
Mean CAR[0, 1]	Treatment Group	-0.4263%	-1.4085%	-0.9822%
	Control Group	0.4247%	0.4161%	-0.0086%
	Difference between groups	-0.8510%	-1.8246%	-0.9736% *DID estimate*

Tables (1.4) and (1.5) report the DID estimation using the average CAR for each group and each period. The importance of double differencing is perfectly clear when the tables are read by rows. The first rows in tables 4 and 5 indicate that downgrades during the crisis have a negative effect on markets. Tables (1.4) and (1.5) show that the CAR of the control group during the crisis is higher than that of the treatment group. The DID estimate shows that during the crisis, the downgrade effect was much stronger on the European stock market than the American stock market. Table (1.6) confirms the robustness of these findings through a DID regression. The main finding is that the DID estimator, CHANGE*CRISIS, is non-significant on both stock markets. This finding suggests

TABLE 1.6 – Regression estimate of the effect of rating downgrades

	American		European	
Variable	Coefficient	t-Stat	Coefficient	t-Stat
C	0.0000787	0.016133	0.004247	0.472959
CHANGE	-0.003507	-0.508261	-0.008510	-0.670134
CRISIS	0.004548	0.782820	-8.56E-05	-0.008541
CHANGE*CRISIS	-0.000850	-0.103547	-0.009736	-0.687167
Adj R-squared	-0.001032		0.017634	
F-Stat	0.740591		3.124174	
N	756		356	

*1%***. 5%** and 10%**

that a crisis annihilates the significant effect of rating downgrades on the markets. Therefore, the results support the view that investors took no notice of rating downgrades. It seems that CRAs did not play a role as the focal point on the market. Moreover, these findings suggest that the failure of highly-rated firms during the subprime crisis undermines the reliability of ratings, and therefore the CRAs' reputations.

TABLE 1.7 – Compute the DID estimate of the effect of rating upgrades on American stock market

		Time		
		2005-2006	2007-2009	Difference between periods
Mean CAR[0, 1]	Treatment Group	0.3511%	-0.3332%	-0.6843%
	Control Group	0.1006%	-0.2031%	-0.3037%
	Difference between groups	0.2505%	-0.1301%	-0.3806% *DID estimate*

TABLE 1.8 – Compute the DID estimate of the effect of rating upgrades on European stock market

		Time		
		2005-2006	2007-2009	Difference between periods
Mean CAR[0, 1]	Treatment Group	0.1964%	0.3972%	0.2008%
	Control Group	-0.1095%	0.1781%	0.2877%
	Difference between groups	0.3060%	0.2190%	-0.0869% *DID estimate*

Tables (1.7) and (1.8) report the findings regarding rating upgrades. The first rows in table (1.7)

TABLE 1.9 – Regression estimate of the effect of rating upgrades

	American		European	
Variable	Coefficient	t-Stat	Coefficient	t-Stat
C	0.001006	0.392070	-0.001095	-0.339637
CHANGE	0.002505	0.690358	0.003060	0.678512
CRISIS	-0.004338	-1.248069	0.002877	0.676781
CHANGE*CRISIS	-0.002505	-0.509600	-0.000869	-0.145535
Adj R-squared	0.004093		-0.007987	
F-Stat	1.883522		0.474388	
N	646		200	

*1%***. 5%** and 10%**

and (1.8) indicate that upgrade announcements have a negative effect during the crisis. Table (1.7) also shows that the CAR of the control group during the crisis is negative, which implies that the crisis had a negative impact on the control group. Table (1.8) underlines that the CAR of the control group during the crisis is lower than that of the treatment group. The DID estimation shows that during the crisis, upgrade effects are negative on both stock markets. Table (1.9) checks the robustness of these findings through a DID regression. The DID estimator, CHANGE*CRISIS, is non-significant on both stock markets. These findings contrast with the results reported in Joo and Pruitt's (2006) empirical paper on the Korean crisis.

During the subprime crisis investors ignore CRA announcements, implying that our first hypothesis is to be rejected, but not our second hypothesis. This shows that investors adjust their beliefs about the accuracy of CRA ratings. Market participants took little notice of CRA announcements during the crisis, implying that CRA downgrades during the crisis did not adversely affect the situation of some firms. The main finding is that the investors' reaction is linked to the reliability of

the rating, and the reputation of the agency issuing the rating. Our study thus shows that investors' response relates not to regulation or coordination channels, but to the reliability of the rating and the CRA's reputation.

6 Conclusion

In this article we study the impact of the subprime crisis on CRAs using standard event study methodology and a Difference-in-Differences estimation. The empirical study provides support for the idea that the impact of ratings is contingent on the CRAs' reputation. Using standard event study methodology we find significant positive reactions to rating upgrades and significant negative reactions to rating downgrades in normal times. This effect largely disappears during the crisis, although downgrades still have significant negative effects on the European stock market. One general concern with event studies during a crisis is that in such periods investors are exposed to an unusual volume of dramatic news that could indirectly affect stock prices. We therefore conduct a Difference-in-Differences study in order to avoid this endogeneity issue. The DID estimation indicates that rating upgrades and rating downgrades have non-significant effects on both the American and European stock markets. Our findings support the idea that market participants ignored rating changes during the crisis and no longer considered CRAs as robust information providers. This study also reveals that the investors' response is not linked to regulation or coordination channels, but to the reliability of the rating and the CRA's reputation.

7 Appendix

TABLE 1.10: Credit Rating definition [8]

Rating	Definition
AAA	An obligation rated 'AAA' has the highest rating assigned by Standard & Poor's. The obligor's capacity to meet its financial commitment on the obligation is extremely strong.
AA	An obligation rated 'AA' differs from the highest-rated obligations only to a small degree. The obligor's capacity to meet its financial commitment on the obligation is very strong.
A	An obligation rated 'A' is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher-rated categories. However, the obligor's capacity to meet its financial commitment on the obligation is still strong.
BBB	An obligation rated 'BBB' exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitment on the obligation.
BB	An obligation rated 'BB' is less vulnerable to nonpayment than other speculative issues. However, it faces major ongoing uncertainties or exposure to adverse business, financial, or economic conditions which could lead to the obligor's inadequate capacity to meet its financial commitment on the obligation.
B	An obligation rated 'B' is more vulnerable to nonpayment than obligations rated 'BB', but the obligor currently has the capacity to meet its financial commitment on the obligation. Adverse business, financial, or economic conditions will likely impair the obligor's capacity or willingness to meet its financial commitment on the obligation.

[8] Standard&Poor's, (2012), "Standard & Poor's Rating Definitions"

CCC	An obligation rated 'CCC' is currently vulnerable to nonpayment, and is dependent upon favorable business, financial, and economic conditions for the obligor to meet its financial commitment on the obligation. In the event of adverse business, financial, or economic conditions, the obligor is not likely to have the capacity to meet its financial commitment on the obligation.
CC	An obligation rated 'CC' is currently highly vulnerable to nonpayment.
C	A 'C' rating is assigned to obligations that are currently highly vulnerable to nonpayment, obligations that have payment arrearages allowed by the terms of the documents, or obligations of an issuer that is the subject of a bankruptcy petition or similar action which have not experienced a payment default. Among others, the 'C' rating may be assigned to subordinated debt, preferred stock or other obligations on which cash payments have been suspended in accordance with the instrument's terms or when preferred stock is the subject of a distressed exchange offer, whereby some or all of the issue is either repurchased for an amount of cash or replaced by other instruments having a total value that is less than par.
D	An obligation rated 'D' is in payment default. The 'D' rating category is used when payments on an obligation are not made on the date due even if the applicable grace period has not expired, unless Standard & Poor's believes that such payments will be made during such grace period. The 'D' rating also will be used upon the filing of a bankruptcy petition or the taking of similar action if payments on an obligation are jeopardized. An obligation's rating is lowered to 'D' upon completion of a distressed exchange offer, whereby some or all of the issue is either repurchased for an amount of cash or replaced by other instruments having a total value that is less than par.
Plus (+) or minus (–)	The ratings from 'AA' to 'CCC' may be modified by the addition of a plus (+) or minus (-) sign to show relative standing within the major rating categories.

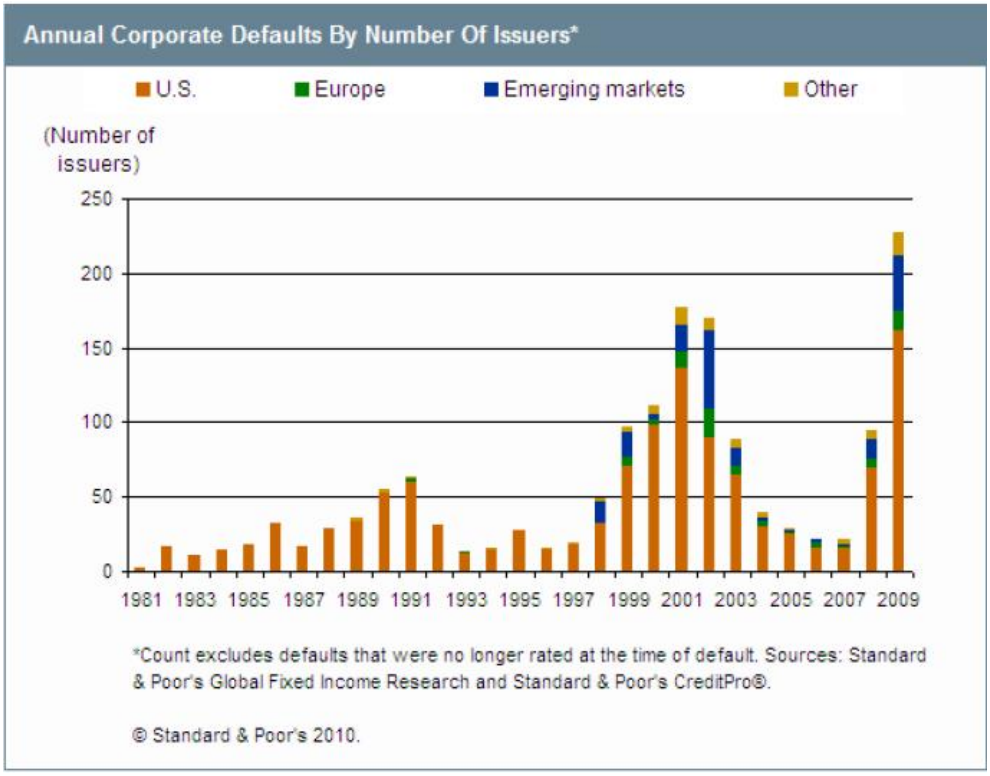

FIGURE 1.1 – Annual corporate default

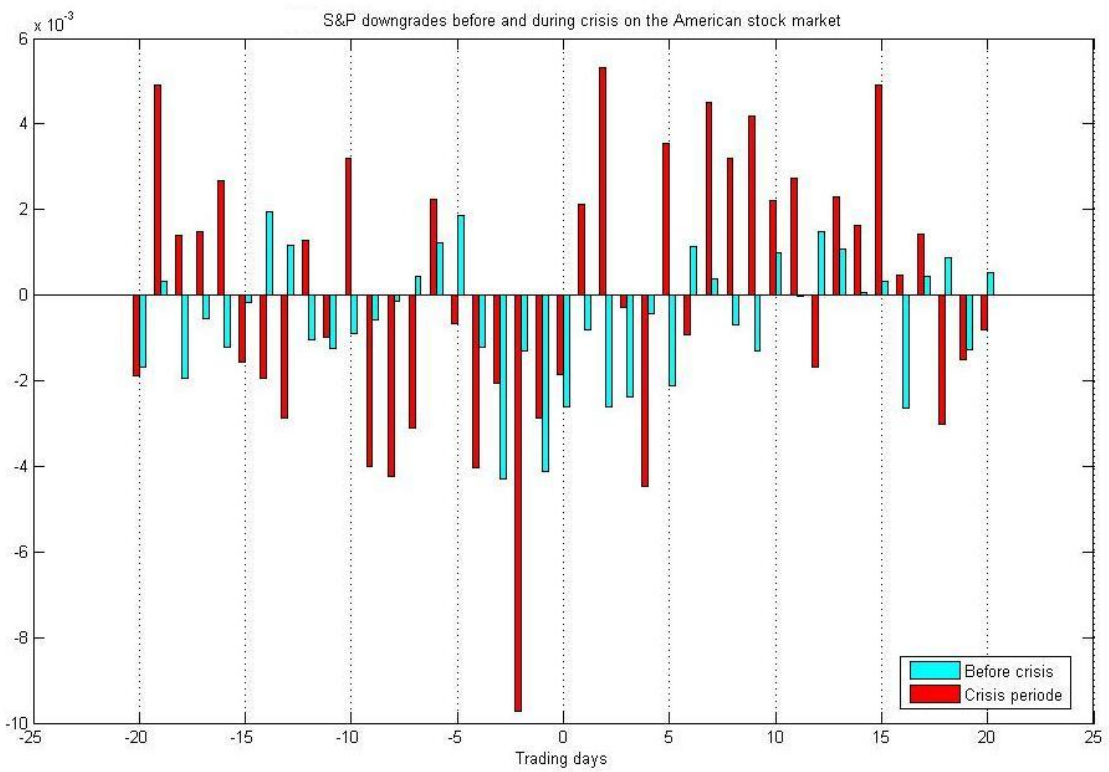

FIGURE 1.2 – Average Abnormal Return S&P downgrades before and during the crisis on the American stock market

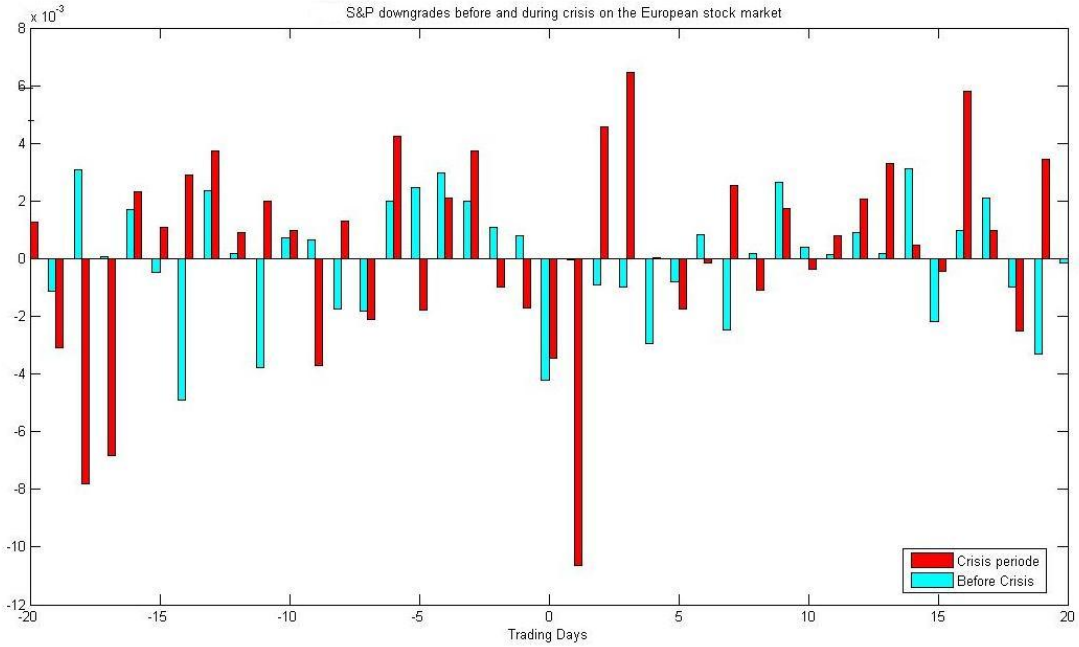

FIGURE 1.3 – Average Abnormal Return S&P downgrades before and during the crisis on the European stock market

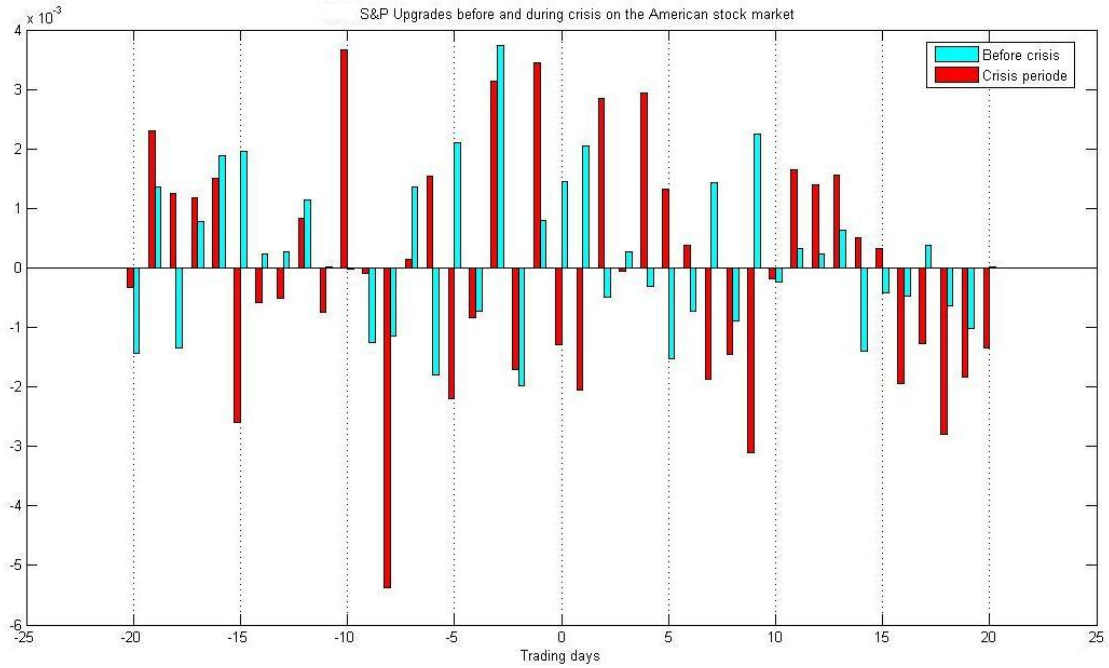

FIGURE 1.4 – Average Abnormal Return S&P upgrades before and during the crisis on the American stock market

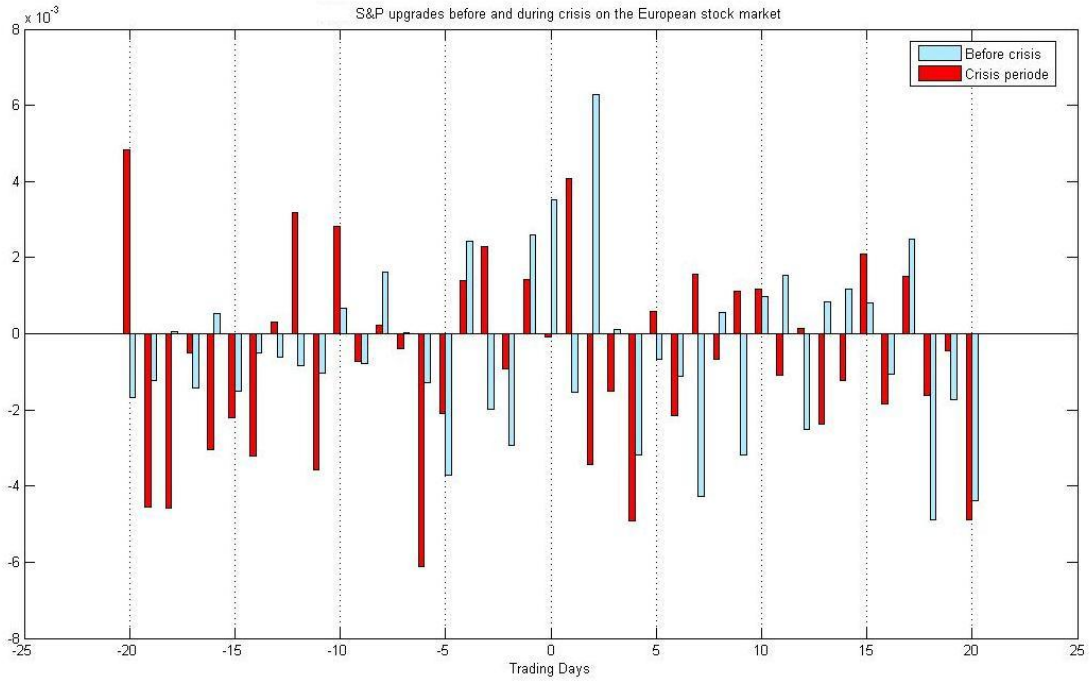

FIGURE 1.5 – Average Abnormal Return S&P upgrades before and during the crisis on the European stock market

Chapitre 2

The Impact of The Enron scandal on the reputation of Corporate Social Responsibility Rating Agencies

1 Introduction

Socially Responsible Investment (SRI) experienced an exponential growth and attracted a lot of investors in the last decade. In the United States of America the total assets under management of SRI portfolios reached $3.744\$$ Trillion in 2012 from $638\$$ Million in 1995.[1] Facing this growing interest of investors and regulation about corporate social responsibility, a new type of information is required on the market to summarize the social performance of the firm. Indeed, SRI applies a set of investment rules to select or exclude assets based on Environmental, Social and Governance

[1] US SIF-The Forum for Sustainable and Responsible Investment's report on Sustainable and Responsible Investing Trends in the US 2012. See figure 1 in appendix. http ://www.ussif.org/files/Publications/12_Trends_Exec_Summary.pdf
Figure1 : The total assets under management of SRI portfolios

(ESG) criteria.

Therefore, a new type of Information Gathering Agencies has emerged. The role of these agencies is to acquire accurate information that summarizes the past and predict the firm's future performance in the field of ethical business. KLD (Peter Kinder, Steve Lydenberg and Amy Domini) Research & Analytics is one of the first social rating agency that appeared in the market by the year 1988. KLD Environmental, Social and Governance (ESG) ratings are widely used in academic works as proxies for the CSR behavior of a firm when studying the effect of CSR on corporate financial performance. A question therefore arises as to whether those CSR ratings are considered as reliable by investors and affect investors' demand. Moreover, KLD's inability to produce an accurate rating regarding Enron's responsible behavior may question the reliability of its ratings. Indeed, KLD ratings considered that Enron was economically viable and did not indicate any corporate governance concern. KLD also disclosed that Enron had a high environmental rating. KLD emphasized that Enron reduced its impact on climate change and used clean energy. In addition, Enron's social rating produced by KLD supports the view that Enron was a company that interacted with its social environment. After the Enron collapse, Robert L. Bradley, Jr.[2] discloses that Jeff Skilling states : "[...], we are a green energy company, but the green stands for money."[3] This statement supports the view of Robert L. Bradley, Jr. that "Enron was trying to practice CSR, so that it could monetize its *green* energy model. This had been Lay's strategy for a decade with natural gas". Moreover, in the aftermath of the accounting fraud of WorldCom and Enron, the Sarbanes Oxley Act requires, in section 406, that companies disclose a written code of ethics adopted by

[2]Robert L. Bradley, Jr. spent 16 years at Enron since 1985, where for the last seven years he was corporate director for public policy analysis and speechwriter for Kenneth L. Lay. Today, he is CEO and founder of the Institute for Energy Research. http ://www.masterresource.org/about/#bradley

[3]http ://www.masterresource.org/2011/12/remembering-green-enron-part-ii-corporate-social-responsibility/#sthash.ANjWh6KZ.dpuf

their CEO. Later in the year 2003, NYSE adopted corporate governance rules requiring that listed companies adopt and disclose a code of business conduct and ethics. Therefore, KLD's incapacity to detect either the accounting fraud or the (in)responsible behavior may question the value of their ratings on the market and the way the socially responsible investors perceived their ratings after the Enron scandal. We therefore aim to study the effect of the Enron Scandal on the perception of KLD rating changes by investors. We first question whether KLD ratings affect investors' perception by studying the effect of KLD rating changes on firms' financial performance. Second, we question the effect of the Enron scandal on investors' perception of KLD rating changes by comparing the effect of KLD rating changes on firms' financial performance before and after the failure of Enron.

We first obtain KLD ratings from KLD STATS. Second we merge the data provided by KLD with the Center for Research in Security Prices database (CRSP), for monthly stock and index return, and Compustat North America, for industry affiliation and corporate financial data. Moreover, the four factors of the Carhart extension of the Fama-French model (the value weighted market proxy, the SMB, HML and MOM factors and the risk free rate) are obtained from Kenneth French's website. KLD's ESG ratings are composed of seven dimensions, each one containing strengths and concerns indicators. We propose to standardize the scores of strengths and weaknesses in each dimension by the corresponding annual numbers of strengths and weaknesses indicators. We add a global score that summarizes the rating in the seven dimensions. Hence, we obtain eight ESG scores defined as follows. First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the

firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

To assess the effect of KLD rating changes in each dimension covered by KLD on investors' perception and the effect of the Enron scandal on investors' perception of these ratings, we perform two types of studies. Firstly, we conduct a study on the effect of KLD rating changes on the long run corporate financial performance in the period 1997-2009. Secondly, we conduct a study on the impact of the failure of Enron on investors' perception of KLD ratings based on the comparison between the effect of KLD rating changes before and after the Enron scandal. For each study we perform three types of analysis. We first form equal-weighted portfolios conditional on the sign[4] of KLD rating changes. We therefore study the performance of equally-weighted portfolios of KLD downgraded stocks and equally-weighted portfolios of KLD upgraded stocks in each dimension covered by KLD. Then, in order to compare the performance of the equally-weighted portfolios of upgraded stocks with the two others, we create a long-short strategy based on these portfolios. We then investigate the performance of equally-weighted portfolios long in KLD upgraded stocks and short in KLD downgraded stocks and equally-weighted portfolios long in KLD upgraded stocks and short in KLD stable stocks for each dimension covered by KLD. Second, we perform a Fama-MacBeth (1973) regression in order to test the direct effect of ratings on a firm's monthly excess return. Finally, we follow Petersen (2009) and Thompson (2011)'s recommendations about panel data regression and perform a pooled OLS regression clustered by time to test the direct effect of

[4] If the firm's rating increases, the sign is positive and we refer to it hereafter as an upgraded stock. If the firm's rating decreases, the sign is negative and we refer to it hereafter as a downgraded stock. If the firm's rating does not change, we refer to it hereafter as a stable stock.

KLD rating changes on a firm's quarterly Book-to-Market ratio.

Regarding portfolios analysis, we begin our analysis by investigating the effect of ratings changes in the period 1997-2010. During this period, we find that neither equally-weighted portfolios of KLD downgraded stocks nor equally-weighted portfolios of KLD upgraded stocks under-perform or out-perform the market. The long-short strategy, however, shows that upgraded stocks underperform by 32 bp downgraded stocks and by 36 bp stable stocks in the ESG global score. Second, we split the data into two subsamples, before and after the Enron scandal. Results show that KLD rating changes affect significantly and strongly investors' perception. We find that the results of the Carhart regression on the equally-weighted portfolios of KLD upgraded stocks show a significant and negative abnormal returns. Moreover, both long-short strategies show that upgraded stocks underperform other stocks in particular in the environmental dimension. The equally-weighted portfolios of upgraded stocks underperform downgraded stocks by 58 basis points in the ESG global score and by 100 bp in the environmental dimension. Similar results are found in the equally-weighted portfolios long in KLD upgraded stocks and short in KLD stable stocks. However, this effect largely disappears after the Enron scandal. We only find that KLD's ratings changes in the diversity dimension have a significant effect on investors' perception. This effect may be explained by the idea that the composition of the workforce does not change very often. Moreover, this finding is in line with the growing literature that links CSR behavior and diversity in the workforce. These findings suggest that KLD ratings no longer affect socially responsible investors' perception after the unexpected failure of Enron. Regarding the excess stock returns study, we do not find significant results on the direct effect of KLD rating changes on firms' monthly excess returns neither over time nor after the Enron collapse. This result is explained by the presence of other factors that may affect firms' long-run returns. Hence, studies that relate both KLD ratings and firms' return do not

report credible results on the relationship between firms' social performance and firms' financial performance. Finally, regarding the Book-to-Market ratio analysis, we find a significant and negative direct effect of KLD scores on the rated firm's book-to-market ratio. This finding is in line with theoretical work suggesting that Corporate Social Responsibility lowers the firm's systematic risk. However, this effect disappeared after the Enron scandal.

Overall, our findings show that in general KLD ratings affect investors' demand. However, if we split the data before and after the Enron scandal, we find that before the Enron scandal KLD ratings affect strongly investors' demand and that after the Enron scandal this effect disappears. These findings suggest that KLD's effect on the market is highly related to her ability to produce precise informations. Moreover, our results are in line with the reputational hypothesis that predicts the loss of reputation of the intermediary of information after unexpected imprecise information. Here, the imprecise social rating of Enron may have reduced investors' perception of KLD's ability to produce reliable predictions on firms' future extra-financial performance.

Most empirical studies use KLD ratings as a measure of the social performance in a firm. These studies, in general, neglect the effect and the role played by the intermediary producer of information on investors' demand. Indeed, KLD ratings are good proxies for the firm's social performance as long as they are considered reliable by investors. A recent survey by Margolis et al. (2009) shows through analyzing 167 studies that the average effect of corporate social responsibility (CSR) behavior on financial performance is positive but small. In addition, they find from the analysis of 26 studies using third-party audit's disclosure that the effect is also small and positive. The heterogeneity test of the survey of Margolis et al. (2009) points that these studies show different outcomes i.e. some studies find a positive effect of CSR on financial performance while others find no effect of CSR on financial performance. Using detailed KLD ratings, Galema et al. (2008) and El Ghoul

et al. (2011) find respectively that the CSR behavior lowers the cost of capital and the book-to-market ratio. These findings suggest that KLD ratings are reliable and affect investors' perception. Our results regarding the effect of KLD in the period 1997-2009 (i.e. if we do not separate the periods before and after the Enron Scandal) are in line with their findings. Our findings support the view that CSR behavior lowers the firm's risk and does not have an explicit and direct effect on the excess return. Moreover, we find that equally-weighted portfolios composed of upgraded firms under-perform equally-weighted portfolios composed of either downgraded firms or stable firms. Moreover, Hong and Kacperczyk (2009) find that sin stocks[5] have a higher expected return than their comparable stocks in non-sinful industries. They explain this higher return by the idea of being neglected by norm-constrained investors facing greater risk due to social norms. Using KLD's classification of firms with controversial business issues, we find that these firms experience a high level of risk. These findings support the view of Hong and Kacperczyk (2009) which is that sin stocks experience higher risk than stocks in other businesses.

Recently, Kruger (2013) studies how investors react to positive and negative CSR events in the short-run window. He uses publicly observable events published by KLD which are may also be disclosed by other providers of information. Kruger (2013) finds that investors respond strongly negatively to negative events and weakly negatively to positive events. Our objective is different since we are interested in the investors' perception of KLD rating changes and not in the investors' perception of CSR events. Indeed, KLD ratings reflect KLD's ability to produce accurate ratings that predict firms' future social performance. We use KLD rating changes which allows to alleviate the endogeneity problem quoted by Kruger (2013) regarding the reverse causality. Our findings

[5] According to Hong and Kacperczyk (2009), are defined as sin stocks those firms belonging to the alcohol, the tobacco or the gaming industry

suggest that the effect of KLD ratings is highly conditioned on KLD's reputation among investors. Moreover, our findings are in line with Kruger's results and suggest that an increase in KLD ratings affect negatively firms' corporate financial performance.

Very few papers investigate the role of social ratings and question the value of their announcements. Recently, Chatterji and Toffel (2009) question the effect of KLD initial ratings on the behavior of rated firms. They find that firms that initially received poor KLD environment ratings improve their environmental performance as a response to KLD ratings more than other firms. Studying the effect of KLD ratings on firms' behavior is however beyond the scope of our study.

Closer to our study, Chatterji et al. (2010) examine the accuracy of KLD environmental ratings in summarizing the past and predicting the future. They compare KLD environmental ratings with available public information on firms' environmental performance for the period 1991-2003. They find that KLD ratings summarize greatly past information but they do not produce accurate predictions. We address the same question on each dimension of KLD ratings. We assume that investors rely on social ratings only if they perceive that they reliably forecast firms' social performance in the future. Our findings are in line with the study Chatterji et al. (2010). Our results suggest that investors update their beliefs concerning the predictive power of KLD ratings after the Enron collapse.

The rest of the chapter is exposed as follows. Section 2 presents our hypotheses. Section 3 and 4 describe our data and empirical strategy. Section 5 reports our results. Section 6 concludes this chapter.

2 Hypotheses

KLD social rating agency adopts a structure of investor-pay-model according to which investors pay the agency a fixed cost in exchange of information about the social performance of the firms studied by KLD. The relationship between investors and their willingness to obtain the specific information is analyzed in the theoretical paper of Merton (1987). Merton develops a model in which investors do not include in their portfolio securities for which they lack information. In the presence of asymmetric information, Merton (1987) assumes that it is costly for information to be transmitted from a firm to an investor. If an investor does not follow a specific firm then any announcement related to this firm will not induce the investor to take position in this firm. Thus, investors need to invest a "set up" cost before they can process detailed information released from time to time about this firm. Following Merton's analysis, socially responsible investors are ready to pay a fee to the CSR rating agency to be aware of the social performance of firms. Heinkel et al. (2001) show that the exclusionary ethical investment strategy leads to firms screened out by ethical investors being held only by non-ethical investors. This lack of risk sharing among non-green investors leads to lower stock prices for polluting firms and raises their cost of capital. Hence, higher CSR level implies lower cost of capital and higher stock price. Moreover, assuming that CSR behavior of a firm is an investment in customer loyalty, Albuquerque et al. (2011) show that the CSR level affects negatively the idiosyncratic risk of the firm.

Therefore, building on the theoretical papers of Merton (1987) and Heinkel et al. (2001), we predict that KLD positive rating changes lower the firm's risk and by consequence the firm's return.

Hypothesis 1 *A positive (negative) change in the KLD rating affects negatively (positively) a firm's expected return.*

Following Vassalou and Xing's (2004) analysis, we choose the Book-to-Market ratio as a proxy for the systematic risk of a firm.

Hypothesis 2 *A positive (negative) change in the KLD rating affects negatively (positively) a firm's Book-to-Market ratio.*

Regarding the effect of the Enron collapse on KLD ratings' perception, we rely two approaches. First, Boot et al. (2006) assume that an issuer can endogenously affect his default risk because he can choose among projects with different risks. They show that the credit rating agencies' role is to provide a coordination mechanism for both the issuer and investors. Thus, even if credit rating agencies have no private information about default risk, ratings affect the coordination between the issuers' choice of default risk and investors' demand. Hence, if the CRA downgrades a firm's rating then it essentially signals that the firm made the choice of a high-risk project or that the firm does not exert sufficient recovery effort. Following Boot et al. (2006)'s analysis, we can adopt the idea that KLD ratings may serve as a coordinating mechanism concerning the social performance of a firm. Indeed, KLD's main work consists in announcing a follow up for each firm in the database. Thus, each firm that has received an initial social rating is aware that this rating will be followed up next years. Hence, investors react only to a change in the rating because it reflects a change in the social criteria of the firm. Hence, KLD ratings announcement can serve as a coordinating mechanism due to the assumption that firms can choose endogenously among projects and strategies with different social criteria. Consequently, any collapse for accounting fraud, environment disaster or employment scandal not detected by the KLD agency are not viewed as the agency's fault but as

the firm's fault. Therefore, investors keep purchasing KLD ratings and consider the agency as a reliable information provider. This theory predicts that investors' belief about KLD ratings does not change after an accounting fraud, an environment disaster or an employment scandal. We can therefore formulate the following hypothesis.

Hypothesis 3 *After the Enron scandal, a positive (negative) change in the KLD rating affects negatively (positively) a firm's expected return.*

Hypothesis 4 *After the Enron scandal, a positive (negative) change in the KLD rating affects negatively (positively) a firm's Book-to-Market ratio.*

However, there may be another way to interpret investors' perception of rating changes. Indeed, a different branch of literature shows that investors' perception of the intermediary's disclosure is conditioned by his reputation. The reputation of the intermediary provider of information is the belief of investors in the intermediary's ability to produce truthful and precise informations. Producing precise information suggests that the intermediary has the technology and the privilege to produce private and precise information that summarizes the past and predicts the future of the firm's social performance.

A large theoretical literature on the role of the intermediary's reputation suggests that investors update their beliefs on the intermediary's reputation after a poor performance (Benabou and Laroque (1992) and Mathis et al. (2009) and Bolton et al. (2012)). Following this literature, the incapacity of the intermediary of information to produce accurate information is either interpreted as an evidence of the intermediary's opportunistic behavior or that the intermediary does not have the technology to assess firms and produce precise information. Besides, unexpected failure of a highly rated firm may induce a higher loss in the reputation of the intermediary provider of information.

Moreover, Dranove and Jin (2010) state that isolating the intermediary from firms is a solution to the incentive problem of producers of information to truthfully produce and reveal information. Adopting an investor-pay model suggests that KLD's incentives are aligned with those of investors. Therefore, the Enron scandal may only signal that KLD does not have the adequate technology to assess a firm's future social performance.

Following these theories, we hypothesize that the Enron scandal revealed that KLD ratings are bad future predictors and that after the Enron scandal, investors react less or even ignore KLD rating changes.

Hypothesis 5 *After the Enron scandal, a positive (negative) change in the KLD rating does not affect a firm's expected return.*

Hypothesis 6 *After the Enron scandal, a positive (negative) change in the KLD rating does not affect a firm's Book-to-Market ratio.*

3 Database

We first obtain KLD ratings from KLD STATS. We retain only KLD ratings before 2010 due to the acquisition of KLD by MSCI.Second we merge the data provided by KLD with the Center for Research in Security Prices (CRSP) database, for monthly stock and index returns, and Compustat North America, for corporate financial data of non-financial firms[6]. Moreover, the four factors of the Carhart model extension of the Fama-French model (namely, the market return, SMB , HML, MOM factors and the risk free rate) are obtained from Kenneth French's website. The excess return

[6]Financial firms with Standard Industry Classification Code, SIC, between 6000 and 6999 are deleted. Moreover, we delete firms with SIC superior to 9000.

on the market $(Rm - Rf)$ is calculated as the value-weighted return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) minus the one-month Treasury bill rate. SMB is the monthly return of a portfolio long Small stocks and short Big stocks, HML is the return of a portfolio long high book-to-market stocks and short low book-to-market stocks and MOM is the monthly return on a portfolio long on past one-year winners and short on past one-year losers.

KLD publishes a wide range of CSR-related items compiled from various sources. During the 1991-2000 period, coverage consisted of the S&P 500 and the Domini Social Index. Since then, KLD has sequentially added the Russell 1000 Index in 2001, the Large Cap Social Index in 2002, and both the Russell 2000 Index and the Broad Market Social Index in 2003. KLD organizes the various CSR-related items into two major categories : a set of Environmental, Social and Governance ratings (ESG ratings) and controversial business issues (army, alcohol, tobacco, gamble). The set ESG ratings is composed of the following seven dimensions : community, corporate governance, diversity, employee relations, environment, human rights, and product characteristics. For each dimension in the ESG set, KLD assigns a binary code (0 or 1) rating to a set of concerns and strengths indicators. The complete list of detailed strengths and concerns indicators is detailed in the appendix. The aggregation method mostly used in empirical papers is to add the sum of strengths and to subtract the sum of concerns. However, this score suffers from a lack of comparability across years due to the variation induced by KLD (The total number of indicators has varied from 54 in 1991 to 72 in 2006 and then 50 in 2012). Hence for comparability issues, we propose to standardize the scores of strengths and weaknesses in each dimension by the corresponding annual numbers of strengths and weaknesses indicators :

$$ESG_t^d = \frac{\sum_{w=1}^{h_t^d} Str_w^d}{h} - \frac{\sum_{r=1}^{f_t^d} Con_r^d}{f} \tag{2.1}$$

Where ESG_t^d represents a given ESG dimension d among the seven dimensions discussed above at year t. Str_w^d is a strengths indicator equal to 1 or 0 at a strength indicator w. Con_r^d is a concerns indicator equal to 1 or 0 at a concern indicator r. h represents the total number of strengths indicators. f represents the total number of concerns indicators. Thus, we calculate the change in the ESG ratings as follows :

$$\Delta ESG_t^d = ESG_t^d - ESG_{t-1}^d \tag{2.2}$$

Where Δ is the difference operator. Moreover, in order to summarize the information in one rating we calculate the sum of all ESG dimensions noted :

$$ESG_t = \sum_{d=1}^{7} ESG_t^d \tag{2.3}$$

and the change in the ESG rating will be as follows :

$$\Delta ESG_t = ESG_t - ESG_{t-1} \tag{2.4}$$

Therefore, we obtain eight ESG scores defined as follows : the ESG global score, ESG, the community score, COM, the corporate governance score, $CGOV$, the diversity score, DIV, the employee relations score, EMP, the environment score, ENV, the human rights score, $HUMR$ and the product score, $PROD$.

The study requires three types of analysis to explore the effect of these KLD scores. First, we use the change in each score to form portfolios conditional on the sense of the change of each ESG score (upgrade or downgrade). These portfolios are formed at the beginning of year t based on the sign of the change in each rating dimension published by KLD at the end of year $(t-1)$ and hold

unchanged until the end of year t. Therefore, we obtain a total of eight equally-weighted portfolios of KLD downgraded stocks, eight equally-weighted portfolios of KLD upgraded stocks and eight equally-weighted portfolios of KLD stable stocks. Then, in order to compare the performance of the equally-weighted portfolios of upgraded stocks with the two others, we create a long-short strategy based on these portfolios. We get eight equally-weighted portfolios long in KLD upgraded stocks and short in KLD downgraded stocks and eight equally-weighted portfolios long in KLD upgraded stocks and short in KLD stable stocks. Second we analyze the direct effect of each ESG score on a firm's monthly excess return. Finally, we analyze the direct effect of each ESG score on a firm's quarterly Book-to-Market ratio. We present summary statistics of each study respectively in tables (2.1), (2.2) and (2.3).

TABLE 2.1: Summary statistics of equally-weighted SRI portfolios

Summary statistics of equally-weighted SRI portfolios formed at the first month of each year conditional on the sign of the change in the ESG score.

The excess return on the market $(Rm - Rf)$ is calculated as the value-weighted return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) minus the one-month Treasury bill rate. SMB is the monthly return of a portfolio long Small stocks and short Big stocks, HML is the return of a portfolio long high book-to-market stocks and short low book-to-market stocks and MOM is the monthly return on a portfolio long on past one-year winners and short on past one-year losers.

First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

	MIN	MAX	MEAN	STD
Date	1997M01	2009M12		
$(Rm - Rf)$	-0.1723	0.1019	0.0029	0.0491
SMB	-0.1639	0.2202	0.0029	0.0398
HML	-0.1268	0.1387	0.0035	0.0380
MOM	-0.3472	0.1839	0.0044	0.0636

Panel A : *Returns of equally-weighted Portfolios of KLD Downgraded stocks*

ESG	-0.2354	0.2543	0.0057	0.0608
COM	-0.1937	0.2267	0.0034	0.0569
CGOV	-0.2360	0.2547	0.0073	0.0605
DIV	-0.1878	0.2832	0.0047	0.0604
EMP	-0.2506	0.4047	0.0064	0.0708
ENV	-0.2295	0.2882	0.0061	0.0634
HUMR	-0.2701	0.2038	0.0018	0.0665
PROD	-0.2188	0.2482	0.0026	0.0596
Panel B : *Returns of equally-weighted Portfolios of KLD Upgraded stocks*				
ESG	-0.2206	0.2292	0.0025	0.0570
CGOV	-0.2317	0.1328	0.0023	0.0551
COM	-0.2745	0.2167	-0.0005	0.0604
DIV	-0.2033	0.2475	0.0018	0.0563
EMP	-0.2118	0.2763	0.0041	0.0613
ENV	-0.2166	0.2428	0.0023	0.0623
HUMR	-0.1935	0.3196	0.0089	0.0789
PROD	-0.2158	0.2118	0.0007	0.0658
Panel C : *Returns of equally-weighted Portfolio long in KLD Upgraded stocks and short in KLD Downgraded stocks*				
ESG	-0.1078	0.0295	-0.0032	0.0164
CGOV	-0.1496	0.0891	-0.0050	0.0348
COM	-0.1260	0.1569	-0.0039	0.0356
DIV	-0.0863	0.0696	-0.0029	0.0231
EMP	-0.3416	0.0639	-0.0022	0.0377
ENV	-0.2572	0.0945	-0.0038	0.0343
HUMR	-0.2187	0.2811	0.0072	0.0726
PROD	-0.1281	0.1285	-0.0019	0.0362
Panel D : *Returns of equally-weighted Portfolio long in KLD Upgraded stocks and short in KLD stable stocks*				
ESG	-0.1865	0.0485	-0.0044	0.0221
CGOV	-0.1417	0.0765	-0.0031	0.0311
COM	-0.1180	0.1115	-0.0064	0.0330
DIV	-0.1348	0.0416	-0.0046	0.0198
EMP	-0.1318	0.0698	-0.0014	0.0226
ENV	-0.1339	0.1407	-0.0035	0.0322
HUMR	-0.1639	0.2126	0.0032	0.0595
PROD	-0.1179	0.1076	-0.0053	0.0316

TABLE 2.2: Summary statistics of ariables used in the monthly excess return analysis

Summary statistics of variables used in the monthly excess return analysis. Monthly returns are obtained from CRSP and Yearly accounting data are obtained from Compustat North America. The data contains 1541 rated firms and cover the period from 1997 to 2010.

$(R_i - Rf)$ is the return of a firm i minus the one-month Treasury bill rate, $Beta$ is defined following Black (1972) as the market sensitivity of an asset and is equal to the slope of the regression line relating the return of a firm R_i and the return of the market R_m calculated on a rolling window of the previous 36 months, BM is the Book-to-Market ratio of the rated firm at the end of the previous year. $Log(TA)$ is equal to the logarithm of the total asset of the rated firm at the end of the previous year. $Log(age)$ is the logarithm of the age of the rated firm, $Sinstock$ is a dummy variable equal to 1 if the firm is defined as a sin stocks (alcohol or tobacco or gaming industry) and 0 otherwise.

First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

Variables	MEAN	Standard Deviation
$(R_i - Rf)$	0.0094	0.4000
$Beta$	1.2321	2.3730
BM	0.5448	0.6553
$log(TA)$	7.4867	1.5830
$Log(age)$	2.9000	0.7697
SinStock	0.1259	0.3317
ESG	-0.1767	0.4273
COM	0.0030	0.0981
CGOV	-0.0586	0.1474
DIV	0.0048	0.2022
EMP	-0.0364	0.1507
ENV	-0.0172	0.1239
HUMR	-0.0207	0.0792
PROD	-0.0514	0.1642

TABLE 2.3: Summary statistics of variables used in the Book-to-Market analysis

Summary statistics of variables used in the Book-to-Market analysis. Quarterly accounting data are obtained from Compustat North America. The data cover the period from 1997 to 2010.
$Log(B/M)$ is the logarithm of the book-to-market ratio, $Leverage$ represents the debt-to-equity ratio, $size$ is the logarithm of the market capitalization. ROE is the return on equity.
First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

Variables	MEAN	Standard Deviation
Log(BM)	-0.8206	0.7952
size	7.5561	1.5908
ROE	-0.0124	0.6005
Leverage	0.8218	30.9050
ESG	-0.1837	0.4149
COM	0.0010	0.0955
CGOV	-0.0542	0.1467
DIV	-0.0017	0.2003
EMP	-0.0381	0.1483
ENV	-0.0210	0.1206
HUMR	-0.0199	0.0780
PROD	-0.0498	0.1582

4 Empirical Study

To assess the effect of KLD ratings on investors' perception and the effect of the Enron scandal on the perception of these scores, we perform two types of studies. First, we conduct a study on the effect of KLD ratings in the period 1997-2010. Second, we conduct a study that compares the effect of KLD ratings before and after the Enron scandal. For each study we perform the following

analysis.

We first use the change in each score to form equal-weighted portfolios conditional on the sign of the change of each ESG score (upgrade or downgrade). Second, we test the direct effect of each score on a firm's monthly excess return. Finally, we follow Petersen (2009) and Thompson (2011)'s recommendations about panel data regression. We perform a pooled OLS regression clustered by time to test the direct effect of each ESG score on a firm's quarterly Book-to-Market ratio. All results of this section are discussed in section 5.

4.1 Impact of KLD Rating changes Over Time

SRI portfolios Analysis

Assuming that socially responsible investors update their portfolios at each time KLD discloses rating changes, we study the performance of equally-weighted portfolios formed of stocks that experienced the same sign of rating changes i.e. upgrade, downgrade or stable. We employ a number of different ways to assess the performance of these equally-weighted portfolios. First, we analyze the excess return of the equally-weighted portfolios of upgraded stocks and downgraded stocks. Second, we analyze a long-short strategy which compares the return of upgraded stocks first to downgraded stocks and second to stable stocks. We analyze the return of an equally-weighted portfolio long in upgraded stocks and short in downgraded stocks. Then, we analyze the return of an equally-weighted portfolio long in upgraded stocks and short in stable stocks.

The idea behind the study of SRI portfolios is to focus on the use of the Jensen's alpha to identify abnormal performance in assets. Such an abnormal performance is detected if the intercept of the Carhart model, usually called Carhart's alpha, is significantly different from zero. Hence, a total of

24 equally-weighted portfolios are formed for the total score, (ESG), and the seven dimensions, (COM, $CGOV$, DIV, EMP, ENV, $HUMR$, $PROD$), based on whether the score experiences an increase, a decrease or no change by KLD.

The excess return of each equally-weighted portfolio is assessed using the Fama-French (1993) three-factor model expanded with the Carhart (1997) momentum factor. Thus, the first model is the following :

$$R_{d,t} - Rf_t = \alpha + \beta_1(Rm_t - Rf_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{i,t} \tag{2.5}$$

where $R_{d,t}$ is the return of a portfolio d in the calendar month t. Summary statistics are in panels A and B of table (2.1).

Second, we examine a long-short strategy (long in the upgraded portfolios and short in the downgraded portfolios) in order to compare the performance of upgraded stocks and the performance of downgraded stocks. Hence the second model is the following :

$$UpR_{d,t} - DownR_{d,t} = \alpha + \beta_1(Rm_t - Rf_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{i,t} \tag{2.6}$$

where $UpR_{d,t}$ is the return of a portfolio d composed of upgraded stocks in the calendar month t and $DownR_{d,t}$ is the return of a portfolio d composed of downgraded stocks in the calendar month t. Hence, $(UpR_{d,t} - DownR_{d,t})$ represents an equally-weighted portfolio long upgraded stocks and short downgraded stocks. Summary statistics are in panel C of table (2.1).

Finally, we examine the difference in performance between upgraded stocks and stable stocks using a long-short strategy (long in the upgraded portfolios and short in the stable portfolios)

$$UpR_{d,t} - StabR_{d,t} = \alpha + \beta_1(Rm_t - Rf_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{i,t} \quad (2.7)$$

where $UpR_{d,t}$ is the return of a portfolio d composed of upgraded stocks in the calendar month t and $StabR_{d,t}$ is the return of a portfolio d composed of stable stocks in the calendar month t. Hence, $(UpR_{d,t} - StabR_{d,t})$ represents an equally-weighted portfolio long upgraded stocks and short stable stocks. Summary statistics are in panel D of table (2.1).

Excess stock returns

In this analysis, we investigate the direct effect of KLD rating changes on firms' excess return. We propose to deal with reverse causality between financial performance and social performance by using the KLD rating changes in order to avoid past correlation between KLD ratings and firms' financial performance. We consider the following model :

$$\begin{aligned} R_{i,t} - Rf_t = \quad & a_0 + a_1 Beta_{i,t} + a_2 BM_{i,t-1} + a_3 Log(TA)_{i,t-1} + a_4 Log(age)_{i,t} \\ & + a_5 \Delta ESG^d_{i,t-1} + \mu_{i,t} \end{aligned} \quad (2.8)$$

where $R_{i,t}$ is the return of a firm i in the calendar month t, $Beta_{i,t}$ is defined following Black (1972) as the market sensitivity of asset i and is equal to the slope of the regression line relating R_i and R_m calculated on a rolling window of the previous 36 months, $BM_{i,t-1}$ is the Book-to-Market ratio of a firm i at the end of the previous year, $Log(TA)_{i,t-1}$ is equal to the logarithm of the total asset of a firm i at the end of the previous year, $Log(age)_{i,t}$ is the logarithm of the age of a firm i measured

at the month t. $ESG^d_{i,t-1}$ contains the KLD scores of a dimension d of stock i at the end of the year $(t-1)$. Summary statistics are in table (2.2). Thus for the twelve observations in a year, the dependent variable (equity returns) changes each month, but among the independent variables only the $Beta_{i,t}$ changes each month while the others (i.e BM, $Log(TA)$) do not. The equation (2.8) is estimated using the Fama-MacBeth (1973) regression adjusted with Newey-West t-statistic.

Book-To-Market Regression

In this part, we investigate the impact of KLD rating changes on the value of the firm's systematic risk by using the firm's book-to-market ratio. We regress a firm's book-to-market ratio on the previous KLD rating changes and a set of control variables. The KLD scores are regressed individually, which means that we repeat the book-to-market regressions eight times. The estimated regression is the following :

$$\begin{aligned} Log(B/M)_{i,t} = \quad & b_0 + b_1 Leverage_{i,t} + b_2 size_{i,t} + b_3 ROE_{i,t} \\ & + b_4 Sinstock_i + b_6 \Delta ESG^d_{i,t-1} + \eta_{i,t} \end{aligned} \tag{2.9}$$

where $Log(B/M)_{i,t}$ is the logarithm of the book-to-market ratio of stock i at the quarter t, $Leverage_{i,t}$ represents the debt-to-equity ratio of a firm i at a quarter t, $ESG^d_{i,t-1}$ contains the KLD scores of a dimension d of stock i at the end of the year $(t-1)$, $size_{i,t}$ is the logarithm of the market capitalization of the stock i at the quarter t, $ROE_{i,t}$ is the return on equity of firm i in quarter t, $Sinstock_i$ is a dummy variable equal to 1 if the firm is defined as a sin stocks (alcohol or tobacco or gaming industry) and 0 otherwise. Summary statistics are in table (2.3).

4.2 The Impact of the Enron Scandal on Investors' perception of KLD rating changes

In this part of the empirical study we assess the effect of the Enron Scandal on the perception of KLD rating changes. We perform two types fo analyses. In a study, first, we reproduce the SRI portfolios before and after the Enron scandal. We split the database presented in table (2.1) into two subsamples before and after the Enron collapse. We then reproduce the same analyses presented in the previous subsection for each subsample.

Second, we present pooled cross-sections with clustered standard errors by time used to assess the direct effect of KLD rating changes on the excess return and on the book-to-market ratio of rated firms before and after the Enron scandal.

The excess stock returns regression is therefore :

$$\begin{aligned} R_{i,t} - Rf_t = \; & \gamma_0 + \gamma_1 Beta_{i,t} + \gamma_2 BM_{i,t-1} + \gamma_3 Log(TA)_{i,t-1} + \gamma_4 Log(age)_{i,t} \\ & + \gamma_5 Times + \gamma_6 Sinstock_i \\ & + \gamma_7 \Delta ESG^d_{i,t-1} + \gamma_8 (\Delta ESG^d_{i,t-1} * Times) + \nu_{i,t} \end{aligned} \tag{2.10}$$

where $Times$ is a dummy variable equal to 1 after the collapse of Enron, which means that this variable takes 0 before 2002 and 1 after 2002. Hence, $(\Delta ESG^d_{i,t-1} * Times)$ represents the perception of KLD scores after the Enron Scandal.

Similarly the Book-to-Market regression is :

$$\begin{aligned} Log(B/M)_{i,t} = \quad & \lambda_0 + \lambda_1 size_{i,t} + \lambda_2 ROE_{i,t} + \lambda_3 Leverage_{i,t} \\ & + \lambda_4 Times + \lambda_5 Sinstock_i \\ & + \lambda_6 \Delta ESG^d_{i,t-1} + \lambda_7 (\Delta ESG^d_{i,t-1} * Times) + \xi_{i,t} \end{aligned} \tag{2.11}$$

5 Results

5.1 Impact of KLD rating changes over time

SRI portfolios Analysis

In table (2.4), we present the results of the Carhart regression on the equally-weighted portfolios. In panels A and B of table (2.4), we present respectively the results of the Carhart regression on the equally-weighted portfolios of KLD downgraded stocks and the Carhart regression on the equally-weighted portfolios of KLD upgraded stocks. From these panels, we see that none of our portfolios shows significant out-performance or under-performance. Thus, stocks that experienced a rating change do not perform better or worse than the market (the value-weight return on all NYSE, AMEX and NASDAQ stocks calculated by CRSP database), with the exception of the community upgraded portfolio which shows a significant under-performance at the level of 10%.

In panels C and D of table (2.4), we present the results of the Carhart regression of the long-short strategy. Panel C shows the results of the Carhart regression on the equally-weighted portfolio long in KLD Upgraded stocks and short in KLD Downgraded stocks. The long-short strategy constructed conditional on the sign of the ESG score shows an alpha of -32 basis points significant at the

level of 5%. Panel D shows the results of the Carhart regression on the equally-weighted portfolio long in KLD Upgraded stocks and short in KLD stable stocks. The long-short strategy constructed conditional on the sign of the scores, ESG, COM and Div shows respectively an alpha of (-36) basis points, (-64) basis points and (-40) basis points significant at the level of 5%. In both panels, we see a negative and significant alpha for the global ESG score. This finding suggests that the equal-weighted portfolio of upgraded stocks under-perform both the equal-weighted portfolio of downgraded stocks and the equal-weighted portfolio of stable stocks. Hence an increase in the total ESG score induces a negative abnormal return of the upgraded firm compared to other rated firms.

TABLE 2.4: Results of the Carhart regression

Carhart regression. January 1997-December 2009. Method :Ordinary Least square.

In panels A and B, we present respectively the results of the Carhart regression on the equally-weighted portfolios of KLD downgraded stocks and the Carhart regression on the equally-weighted portfolios of KLD upgraded stocks. In panels C and D of table (2.4), we present the results of the Carhart regression of the long-short strategy. Panel C shows the results of the Carhart regression on the equally-weighted portfolio long in KLD Upgraded stocks and short in KLD Downgraded stocks. Panel D shows the results of the Carhart regression on the equally-weighted portfolio long in KLD Upgraded stocks and short in KLD stable stocks.

The excess return on the market $(Rm-Rf)$ is calculated as the value-weighted return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) minus the one-month Treasury bill rate. SMB is the monthly return of a portfolio long Small stocks and short Big stocks, HML is the return of a portfolio long high book-to-market stocks and short low book-to-market stocks and MOM is the monthly return on a portfolio long on past one-year winners and short on past one-year losers.

First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

	Alpha	$(Rm - Rf)$	SMB	HML	MOM	R^2
Panel A : *equally-weighted Portfolios of KLD Downgraded stocks*						
ESG	0.0016	1.0285 ***	0.1737 ***	0.4616 ***	-0.2349 ***	0.8825
	(0.94)	(25.88)	(3.72)	(9.06)	(-7.95)	
COM	-0.0003	0.9332 ***	0.0204	0.5236 ***	-0.2057 ***	0.8133
	(-0.13)	(19.90)	(0.37)	(8.71)	(-5.90)	
CGOV	0.0026	1.0222 ***	0.2715 ***	0.5168 ***	-0.2047 ***	0.8765
	(1.49)	(25.19)	(5.69)	(9.93)	(-6.78)	
DIV	0.0014	0.9864 ***	0.0932 *	0.3801 ***	-0.2459 ***	0.8291
	(0.66)	(20.73)	(1.67)	(6.23)	(-6.95)	
EMP	0.0033	1.0783 ***	0.1389 *	0.2481 ***	-0.2928 ***	0.7518
	(1.12)	(16.03)	(1.76)	(2.88)	(-5.85)	
ENV	0.0015	1.0009 ***	0.0901	0.6750 ***	-0.2273 ***	0.7882
	(0.64)	(17.97)	(1.38)	(9.45)	(-5.49)	
HUMR	-0.0030	0.8931 ***	0.2161 **	0.5612 ***	-0.0849	0.4913
	(-0.78)	(9.87)	(2.03)	(4.84)	(-1.26)	
PROD	-0.0014	0.9501 ***	0.1686 ***	0.4774 ***	-0.2187 ***	0.7905
	(-0.61)	(18.25)	(2.76)	(7.15)	(-5.65)	
Panel B : *equally-weighted Portfolios of KLD Upgraded stocks*						
ESG	-0.0016	0.9723 ***	0.2131 ***	0.4345 ***	-0.2047 ***	0.8890

	(-0.99)	(26.84)	(5.01)	(9.35)	(-7.60)	
CGOV	-0.0014	0.8546 ***	0.2509 ***	0.3140 ***	-0.1379 ***	0.7120
	(-0.57)	(15.16)	(3.79)	(4.34)	(-3.29)	
COM	-0.0048 *	1.0283 ***	0.0084	0.4914 ***	-0.0849 *	0.7161
	(-1.80)	(16.76)	(0.12)	(6.25)	(-1.86)	
DIV	-0.0021	0.9487 ***	0.1951 ***	0.4114 ***	-0.1990 ***	0.8627
	(-1.20)	(23.85)	(4.17)	(8.07)	(-6.73)	
EMP	0.0004	0.9673 ***	0.2008 ***	0.4415 ***	-0.2761 ***	0.8393
	(0.20)	(20.64)	(3.65)	(7.35)	(-7.92)	
ENV	-0.0023	1.0302 ***	0.0690	0.5789 ***	-0.1480 ***	0.7489
	(-0.89)	(17.31)	(0.99)	(7.59)	(-3.34)	
HUMR	0.0058	0.9632 ***	-0.2171	0.4909 ***	-0.1789 **	0.4276
	(1.18)	(8.46)	(-1.62)	(3.36)	(-2.11)	
PROD	-0.0027	1.0737 ***	-0.0493	0.3957 ***	-0.2236 ***	0.7633
	(-1.00)	(17.59)	(-0.69)	(5.05)	(-4.92)	
Panel C : *equally-weighted Portfolio long KLD Upgraded stocks and short KLD Downgraded stocks*						
ESG	-0.0032 **	-0.0562 *	0.0394	-0.0271	0.0302	0.0632
	(-2.41)	(-1.85)	(1.10)	(-0.70)	(1.34)	
CGOV	-0.0040	-0.1676 ***	-0.0207	-0.2029 **	0.0668	0.1167
	(-1.49)	(-2.69)	(-0.28)	(-2.54)	(1.44)	
COM	-0.0045	0.0951	-0.0120	-0.0322	0.1208 **	0.0499
	(-1.58)	(1.44)	(-0.15)	(-0.38)	(2.45)	
DIV	-0.0034 *	-0.0377	0.1019 **	0.0313	0.0470	0.0538
	(-1.83)	(-0.88)	(2.02)	(0.57)	(1.47)	
EMP	-0.0029	-0.1110	0.0619	0.1934 **	0.0167	0.0671
	(-0.95)	(-1.60)	(0.76)	(2.17)	(0.32)	
ENV	-0.0038	0.0294	-0.0211	-0.0960	0.0793 *	0.0360
	(-1.38)	(0.46)	(-0.28)	(-1.17)	(1.66)	
HUMR	0.0089	0.0701	-0.4332 ***	-0.0703	-0.0940	0.0607
	(1.52)	(0.52)	(-2.75)	(-0.41)	(-0.94)	
PROD	-0.0013	0.1236 *	-0.2179 ***	-0.0817	-0.0049	0.0677
	(-0.44)	(1.85)	(-2.78)	(-0.96)	(-0.10)	
Panel D : *equally-weighted Portfolio long KLD Upgraded stocks and short KLD stable stocks*						
ESG	-0.0036 **	0.0116	-0.1328 ***	-0.0842	-0.0119	0.0533
	(-2.05)	(0.28)	(-2.76)	(-1.60)	(-0.39)	
CGOV	-0.0025	-0.1342 **	0.0140	-0.1657 **	0.0703 *	0.1139
	(-1.01)	(-2.41)	(0.21)	(-2.32)	(1.70)	
COM	-0.0064 **	0.0310	-0.2523 ***	0.0340	0.1265 ***	0.1341
	(-2.53)	(0.53)	(-3.66)	(0.45)	(2.90)	
DIV	-0.0040 **	-0.0537	-0.0695	-0.0802 *	0.0038	0.0433
	(-2.47)	(-1.46)	(-1.60)	(-1.70)	(0.14)	
EMP	-0.0005	-0.0187	-0.0596	-0.0712	-0.0984 ***	0.0794
	(-0.29)	(-0.45)	(-1.22)	(-1.34)	(-3.19)	
ENV	-0.0038	0.0402	-0.2028 ***	0.1400 *	0.0652	0.1115
	(-1.52)	(0.70)	(-2.98)	(1.89)	(1.51)	
HUMR	0.0044	-0.0339	-0.4528 ***	0.0263	0.0305	0.1005
	(0.95)	(-0.31)	(-3.58)	(0.19)	(0.38)	
PROD	-0.0043 *	0.0780	-0.3016 ***	-0.0766	-0.0197	0.1319
	(-1.75)	(1.39)	(-4.57)	(-1.06)	(-0.47)	

*1%***. 5%** and 10%**

Excess Return Regression

In table (2.5), we present the results of the Fama-MacBeth regression of the excess return of rated firms. We notice that none of the eight ESG dimensions is significant. Hence, we find that ESG scores do not affect the excess return of the rated firm.

These findings are in line with Galema et al. (2008) findings concerning the direct effect of CSR ratings on excess returns of rated firms.

TABLE 2.5: Results of the Fama-MacBeth (1973) regression

Fama-MacBeth (1973) regression adjusted with Newey-West t-statistic. Cross-section regression of excess stock returns, January 1997-December 2010. Total panel (unbalanced) observations :113671
First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

Variables	MODEL1	MODEL2	MODEL3	MODEL4	MODEL5	MODEL6	MODEL7	MODEL8
$Intercept$	0.0007	0.0009	0.0010	0.0005	0.0008	0.0007	0.0005	0.0007
	(0.11)	(0.14)	(0.15)	(0.07)	(0.12)	(0.11)	(0.08)	(0.11)
Beta	0.0086	0.0085	0.0083	0.0084	0.0084	0.0085	0.0084	0.0084
	(1.58)	(1.56)	(1.53)	(1.56)	(1.56)	(1.56)	(1.55)	(1.55)
BM	0.0067***	0.0066***	0.0069***	0.0067***	0.0067***	0.0066***	0.0067***	0.0067***
	(2.66)	(2.63)	(2.75)	(2.67)	(2.65)	(2.64)	(2.66)	(2.67)
Log(TA)	-0.0014**	-0.0014**	-0.0015***	-0.0014**	-0.0014**	-0.0014**	-0.0014**	-0.0014**
	(-2.52)	(-2.57)	(-2.74)	(-2.51)	(-2.51)	(-2.56)	(-2.52)	(-2.55)
Log(age)	0.0009	0.0009	0.0010	0.0010	0.0009	0.0010	0.0010	0.0010
	(0.89)	(0.91)	(1.02)	(0.96)	(0.87)	(0.96)	(0.97)	(0.97)
ΔESG	0.0021							
	(0.43)							
ΔCOM		0.0349						
		(1.15)						
ΔCGOV			-0.0076					
			(-1.06)					
ΔDIV				0.0063				
				(0.75)				
ΔEMP					0.0056			
					(0.68)			
ΔENV						0.0089		
						(0.78)		
ΔHUMR							0.0006	
							(0.05)	
ΔPROD								0.0057

								(0.94)
R-squared	0.0878	0.0878	0.0880	0.0875	0.0879	0.0873	0.0880	0.0871

*1%***. 5%** and 10%**

Book-To-Market Regression

Table (2.6) shows the results of the Book-to-Market regression. We notice that five (ESG, COM, EMP, ENV and $PROD$) out of the eight dimensions have a negative and significant effect on the book-to-market ratio of the rated firm. These findings suggest that KLD ratings affect negatively the risk of the rated firm. In contrast, we surprisingly find that the corporate governance dimension affects positively and significantly the firm's risk measure. Moreover, the positive and significant slope coefficient of the dummy variable $sinstock$ suggests that sin stocks face greater risk than non-sin stocks.

Our findings are in line with the studies of Hong and Kacperczyk (2009) and Galema et al. (2008).

TABLE 2.6: Cross-section regression of Log(B/M)

Cross-section regression of Log(B/M). January 1997-December 2010. Method : ordinary Least Squares. Clustered Standard Errors by Time

First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Intercept$	0.4613 ***	0.4613 ***	0.4613 ***	0.4613 ***	0.4613 ***	0.4613 ***	0.4613 ***	0.4613 ***
	(4.63)	(4.63)	(4.63)	(4.63)	(4.63)	(4.63)	(4.63)	(4.63)
Leverage	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010
	(-1.18)	(-1.18)	(-1.18)	(-1.18)	(-1.18)	(-1.18)	(-1.18)	(-1.18)
Size	-0.1743 ***	-0.1743 ***	-0.1743 ***	-0.1743 ***	-0.1743 ***	-0.1743 ***	-0.1743 ***	-0.1743 ***

	(-15.84)	(-15.84)	(-15.84)	(-15.84)	(-15.84)	(-15.84)	(-15.84)	(-15.84)
ROE	-0.3474 ***	-0.3474 ***	-0.3474 ***	-0.3474 ***	-0.3474 ***	-0.3474 ***	-0.3474 ***	-0.3474 ***
	(-8.75)	(-8.75)	(-8.75)	(-8.75)	(-8.75)	(-8.75)	(-8.75)	(-8.75)
$Sinstock$	0.2888 ***	0.2888 ***	0.2888 ***	0.2888 ***	0.2888 ***	0.2888 ***	0.2888 ***	0.2888 ***
	(18.59)	(18.59)	(18.59)	(18.59)	(18.59)	(18.59)	(18.59)	(18.59)
ΔESG	-0.0531 *							
	(-1.63)							
ΔCOM		-0.4294 ***						
		(-3.87)						
ΔCGOV			0.1286 ***					
			(2.76)					
ΔDIV				0.0486				
				(0.63)				
ΔEMP					-0.1952 ***			
					(-3.44)			
ΔENV						-0.2098 ***		
						(-2.77)		
ΔHUMR							-0.0859	
							(-0.98)	
ΔPROD								-0.1115 **
								(-2.14)
R-squared	0.1355	0.1355	0.1355	0.1355	0.1355	0.1355	0.1355	0.1355

*1%***. 5%** and 10%**

To conclude our study about the effect of KLD ratings on corporate financial performance over the last two decades, we find that a positive change in the CSR score affects negatively a firm's expected return and a firm's systematic risk. Hence we do not reject our first and second hypotheses.

Our findings suggest that a firm's expected return is significantly and negatively affected by the CSR rating changes. We suggest that this negative effect is due to the negative effect of CSR ratings on the systematic risk. Hence, an increase in the CSR rating lowers the systematic risk and reduces the expected return. Moreover, our findings support the view that investors' perception is significantly affected by the KLD CSR rating agency. Thus, even if KLD does not perform explicit monitoring on the rated firm it provides useful information for investors.

5.2 The Impact of the Enron Scandal on Investors' perception of KLD rating changes

SRI portfolios Analysis

In table (2.7), we present the results of the Carhart regression on the equally-weighted portfolios before and after the Enron scandal. For each equal-weighted portfolio, we present both results of the Carhart regressions in the period 1997-2001 and the period 2002-2009.

In panels A and B of table (2.7), we present respectively the results of the Carhart regression on the equally-weighted portfolios of KLD downgraded stocks and the Carhart regression on the equally-weighted portfolios of KLD upgraded stocks for both periods. In panel A, we only find that the equally-weighted portfolio of KLD downgraded stocks based on the human rights dimension has an alpha of (-154) basis points significant at the level of 5% in the period 1997-2001. However, this effect disappears after the Enron scandal. In panel B and in the period 1997-2001, we find that upgraded stocks in the corporate governance $(-84bp)$, the environmental $(-137bp)$, the product $(-84bp)$ and the aggregated ESG measure (-70bp) dimensions underperform the market return. Moreover, the equally-weighted portfolio of KLD upgraded stocks based on the environmental has an alpha of -137 basis points significant at the level of 1% which suggests that investors' perception are greatly affected by KLD rating changes in the environmental dimension. We however find that these effects largely disappear after the Enron scandal which suggest that investors' perception is affected by the Enron scandal. Hence, the poor performance of KLD rating agency regarding the rating of Enron signals that her ratings are not reliable and do not predict the firm's social performance.

In panels C and D of table (2.7), we present the results of the Carhart regression of the long-short strategy over both periods (before and after the failure of Enron). Panel C shows the results of the Carhart regression on the equally-weighted portfolio long in KLD Upgraded stocks and short in KLD Downgraded stocks. In the period 1997-2001, we find that the corporate governance $(-114bp)$, the environmental $(-100bp)$ and the aggregated ESG measure $(-58bp)$ dimensions underperform the market return. In the period 2002-2009, we find that these effects largely disappear, with the exception of the equally-weighted portfolio based on the diversity dimension that shows an abnormal return of (-38) basis points significant at the level of 5%. These findings again suggest that the Enron scandal signals that KLD rating changes are poor predictors of firms' social behavior and annihilates the effect of KLD rating changes on investors' demand. The effect of rating changes in the diversity dimension shows that investors are more interested in the composition of the workforce of the firm after the failure of Enron. This finding is in line with the recent literature that relates diversity and firm performance. The effect of the diversity dimension on investors' perception may be free of any reliability problem since the firm's workforce composition is publicly observable. Panel D shows the results of the Carhart regression on the equally-weighted portfolio long in KLD Upgraded stocks and short in KLD stable stocks. Our findings in panel D are close to those in panel C either in the period 1997-2001 or in the period 2002-2009. In the period 1997-2001, we find that the environmental $(-121bp)$ and the aggregated ESG measure $(-64bp)$ dimensions underperform the market return. In the period 2002-2009, we find that these effects largely disappear, again with the exception of the equally-weighted portfolio based on the diversity dimension that shows an abnormal returns of (-50) basis points significant at the level of 5%.

TABLE 2.7: Results of the Carhart regression before and after the Enron Collapse

Carhart regression. Method :Ordinary Least square.

In panels A and B, we present respectively the results of the Carhart regression on the equally-weighted portfolios of KLD downgraded stocks and the Carhart regression on the equally-weighted portfolios of KLD upgraded stocks. In panels C and D of table (2.4), we present the results of the Carhart regression of the long-short strategy. Panel C shows the results of the Carhart regression on the equally-weighted portfolio long KLD Upgraded stocks and short KLD Downgraded stocks. Panel D shows the results of the Carhart regression on the equally-weighted portfolio long KLD Upgraded stocks and short KLD stable stocks.

The excess return on the market $(Rm - Rf)$ is calculated as the value-weighted return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) minus the one-month Treasury bill rate. SMB is the monthly return of a portfolio long Small stocks and short Big stocks, HML is the return of a portfolio long high book-to-market stocks and short low book-to-market stocks and MOM is the monthly return on a portfolio long on past one-year winners and short on past one-year losers.

First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

	Alpha	$(Rm - Rf)$	SMB	HML	mom	Alpha	$(Rm - Rf)$	SMB	HML	mom
			1997-2001					***2002-2009***		
Panel A : *equally-weighted Portfolios of KLD Downgraded stocks*										
ESG	-0.0012	0.9960 ***	0.1625 ***	0.6023 ***	-0.2031 ***	0.0035 *	1.1676 ***	0.4471 ***	-0.0211	-0.2080 ***
	(-0.49)	(17.30)	(3.03)	(8.19)	(-5.91)	(1.98)	(24.31)	(6.19)	(-0.31)	(-5.92)
COM	-0.0066 *	1.0808 ***	0.0414	0.7169 ***	-0.2432 ***	0.0030	0.9316 ***	0.2781 ***	0.2851 ***	-0.1442 ***
	(-1.96)	(13.18)	(0.54)	(6.84)	(-4.97)	(1.29)	(14.71)	(2.92)	(3.17)	(-3.11)
CGOV	0.0030	1.0703 ***	0.2712 ***	0.6574 ***	-0.1899 ***	0.0020	1.0476 ***	0.5126 ***	0.2083 ***	-0.2047 ***
	(0.90)	(13.39)	(3.65)	(6.44)	(-3.98)	(1.10)	(21.13)	(6.87)	(2.96)	(-5.64)
DIV	-0.0017	0.9359 ***	0.0228	0.4641 ***	-0.2399 ***	0.0034 *	1.1210 ***	0.4899 ***	-0.1089	-0.1885 ***
	(-0.50)	(11.21)	(0.29)	(4.35)	(-4.82)	(1.76)	(21.29)	(6.18)	(-1.46)	(-4.89)
EMP	0.0008	0.9290 ***	0.1588 **	0.4176 ***	-0.1902 ***	0.0056	1.3528 ***	0.3305 **	-0.4537 ***	-0.2997 ***
	(0.26)	(12.94)	(2.38)	(4.55)	(-4.44)	(1.55)	(13.65)	(2.22)	(-3.22)	(-4.13)
ENV	-0.0036	0.9698 ***	0.0586	0.6988 ***	-0.1501 ***	0.0045	1.0316 ***	0.1653	0.5144 ***	-0.2725 ***
	(-1.00)	(10.99)	(0.71)	(6.20)	(-2.85)	(1.40)	(11.76)	(1.25)	(4.13)	(-4.25)
HUMR	-0.0154 **	0.8776 ***	0.1703	0.7098 ***	-0.0502	0.0046	1.0567 ***	0.5783 ***	0.0232	-0.0209
	(-2.11)	(4.96)	(1.03)	(3.14)	(-0.48)	(1.10)	(9.29)	(3.38)	(0.14)	(-0.25)
PROD	-0.0058 *	0.9542 ***	0.1084	0.5790 ***	-0.2280 ***	0.0013	1.0411 ***	0.5562 ***	0.0612	-0.1555 ***
	(-1.88)	(12.70)	(1.55)	(6.03)	(-5.09)	(0.46)	(13.97)	(4.96)	(0.58)	(-2.85)
Panel B : *equally-weighted Portfolios of KLD Upgraded stocks*										
ESG	-0.0070 **	0.9765 ***	0.2019 ***	0.5607 ***	-0.1887 ***	0.0017	1.0743 ***	0.4521 ***	0.0616	-0.1666 ***
	(-2.44)	(14.09)	(3.13)	(6.33)	(-4.56)	(1.33)	(29.86)	(8.35)	(1.21)	(-6.33)
CGOV	-0.0084 **	0.9274 ***	0.3104 ***	0.5540 ***	-0.2008 ***	0.0032	1.0140 ***	0.5018 ***	-0.1387	-0.0069
	(-2.07)	(9.37)	(3.37)	(4.38)	(-3.40)	(1.26)	(14.51)	(4.77)	(-1.40)	(-0.14)
COM	-0.0092 *	0.9449 ***	-0.0782	0.5097 ***	-0.0327	-0.0021	1.1335 ***	0.3022 **	0.1153	-0.0783
	(-1.96)	(8.35)	(-0.74)	(3.53)	(-0.48)	(-0.69)	(13.81)	(2.45)	(0.99)	(-1.30)
DIV	-0.0054	0.9305 ***	0.1190	0.4479 ***	-0.1592 ***	-0.0004	0.9822 ***	0.4842 ***	0.1279 **	-0.2044 ***
	(-1.60)	(11.37)	(1.56)	(4.28)	(-3.26)	(-0.23)	(22.36)	(7.32)	(2.05)	(-6.36)
EMP	-0.0019	1.0039 ***	0.1934 **	0.6206 ***	-0.2570 ***	0.0015	1.0465 ***	0.5270 ***	-0.0133	-0.2539 ***
	(-0.56)	(12.02)	(2.49)	(5.81)	(-5.16)	(0.73)	(18.38)	(6.15)	(-0.16)	(-6.09)
ENV	-0.0137 ***	1.1071 ***	0.0275	0.6893 ***	-0.1028	0.0039	1.0278 ***	0.3148 ***	0.3490 ***	-0.1477 ***
	(-2.77)	(9.25)	(0.25)	(4.51)	(-1.44)	(1.45)	(13.95)	(2.84)	(3.34)	(-2.74)
HUMR	0.0001	0.9403 ***	-0.1511	0.7783 ***	-0.1111	0.0096	1.1950 ***	0.0198	-0.2195	-0.1559
	(0.02)	(4.95)	(-0.85)	(3.21)	(-0.98)	(1.57)	(7.09)	(0.08)	(-0.92)	(-1.26)
PROD	-0.0084 **	1.0425 ***	-0.0148	0.6368 ***	-0.1422 **	0.0010	1.2705 ***	0.2004 *	-0.2569 **	-0.2216 ***
	(-2.08)	(10.70)	(-0.16)	(5.11)	(-2.44)	(0.35)	(16.53)	(1.73)	(-2.35)	(-3.94)
Panel C : *equally-weighted Portfolio long KLD Upgraded stocks and short KLD Downgraded stocks*										
ESG	-0.0058 ***	-0.0195	0.0395	-0.0416	0.0144	-0.0017	-0.0933 **	0.0050	0.0827	0.0414
	(-2.70)	(-0.37)	(0.81)	(-0.62)	(0.46)	(-1.03)	(-2.05)	(0.07)	(1.28)	(1.24)
CGOV	-0.0114 **	-0.1429	0.0392	-0.1034	-0.0109	0.0012	-0.0336	-0.0109	-0.3470 ***	0.1978 ***
	(-2.44)	(-1.26)	(0.37)	(-0.71)	(-0.16)	(0.38)	(-0.38)	(-0.08)	(-2.78)	(3.07)
COM	-0.0025	-0.1359	-0.1196	-0.2072	0.2105 ***	-0.0050	0.2020 **	0.0241	-0.1697	0.0659
	(-0.55)	(-1.22)	(-1.15)	(-1.46)	(3.17)	(-1.40)	(2.04)	(0.16)	(-1.21)	(0.91)

DIV	-0.0037	-0.0054	0.0962	-0.0162	0.0807	-0.0038 **	-0.1387 ***	-0.0057	0.2368 ***	-0.0160
	(-0.93)	(-0.06)	(1.07)	(-0.13)	(1.41)	(-2.14)	(-2.88)	(-0.08)	(3.47)	(-0.45)
EMP	-0.0027	0.0748	0.0346	0.2029 *	-0.0669	-0.0041	-0.3064 ***	0.1965	0.4404 ***	0.0458
	(-0.76)	(0.87)	(0.43)	(1.84)	(-1.29)	(-0.97)	(-2.66)	(1.13)	(2.69)	(0.54)
ENV	-0.0100 **	0.1373	-0.0310	-0.0094	0.0473	-0.0006	-0.0038	0.1495	-0.1654	0.1248 *
	(-2.30)	(1.30)	(-0.31)	(-0.07)	(0.75)	(-0.16)	(-0.04)	(1.00)	(-1.17)	(1.71)
HUMR	0.0155	0.0627	-0.3213	0.0684	-0.0609	0.0051	0.1383	-0.5585 *	-0.2427	-0.1350
	(1.60)	(0.27)	(-1.47)	(0.23)	(-0.43)	(0.68)	(0.67)	(-1.80)	(-0.83)	(-0.89)
PROD	-0.0025	0.0883	-0.1232	0.0577	0.0859	-0.0003	0.2294 **	-0.3558 **	-0.3181 **	-0.0661
	(-0.55)	(0.80)	(-1.20)	(0.41)	(1.30)	(-0.07)	(2.27)	(-2.33)	(-2.21)	(-0.89)
Panel D : *equally-weighted Portfolio long KLD Upgraded stocks and short KLD stable stocks*										
ESG	-0.0064 **	0.0704	-0.1231 **	-0.0153	0.0595	-0.0027	-0.0515	-0.1245	-0.1149	-0.0893 *
	(-2.50)	(1.13)	(-2.12)	(-0.19)	(1.60)	(-1.12)	(-0.78)	(-1.25)	(-1.22)	(-1.85)
CGOV	-0.0055	-0.0119	0.0880	-0.0302	0.0150	-0.0008	-0.1423	0.0152	-0.1841	0.1264 **
	(-1.44)	(-0.13)	(1.02)	(-0.25)	(0.27)	(-0.24)	(-1.64)	(0.12)	(-1.50)	(1.99)
COM	-0.0075 *	-0.0161	-0.3374 ***	-0.0635	0.1885 ***	-0.0062 *	-0.0211	-0.1860	0.0730	0.0622
	(-1.97)	(-0.17)	(-3.91)	(-0.54)	(3.41)	(-1.79)	(-0.22)	(-1.31)	(0.54)	(0.90)
DIV	-0.0036	-0.0419	-0.1514 ***	-0.1672 **	0.0585	-0.0050 **	-0.1807 ***	0.0016	0.0480	-0.0790 *
	(-1.46)	(-0.70)	(-2.73)	(-2.20)	(1.65)	(-2.47)	(-3.25)	(0.02)	(0.61)	(-1.94)
EMP	0.0013	0.0470	-0.0401	0.0304	-0.0537	-0.0023	-0.0712	0.0157	-0.1772 *	-0.1594 ***
	(0.50)	(0.73)	(-0.67)	(0.37)	(-1.40)	(-0.97)	(-1.08)	(0.16)	(-1.89)	(-3.30)
ENV	-0.0121 ***	0.1638	-0.2341 **	0.1498	0.1270 **	-0.0001	-0.1254	-0.1947	0.3226 ***	-0.0138
	(-2.87)	(1.60)	(-2.46)	(1.15)	(2.08)	(-0.02)	(-1.51)	(-1.56)	(2.74)	(-0.23)
HUMR	0.0023	-0.0222	-0.3752 **	0.2105	0.1050	0.0057	0.0539	-0.4499 *	-0.2899	-0.0123
	(0.31)	(-0.12)	(-2.19)	(0.89)	(0.95)	(0.93)	(0.32)	(-1.80)	(-1.23)	(-0.10)
PROD	-0.0065 *	0.0844	-0.2553 ***	0.0629	0.0710	-0.0032	0.1267	-0.2872 **	-0.3317 **	-0.0867
	(-1.95)	(1.04)	(-3.39)	(0.61)	(1.47)	(-0.96)	(1.40)	(-2.11)	(-2.58)	(-1.31)

*1%***. 5%** and 10%**

Excess stock returns regression

In table (2.8), we present the results of the pooled cross-section clustered by time of the excess returns of rated firms. We see that the direct effect of KLD ratings on rated firms' excess returns is not significant either before or after the Enron scandal.

TABLE 2.8: Results of the Cross-section regression of excess stock returns with Clustered Standard Errors by Time

Cross-section regression of excess stock returns. January 1997-December 2010. Method : ordinary Least Squares. Clustered Standard Errors by Time. Total panel (unbalanced) observations :113671.

$(R_i - Rf)$ is the return of a firm i minus the one-month Treasury bill rate, $Beta$ is defined following Black (1972) as the market sensitivity of an asset and is equal to the slope of the regression line relating the return of a firm R_i and the return of the market R_m calculated on a rolling window of the previous 36 months. BM is the Book-to-Market ratio of the rated firm at the end of the previous year. $Log(TA)$ is equal to the logarithm of the total asset of the rated firm at the end of the previous year. $Log(age)$ is the logarithm of the age of the rated firm. $Sinstock$ is a dummy variable equal to 1 if the firm is defined as a Sin stocks (alcohol or tobacco or gaming industry) and 0 otherwise. First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Intercept$	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082
	(0.85)	(0.85)	(0.85)	(0.85)	(0.85)	(0.85)	(0.85)	(0.85)
BETA	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
	(1.57)	(1.57)	(1.57)	(1.57)	(1.57)	(1.57)	(1.57)	(1.57)
BM	0.0178 ***	0.0178 ***	0.0178 ***	0.0178 ***	0.0178 ***	0.0178 ***	0.0178 ***	0.0178 ***
	(3.16)	(3.16)	(3.16)	(3.16)	(3.16)	(3.16)	(3.16)	(3.16)
Log(TA)	-0.0018 *	-0.0018 *	-0.0018 *	-0.0018 *	-0.0018 *	-0.0018 *	-0.0018 *	-0.0018 *
	(-1.76)	(-1.76)	(-1.76)	(-1.76)	(-1.76)	(-1.76)	(-1.76)	(-1.76)
Log(age)	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
	(-0.13)	(-0.13)	(-0.13)	(-0.13)	(-0.13)	(-0.13)	(-0.13)	(-0.13)
TIME	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036
	(0.42)	(0.42)	(0.42)	(0.42)	(0.42)	(0.42)	(0.42)	(0.42)
SINSTOCK	-0.0008	-0.0008	-0.0008	-0.0008	-0.0008	-0.0008	-0.0008	-0.0008
	(-0.54)	(-0.54)	(-0.54)	(-0.54)	(-0.54)	(-0.54)	(-0.54)	(-0.54)
ΔESG	-0.0073							
	(-1.10)							
ΔESG*TIME	0.0107							
	(1.32)							
ΔCOM		-0.0058						
		(-0.44)						
ΔCOM*TIME		0.0020						
		(0.12)						
ΔCGOV			-0.0219					
			(-0.97)					
ΔCGOV*TIME			0.0289					
			(1.22)					
ΔDIV				-0.0081				
				(-0.91)				
ΔDIV*TIME				0.0134				
				(1.19)				
ΔENV					-0.0166			
					(-1.16)			
ΔENV*TIME					0.0315 *			
					(1.63)			
ΔEMP						-0.0031		
						(-0.28)		
ΔEMP*TIME						0.0037		
						(0.25)		
ΔHUMR							0.0367 **	
							(1.94)	
ΔHUMR*TIME							-0.0407	
							(-1.48)	
ΔPROD								-0.0035
								(-0.32)
ΔPROD*TIME								0.0035
								(0.29)
R-squared	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048

*1%***. 5%** and 10%**

Book-to-Market Regression

In table (2.9), we present the results of the pooled cross-section clustered by time of the book-to-market of rated firms. We first note that sin stocks have a greater book-to-market ration than

non-sin stocks. Moreover, the firm's size and the return on equity have a negative and significant impact on the book-to-market ratio which suggests that an increase in the firm's return reduces the firm's risk. Moreover, consistent with theory, we notice that a change in the ESG, Community, Diversity and Human rights dimensions have a negative and significant impact on the book-to-market ratio. However, these effects disappear after the failure of Enron. Surprisingly, we find an opposite reaction of investors regarding the diversity dimension. Indeed, after the failure of Enron the diversity dimension affects positively and significantly the book-to-market ratio which suggests that an increase in the diversity of the workforce increases the firm's risk.

These results confirm the view that the failure of Enron annihilates KLD's impact on the market.

TABLE 2.9: Results of the Cross-section regression of Log(B/M) with Clustered Standard Errors by Time

Cross-section regression of Log(B/M). January 1997-December 2010. Method : ordinary Least Squares, Clustered Standard Errors by Time
$Log(B/M)$ is the logarithm of the book-to-market ratio, $Leverage$ represents the debt-to-equity ratio, $size$ is the logarithm of the market capitalization. ROE is the return on equity.
First, the ESG global score, (ESG), represents the aggregation of the different dimensions. Second, the community score (COM) reports the interaction of the firm with its social environment. Third, the corporate governance score $(CGOV)$ relates to how the firm is governed and directed. Fourth, the diversity score (DIV) reports the level of diversity and composition of the workforce. Fifth, the employee relations score (EMP) is about the relationship between the firm and its employees. Sixth, the environment score (ENV) reports the firm's environmental management. Seventh, the human rights score $(HUMR)$ investigates the firm's behavior with respect to human rights. Finally, the product score $(PROD)$ produces a diagnostic about the firm's product quality and production process.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Intercept$	0.4101 ***	0.4101 ***	0.4101 ***	0.4101 ***	0.4101 ***	0.4101 ***	0.4101 ***	0.4101 ***
	(4.61)	(4.61)	(4.61)	(4.61)	(4.61)	(4.61)	(4.61)	(4.61)
Size	-0.1724 ***	-0.1724 ***	-0.1724 ***	-0.1724 ***	-0.1724 ***	-0.1724 ***	-0.1724 ***	-0.1724 ***
	(-16.65)	(-16.65)	(-16.65)	(-16.65)	(-16.65)	(-16.65)	(-16.65)	(-16.65)
ROE	-0.3473 ***	-0.3473 ***	-0.3473 ***	-0.3473 ***	-0.3473 ***	-0.3473 ***	-0.3473 ***	-0.3473
	(-8.73)	(-8.73)	(-8.73)	(-8.73)	(-8.73)	(-8.73)	(-8.73)	(-8.73) ***
Leverage	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010
	(-1.18)	(-1.18)	(-1.18)	(-1.18)	(-1.18)	(-1.18)	(-1.18)	(-1.18)
$Sinstock$	0.2916 ***	0.2916 ***	0.2916 ***	0.2916 ***	0.2916 ***	0.2916 ***	0.2916 ***	0.2916 ***
	(18.17)	(18.17)	(18.17)	(18.17)	(18.17)	(18.17)	(18.17)	(18.17)
TIME	0.0432	0.0432	0.0432	0.0432	0.0432	0.0432	0.0432	0.0432
	(1.30)	(1.30)	(1.30)	(1.30)	(1.30)	(1.30)	(1.30)	(1.30)
ΔESG	-0.1036 ***							
	(-2.88)							
ΔESG*TIME	0.0636							
	(1.21)							
ΔCOM		-0.4126 **						
		(-2.13)						
ΔCOM*TIME		-0.0381						
		(-0.16)						
ΔCGOV			0.2727 **					
			(1.96)					
ΔCGOV*TIME			-0.1723					
			(-1.19)					
ΔDIV				-0.3509 ***				
				(-2.95)				
ΔDIV*TIME				0.4811 ***				
				(3.33)				
ΔENV					-0.1824			
					(-1.56)			
ΔENV*TIME					-0.0466			
					(-0.31)			
ΔEMP						-0.0659		

						(-0.92)		
ΔEMP*TIME						-0.1536		
						(-1.57)		
ΔHUMR							-0.0425	
							(-0.18)	
ΔHUMR*TIME							-0.0690	
							(-0.27)	
ΔPROD								-0.2584 *
								(-1.73)
ΔPROD*TIME								0.1836
								(1.18)
R-squared	0.1359	0.1359	0.1359	0.1359	0.1359	0.1359	0.1359	0.1359

*1%***. 5%** and 10%**

To conclude this second section, one may emphasize that the absence of effect after the Enron scandal may be due to other factors that affected investors' perception of the credibility of CSR behavior. This argument fails to hold if we look closely at the total assets under management of SRI portfolios : we can see that the total amount[7] increased after the collapse of Enron. Hence, the collapse of Enron does not question the importance of business ethics and Corporate Social Responsibility for companies.

Thus, we do reject our third and fourth hypotheses and do not reject our fifth and sixth hypotheses. After the Enron scandal, KLD's effect on the market disappears. This finding supports the view that investors update their beliefs on KLD's ability to produce precise and truthful information. This finding suggests that the effect of an intermediary provider of information on investors' perception is only related to the intermediary's reputation to convey reliable information and that the intermediary's poor performance affects immediately his reputation.

6 Conclusion

KLD is an intermediary provider of social performance information that adopts an investor-pay model. Following theoretical papers analysis, we examine the impact of the Enron scandal on the

[7]See figure1 : The total assets under management of SRI portfolios.

reputation of KLD by comparing investors' perception of KLD ratings changes before and after the Enron failure. we propose an empirical study that relates a number of equally-weighted portfolios returns, excess stock returns and book-to-market ratio to different dimensions of KLD social ratings. We find that after the Enron scandal the significant effect of KLD rating changes on investors' perception disappears. Our findings confirm the view that the failure of Enron annihilates KLD's impact on the market.

Finally, our findings may question the results of recent studies that relates social performance and financial performance using KLD ratings as a proxy for corporate social performance. Indeed, if studies using KLD ratings as a proxy for CSR level find no significant link between both corporate social responsibility behavior and corporate financial performance, investors may be relying more on proxies that predict firms' future corporate social performance than KLD ratings that are more about past corporate social performance.

7 Appendix

Sustainable and Responsible Investing in the United States 1995–2012

	1995	1997	1999	2001	2003	2005	2007	2010	2012
ESG Incorporation	$166	$533	$1,502	$2,018	$2,157	$1,704	$2,123	$2,554	$3,314
Shareholder Resolutions	$473	$736	$922	$897	$448	$703	$739	$1,497	$1,536
Overlapping Strategies	N/A	($84)	($265)	($592)	($441)	($117)	($151)	($981)	($1,106)
TOTAL	**$639**	**$1,185**	**$2,159**	**$2,323**	**$2,164**	**$2,290**	**$2,711**	**$3,069**	**$3,744**

SOURCE: US SIF Foundation.
NOTE: Overlapping assets involved in some combination of ESG incorporation (including community investing) and shareholder advocacy are subtracted to avoid potential effects of double counting. Separate tracking of the overlapping strategies only began in 1997, so there is no datum for 1995. Prior to 2010, assets subject to ESG incorporation were limited to socially and environmentally screened assets.

FIGURE 2.1 – The total assets under management of SRI portfolios

QUALITATIVE ISSUE AREAS

COMMUNITY (COM-)

STRENGTHS

Charitable Giving (COM-str-A). The company has consistently given over 1.5% of trailing three-year net earnings before taxes (NEBT) to charity, or has otherwise been notably generous in its giving. In 2002, KLD renamed the Generous Giving Strength as Charitable Giving.

Innovative Giving (COM-str-B). The company has a notably innovative giving program that supports nonprofit organizations, particularly those promoting self-sufficiency among the economically disadvantaged. Companies that permit nontraditional federated charitable giving drives in the workplace are often noted in this section as well.

Support for Housing (COM-str-C). The company is a prominent participant in public/private partnerships that support housing initiatives for the economically disadvantaged, e.g., the National Equity Fund or the Enterprise Foundation.

Support for Education (COM-str-D). The company has either been notably innovative in its support for primary or secondary school education, particularly for those programs that benefit the economically disadvantaged, or the company has prominently supported job-training programs for youth. In 1994, KLD added the Support for Education Strength.

Indigenous Peoples Relations (COM-str-E). The company has established relations with indigenous peoples in the areas of its proposed or current operations that respect the sovereignty, land, culture, human rights, and intellectual property of the indigenous peoples. KLD began assigning this strength in 2000. In 2002

Volunteer Programs (COM-str-G). The company has an exceptionally strong volunteer program. In 2005, KLD added the Volunteer Programs Strength.

Other Strength (COM-str-X). The company has either an exceptionally strong in-kind giving program or engages in other notably positive community activities.

CONCERNS

Investment Controversies (COM-con-A). The company is a financial institution whose lending or investment practices have led to controversies, particularly ones related to the Community Reinvestment Act.

Negative Economic Impact (COM-con-B). The company's actions have resulted in major controversies concerning its economic impact on the community. These controversies can include issues related to environmental contamination, water rights disputes, plant closings, "put-or-pay" contracts with trash incinerators, or other company actions that adversely affect the quality of life, tax base, or property values in the community.

Tax Disputes (COM-con-D). The company has recently been involved in major tax disputes involving Federal, state, local or non-U.S. government authorities, or is involved in controversies over its tax obligations to the community. In 2005, KLD moved Tax Disputes from Corporate Governance

to Community.
Other Concern (COM-con-X). The company is involved with a controversy that has mobilized community opposition, or is engaged in other noteworthy community controversies.

CORPORATE GOVERNANCE (CGOV-)

STRENGTHS

Limited Compensation (CGOV-str-A). The company has recently awarded notably low levels of compensation to its top management or its board members. The limit for a rating is total compensation of less than $500,000 per year for a CEO or $30,000 per year for outside directors.
Ownership Strength (CGOV-str-C). The company owns between 20% and 50% of another company KLD has cited as having an area of social strength, or is more than 20% owned by a firm that KLD has rated as having social strengths. When a company owns more than 50% of another firm, it has a controlling interest, and KLD treats the second firm as if it is a division of the first.
Transparency Strength (CGOV-str-D). The company is particularly effective in reporting on a wide range of social and environmental performance measures.
Political Accountability Strength (CGOV-str-E). The company has shown markedly responsible leadership on public policy issues and/or has an exceptional record of transparency and accountability concerning its political involvement in state or federal- level U.S. politics, or in non-U.S. politics. In 2006, KLD added the Political Accountability Strength.
Other Strength (CGOV-str-X). The company has a unique and positive corporate culture, or has undertaken a noteworthy initiative not covered by KLD's other corporate governance ratings.

CONCERNS

High Compensation (CGOV-con-B). The company has recently awarded notably high levels of compensation to its top management or its board members. The limit for a rating is total compensation of more than $10 million per year for a CEO or $100,000 per year for outside directors.
Ownership Concern (CGOV-con-F). The company owns between 20% and 50% of a company KLD has cited as having an area of social concern.
Accounting Concern (CGOV-con-G). The company is involved in significant accounting-related controversies. In 2006, KLD added the Accounting Concern.
Transparency Concern (CGOV-con-H). The company is distinctly weak in reporting on a wide range of social and environmental performance measures. In 2006, KLD added the Transparency Concern.
Other Concern (CGOV-con-X). The company is involved with a controversy not covered by

DIVERSITY (DIV-)

STRENGTHS

CEO (DIV-str-A). The company's chief executive officer is a woman or a member of a minority

group.
Promotion (DIV-str-B). The company has made notable progress in the promotion of women and minorities, particularly to line positions with profit-and-loss responsibilities in the corporation.
Board of Directors (DIV-str-C). Women, minorities, and/or the disabled hold four seats or more (with no double counting) on the board of directors, or one-third or more of the board seats if the board numbers less than 12.
Work/Life Benefits (DIV-str-D). The company has outstanding employee benefits or other programs addressing work/life concerns, e.g., childcare, elder care, or flextime. In 2005, KLD renamed this strength from Family Benefits Strength.
Women & Minority Contracting (DIV-str-E). The company does at least 5% of its subcontracting, or otherwise has a demonstrably strong record on purchasing or contracting, with women- and/or minority-owned businesses.
Employment of the Disabled (DIV-str-F). The company has implemented innovative hiring programs ; other innovative human resource programs for the disabled, or otherwise has a superior reputation as an employer of the disabled.
Gay & Lesbian Policies (DIV-str-G). The company has implemented notably progressive policies toward its gay and lesbian employees. In particular, it provides benefits to the domestic partners of its employees. In 1995, KLD added the Gay & Lesbian Policies Strength, which was originally titled the Progressive Gay/Lesbian Policies strength.
Other Strength (DIV-str-X). The company has made a notable commitment to diversity that is not covered by other KLD ratings.

CONCERNS

Controversies (DIV-con-A). The company has either paid substantial fines or civil penalties as a result of affirmative action controversies, or has otherwise been involved in major controversies related to affirmative action issues.
Non-Representation (DIV-con-B). The company has no women on its board of directors or among its senior line managers.
DIV-CON-C
Other Concern (DIV-con-X). The company is involved in diversity controversies not covered by other KLD ratings.

EMPLOYEE RELATIONS (EMP-)

STRENGTHS

Union Relations (EMP-str-A). The company has taken exceptional steps to treat its unionized workforce fairly. KLD renamed this strength from Strong Union Relations.
Cash Profit Sharing (EMP-str-C). The company has a cash profit-sharing program through which it has recently made distributions to a majority of its workforce.
Employee Involvement (EMP-str-D). The company strongly encourages worker involvement and/or

ownership through stock options available to a majority of its employees ; gain sharing, stock ownership, sharing of financial information, or participation in management decision-making.
Retirement Benefits Strength (EMP-str-F). The company has a notably strong retirement benefits program. KLD renamed this strength from Strong Retirement Benefits.
Health and Safety Strength (EMP-str-G). The company has strong health and safety programs.
EMP-STR-H
Other Strength (EMP-str-X). The company has strong employee relations initiatives not covered by other KLD ratings.

CONCERNS

Union Relations (EMP-con-A). The company has a history of notably poor union relations. KLD renamed this concern from Poor Union Relations.
Health and Safety Concern (EMP-con-B). The company recently has either paid substantial fines or civil penalties for willful violations of employee health and safety standards, or has been otherwise involved in major health and safety controversies.
Workforce Reductions (EMP-con-C). The company has made significant reductions in its workforce in recent years.
Retirement Benefits Concern (EMP-con-D). The company has either a substantially under funded defined benefit pension plan, or an inadequate retirement benefits program. In 2004, KLD renamed this concern from Pension/Benefits Concern.
EMP-CON-F
Other Concern (EMP-con-X). The company is involved in an employee relations controversy that is not covered by other KLD ratings.

ENVIRONMENT (ENV-)

STRENGTHS

Beneficial Products and Services (ENV-str-A). The company derives substantial revenues from innovative remediation products, environmental services, or products that promote the efficient use of energy, or it has developed innovative products with environmental benefits. (The term "environmental service" does not include services with questionable environmental effects, such as landfills, incinerators, waste-to-energy plants, and deep injection wells.)
Pollution Prevention (ENV-str-B). The company has notably strong pollution prevention programs including both emissions reductions and toxic-use reduction programs. STRENGTHS
Recycling (ENV-str-C). The company either is a substantial user of recycled materials as raw materials in its manufacturing processes, or a major factor in the recycling industry.
Clean Energy (ENV-str-D). The company has taken significant measures to reduce its impact on climate change and air pollution through use of renewable energy and clean fuels or through energy efficiency. The company has demonstrated a commitment to promoting climate-friendly policies

and practices outside its own operations. KLD renamed the Alternative Fuels strength as Clean Energy Strength.

Management Systems (ENV-str-G). The company has demonstrated a superior commitment to management systems through ISO 14001 certification and other voluntary programs. This strength was first awarded in 2006.

Other Strength (ENV-str-X). The company has demonstrated a superior commitment to management systems, voluntary programs, or other environmentally proactive activities.

CONCERNS

Hazardous Waste (ENV-con-A). The company's liabilities for hazardous waste sites exceed $50 million, or the company has recently paid substantial fines or civil penalties for waste management violations.

Regulatory Problems (ENV-con-B). The company has recently paid substantial fines or civil penalties for violations of air, water, or other environmental regulations, or it has a pattern of regulatory controversies under the Clean Air Act, Clean Water Act or other major environmental regulations.

Ozone Depleting Chemicals (ENV-con-C). The company is among the top manufacturers of ozone depleting chemicals such as HCFCs, methyl chloroform, methylene chloride, or bromines.

Substantial Emissions (ENV-con-D). The company's legal emissions of toxic chemicals (as defined by and reported to the EPA) from individual plants into the air and water are among the highest of the companies followed by KLD.

Agricultural Chemicals (ENV-con-E). The company is a substantial producer of agricultural chemicals, i.e., pesticides or chemical fertilizers.

Climate Change (ENV-con-F). The company derives substantial revenues from the sale of coal or oil and its derivative fuel products, or the company derives substantial revenues indirectly from the combustion of coal or oil and its derivative fuel products. Such companies include electric utilities, transportation companies with fleets of vehicles, auto and truck manufacturers, and other transportation equipment companies. In 1999, KLD added the Climate Change Concern.

Other Concern (ENV-con-X). The company has been involved in an environmental controversy that is not covered by other KLD ratings.

HUMAN RIGHTS (HUM-)

STRENGTHS

Indigenous Peoples Relations Strength (HUM-str-D). The company has established relations with indigenous peoples near its proposed or current operations (either in or outside the U.S.) that respect the sovereignty, land, culture, human rights, and intellectual property of indigenous peoples. In 2000, KLD added the Indigenous Peoples Relations Strength. In 2004, KLD moved the Indigenous Peoples Relations Strength from Community to Human Rights.

Labor Rights Strength (HUM-str-G). The company has outstanding transparency on overseas sour-

cing disclosure and monitoring, or has particularly good union relations outside the U.S., or has undertaken labor rights-related initiatives that KLD considers outstanding or innovative. In 2002, the Labor Rights Strength was added.

Other Strength (HUM-str-X). The company has undertaken exceptional human rights initiatives, including outstanding transparency or disclosure on human rights issues, or has otherwise shown industry leadership on human rights issues not covered by other KLD human rights ratings.

CONCERNS

Burma Concern (HUM-con-C). The company has operations or direct investment in, or sourcing from, Burma. KLD started assigning concerns for this issue in 1995.

Labor Rights Concern (HUM-con-F). The company's operations have had major recent controversies primarily related to labor standards in its supply chain. KLD started assigning concerns for this issue in 1998, and subsequently renamed it from International Labor Concern. KLD subsequently created the Labor Rights Concern using data from the International Labor Concern. KLD started assigning concerns for this issue in 1998.

Indigenous Peoples Relations Concern (HUM-con-G). The company has been involved in serious controversies with indigenous peoples (either in or outside the U.S.) that indicate the company has not respected the sovereignty, land, culture, human rights, and intellectual property of indigenous peoples. KLD started assigning concerns for this issue in 2000.

Other Concern (HUM-con-X). The company's operations have been the subject of major recent human rights controversies not covered by other KLD ratings.

PRODUCT (PRO-)

STRENGTHS

Quality (PRO-str-A). The company has a long-term, well-developed, company-wide quality program, or it has a quality program recognized as exceptional in U.S. industry.

R&D/Innovation (PRO-str-B). The company is a leader in its industry for research and development (R&D), particularly by bringing notably innovative products to market.

Benefits to Economically Disadvantaged (PRO-str-C). The company has as part of its basic mission the provision of products or services for the economically disadvantaged.

PRO-STR-D

Other Strength (PRO-str-X). The company's products have notable social benefits that are highly unusual or unique for its industry.

CONCERNS

Product Safety (PRO-con-A). The company has recently paid substantial fines or civil penalties, or is involved in major recent controversies or regulatory actions, relating to the safety of its products and services.

Marketing/Contracting Concern (PRO-con-D). The company has recently been involved in major

marketing or contracting controversies, or has paid substantial fines or civil penalties relating to advertising practices, consumer fraud, or government contracting. (Formerly : Marketing/Contracting Controversy)

Antitrust (PRO-con-E). The company has recently paid substantial fines or civil penalties for antitrust violations such as price fixing, collusion, or predatory pricing, or is involved in recent major controversies or regulatory actions relating to antitrust allegations.

Other Concern (PRO-con-X). The company has major controversies with its franchises, is an electric utility with nuclear safety problems, defective product issues, or is involved in other product-related controversies not covered by other KLD ratings.

Conclusion de la première partie

Les résultats de cette première partie affirment la présence d'un effet de réputation sur les agences de notation financière et extra-financière. Cet effet de réputation a été observé suite à un changement de la réaction des investisseurs à leurs annonces de notation soit pendant la crise pour l'agence de notation financière soit après la faillite d'Enron pour l'agence de notation extra-financière.

Ainsi, les investisseurs réagissent et mettent à jour leur croyance concernant la fiabilité des annonces du producteur d'information suite à la divulgation d'information imprécise. De plus, cette première partie nous a permis de constater que l'effet de la réputation est présent indépendamment de la structure de rémunération des agences. En ce sens, les investisseurs sont capables d'évaluer et de sanctionner les déclarations erronées des pourvoyeurs d'informations. Ainsi, la réputation peut constituer un mécanisme d'incitation des agences de notation à produire des notations fiables et précises. Une extension naturelle à cette première partie serait d'examiner dans la deuxième partie de la thèse le comportement des agences de notation en fonction de leur réputation. L'intuition est d'examiner si les agences de notation ajustent leur standard de notation en fonction de leur réputation.

Deuxième partie

L’effet de la réputation sur le comportement des agences de notation

Introduction de la deuxième partie

Cette deuxième partie est composée de deux chapitres, rédigés en anglais, concernant le comportement des agences de notation en fonction de leur réputation. Ainsi, Le troisième chapitre de cette thèse examine l'effet de la réputation des agences de notation sur la ponctualité de leurs notations. Le quatrième chapitre de la thèse examine l'effet de la réputation des agences de notation sur la précision de leurs notations. La question générale de cette deuxième partie, est d'examiner en quoi le comportement des agences de notation est affecté par leur réputation sur le marché. Plus précisément, nous cherchons à savoir dans quelle mesure la réputation joue un rôle de mécanisme de gouvernance des agences de notation. Les agences de notation ajustent-elles les standards de notation en fonction de leur réputation ?

Dans le troisième chapitre, nous étudions l'effet de la réputation sur la ponctualité des annonces effectuées par l'agence de notation Standard & Poor's. La ponctualité résume la capacité de l'agence de notation à anticiper et à prédire le défaut de paiement des entreprises. Dans ce chapitre, nous proposons d'étudier si le comportement des agences de notation est affecté par leur réputation ou par d'autres facteurs externes liés à la situation financière de l'entreprise ou aux conditions du cycle économique du pays.

Dans le quatrième chapitre de la thèse, nous étudions l'effet de la réputation sur la précision

des annonces effectuées par l'agence de notation Standard & Poor's. La précision de la notation représente la capacité de l'agence de notation à divulguer fidèlement la situation financière actuelle de l'entreprise. Notre objectif, dans ce chapitre, est d'étudier l'impact des facteurs suivants : la concentration du marché (représentée par le nombre d'entreprises notées par l'agence de notation), la réputation de l'agence de notation auprès des investisseurs (représentée par la valeur boursière de l'agence de notation) et l'augmentation de la concurrence dans l'industrie de la notation (représentée par les parts de marché de l'agence de notation Fitch), sur la précision des annonces de notation accordées par l'agence de notation.

Chapitre 3

Do reputation concerns discipline Credit Rating Agencies' ratings timeliness ?

1 Introduction

*"The ideal is to rate "through the cycle." There is no point in assigning high ratings to a company enjoying peak prosperity if that performance level is expected to be only temporary. Similarly, there is no need to lower ratings to reflect poor performance as long as one can reliably anticipate that better times are just around the corner"*Standard & Poor's, 2007[1]

The behavior of the major CRAs seems not to be always consistent with their rule "rating through the cycle". Indeed, Ferri et al. (1999) and Benmelech and Dlugosz (2010) find that CRAs were initially slow to downgrade rated entities during respectively the Asian crisis and the Sub-prime crisis. Then, this waiting period was followed by a period of massive downgrades. Thus, one could think that at each time CRAs try to remain ratings stable as long as possible and once their

[1] cited by Amato and Furfine (2004)

reputation is at stake they try to restore confidence in ratings by being timely and downgrade massively ratings. The objective of this chapter is to study the relationship between rating timeliness and reputation. Our purpose is therefore to separate the impact of the CRA's reputation on the CRA's rating timeliness from other factors.

We focus on the long term issuer credit rating changes that reflect the CRA's opinion of an obligor and its overall financial capacity to pay its financial obligations in the long run. We use Reuters Xtra 3000 database to identify Standard&Poor's rating changes of long term issuer credit rating of non-financial firms over the period $1996 - 2011$. The requirement of stock price and balance sheet data availability restrict the sample obtained from Reuters Xtra 3000 to the sample that is linked with the CRSP/Compustat Merged Database.

Our empirical strategy aims at studying the effect of the CRA's reputation on the timing of rating changes over time. Timeliness is measured by rating stickiness[2]. If it's true that the CRA changes the rating as soon as there is a change in the observed default probabilities, then there is no friction in the rating timeliness. However, if the CRA aims at keeping the rating stable, we should observe a rating friction. Therefore, we use a methodology similar in spirit to Altman and Rijken (2004) and Posch (2011). The empirical strategy is done in three steps.

First, we estimate a point-in-time-through-the-cycle predicted probability of default related to the performance and financial risks of the firm and free of temporary fluctuation linked to the firm's operating cycle. Second, we estimate stickiness thresholds by comparing the change in estimated probabilities of default and those assigned by the CRA. We use a tobit friction model (Rosett (1959), Posch(2011)) in order to calculate stickiness thresholds over time. Finally, we determine whether variations in these thresholds are a function of reputation proxies and macroeconomic proxies.

[2]Stickiness is defined as the non-adjustment of the rating even when the estimate of default probability changes

We use both the quarterly Market Capitalization return of the CRA and the Cumulative Abnormal Average Return (CAAR) of the window event $[-1, +1]$ of firms who experienced rating changes as a proxy for the CRA's reputation. Besides, we use the quarterly Gross Domestic Product growth rate of USA represents as a macroeconomic condition proxy. We assume that boom phase is presented by a positive quarterly Gross Domestic Product growth rate, while recession phase is presented by a negative quarterly Gross Domestic Product growth rate.

We find that CRAs' rating is more timely during boom periods than during recession periods. Moreover, the CRA's reputation affects negatively credit rating timeliness. We provide evidence that CRAs vary their rating standards according to investors' perception of previous rating changes only in the case of upgrades of investment grade. However, we do not find a significant impact of investors' perception of previous rating changes on rating timeliness for speculative grades. The main result of our study is that CRAs vary their credit rating standards over time due to reputation concerns.

There is an ambiguous interpretation in empirical papers about the finding of rating timeliness variation. Cheng and Neamtiu (2009) compare rating qualities (i.e. timeliness, accuracy and volatility) before and after the collapse of Enron and the Sarbanes-Oxley Act (July 2002)[3]. They find that CRAs improve rating timeliness, increase rating accuracy and reduce rating volatility during the period between July 2003 and December 2005 in comparison with the period between January 1996 and July 2002. Therefore, they interpret that the improvement in rating timeliness is related to reputation concerns as a response from CRAs to the Sarbanes-Oxley act and in general to the increase of criticism after the Enron default and not to macroeconomic conditions. Our findings are in line with theirs and support the view that the CRA improves her rating timeliness in order to

[3] "Section 702 (b)[...] requires the SEC to carefully study the role and function of CRAs."

rebuild her reputation.

Other studies link variation in rating timeliness to the business cycle. Therefore, Nickell et al.(2000) find that macroeconomic conditions influence CRAs' rating transition matrix [4] . Moreover, Amato and Furfine (2004) show how ratings are assigned in a procyclical way. Hence, these studies argue that ratings move in a procyclically way which suggest that ratings are more timely during recession periods than during boom periods. However, our findings are in contrast with these studies and suggest that ratings are more timely during boom periods than during recession periods.

The remainder of the chapter is organized as follows. In section 2 we present the empirical hypotheses. In section 3 we present the data. Section 4 exposes the empirical strategy. Results are presented in section 5. Finally, we conclude this study in section 7.

2 Hypotheses

The credit rating is an opinion of the creditworthiness of an issuer. It must reflect his ability to meet his financial commitments. A natural question arises regarding the spread at which credit rating agencies incorporate new information to change their previous rating. In their Understanding S&P Rating Definitions Document, Standard & Poor's note that *S&P generally apply longer time horizons for their analysis of issuers/issues at higher rating levels.* CRAs note that they do not use a simple formula to judge the creditworthiness of an issuer. Indeed, they have a complex process. First, the CRA sends a team of analysts to meet the firm's management to take into account the creditworthiness of guarantors, insurers, or other forms of credit enhancement on the obligation. The rating is, therefore, based on public and private information. Before disclosing the rating, the

[4]Transition matrix called also migration matrix reports estimates of probabilities of changing to any other possible rating from a given initial rating.

CRA must contact the issuer and obtain his approval. After an initial rating is assigned, if the CRA perceives a change in the firm's creditworthiness, it will either announce a rating change or place the firm on its "credit watch" list.[5]

Therefore, there is an implicit equivalence between the rating and the default probability perceived by the CRA. If the default probability changes, then the rating must change. Hence, a rating downgrade reflects that the probability of default increases and that the time to default is closer. However, the lack of timeliness in predicting the failure of high-grade issuers increased the criticism of regulatory bodies and investors. The academic literature links the lack of timeliness to the rule of stability through–the–cycle and more generally to the fact that rating reflects a long term creditworthiness independent of the business cycle.

Altman and Rijken (2004) define the through–the–cycle methodology as "an optimal balance between rating timeliness and rating stability".[6]

There are ambiguous findings about the stability of ratings through the business cycle. Kealhofer et al. (1998) compare the stability of the transition matrix probabilities of the Merton (1974) based model of Expected Default Frequency (EDF) with the one of S&P. They find that the probability of remaining in the same grade as revealed by the S&P matrix is twice the probability of staying in the same grade using the EDF matrix. They link this lack in timeliness to S&P's desire to provide stable ratings over the cycle.

Relatedly, Altman and Rijken (2004) compare a point-in-time credit quality based on the Z-

[5] "Credit Watch highlights the potential direction of a short- or long-term rating. It focuses on identifiable events and short-term trends that cause ratings to be placed under special surveillance.[...] The "positive" designation means that a rating may be raised ; "negative" means a rating may be lowered." S&P Rating Definitions Document

[6] Moody's design through–the–cycle methodology as a trade-off between rating timeliness and rating stability :″If over time new information reveals a potential change in an issuer's relative creditworthiness, Moody's considers whether or not to adjust the rating. It manages the tension between its dual objectives – accuracy and stability – by changing ratings only when it believes an issuer has experienced what is likely to be an enduring change in fundamental creditworthiness. For this reason, ratings are said to 'look through the cycle'" (Cantor and Mann, (2003)).

scores with the credit rating issued by the CRA. They find that the CRA's rating migration is triggered when the point-in-time rating prediction differs from the actual agency rating by a threshold of 1.25 notch step. However, other papers on agency-rating migration matrices find that the rating migration matrices vary over the business cycle. Some studies do find that CRAs' tendency to provide stable ratings varies with business conditions. Nickell et al. (2000) use an ordered probit model based on dummy variable for country, sector and business cycle. They find that the business cycle has a significant impact specially for low graded firms.

Amato and Furfine (2004) use an ordered probit to model the rating as a function of firm specification and business cycle. They find that in general ratings vary according to changes in business and financial risks related to the firm and not the business cycle. However, a subsample of firms who recently experienced a rating change exhibits an excessive procyclicality of rating to the business cycle. This finding suggests that CRAs are more likely to downgrade ratings in a recession period. These studies can only argue that ratings move in a procyclically way. However, Ferri et al. (1999) find CRAs downgrade late and by multiple grade ratings during the Asian crisis. Hence, ratings' timeliness decrease during recession phases.

Recently, the theoretical paper of Bar-Isaac and Shapiro (2013) shows that the quality of credit ratings is likely to change over the business cycle. Ratings' quality decreases during boom and increases during recession periods. Rating timeliness represents the ability of CRAs to produce earlier rating changes when new information reveals a change in the issuer's relative creditworthiness. In other words, rating timeliness represents the ability of CRAs to keep their ratings of high quality, accurate, or to adjust their ratings if they notice that the initial rating is not accurate. Rating changes represent also the capacity of CRAs to update their ratings in order to reflect the truthful creditworthiness of the rated firm. Hence, rating timeliness is highly and positively correlated with

the CRA's willing to produce high quality ratings.

We therefore rely on the paper of Bar-Isaac and Shapiro (2013) to predict the CRA's behavior over the business cycle.

Hypothesis 1 *Boom (recession) periods affect negatively (positively) CRAs' rating timeliness.*

There may be another reason why CRAs change rating criteria. Indeed, CRAs argue that their reputation is their most valuable capital. Hence, we should find a relationship between their rating criteria and their reputation.

The theoretical paper of Mathis et al. (2009) studies the incentive provided by the reputation concerns of CRAs. They show that a conflict of interest is generated by the CRAs' remuneration from the issuers. Thus, the authors study how a CRA builds a reputation in order to cash in on it. Hence, a CRA's behavior is conditioned to its reputation level. The higher the reputation the lower the quality of the rating is (and vice versa).

Therefore, if the CRA adopts a strategical behavior in which it changes ratings' timeliness over time in a way that takes into account its own reputation on the market, we should find a strong relationship between timeliness variation over time and reputation proxies. Therefore we formulate the second hypothesis as follow :

Hypothesis 2 *CRAs' reputation affects negatively CRAs' rating timeliness.*

3 Database

To assess ratings timeliness over time, we model rating changes as a function of changes in the measured default probability. We focus on the long term issuer credit rating changes that reflect the

CRA's opinion of an obligor and its overall financial capacity to pay its financial obligations in the long run. We use Reuters Xtra 3000 database to identify Standard&Poor's rating changes of long term issuer credit rating. The requirement of stock price and balance sheet data availability (in order to measure default probabilities) restrict the sample obtained from Reuters Xtra 3000 to the sample that is linked with the CRSP/Compustat Merged Database. In addition, only non-financial firms are selected.[7] The quarterly panel data covers the $1996-2011$ period and contains 802 rated firms with period lengths between 12 and 64 quarters, as well as 349 defaulted and non-rated firms[8]. The panel data includes the time series of 33020 firm-quarter observations with known S&P ratings.The table below shows descriptive statistics for each rating category. Each firm-quarter observation consists of the S&P rating at the end of each quarter.

The issuer rating is converted to their idealized probability of default (DP_R) published by Moody's (Yoshizawa (2003)) noted (DP_R).

4 Empirical strategy

Stickiness is defined as the non-adjustment of the rating even when the estimated of default probability changes. Indeed, CRAs upgrade or downgrade a rated firm if the default probability exceeds a certain threshold (respectively upgrade threshold and downgrade threshold) and between those thresholds the rating remains unchanged. Thus, to answer the question of timeliness variation over time we need a benchmark model against which to judge the rating. The benchmark model is used

[7]Financial firms with Standard Industry Classification Code=$6020, 6021, 6022, 6029, 6035, 6036$ are deleted. Moreover, in order to focus our analysis on the rating timeliness, we eliminate observations with a "Withdraw Rating" observation.

[8]We include non-rated observation in order to maximize the number of defaulted observations in the default prediction model.

TABLE 3.1 – Summary statistics of the database

Descriptive statistics			
Mean statistic per rating class			
S&P rating	Numerical value	Obs.	$DP_R(\%)$
AAA	1	223	0.0001
AA+	2	66	0.0006
AA	3	482	0.0014
AA-	4	706	0.003
A+	5	1365	0.0058
A	6	2624	0.0109
A-	7	2288	0.0389
BBB+	8	3131	0.09
BBB	9	3986	0.17
BBB-	10	3372	0.42
BB+	11	2101	0.87
BB	12	3012	1.56
BB-	13	3623	2.81
B+	14	3110	4.68
B	15	1585	7.16
B-	16	859	11.62
CCC+	17	276	17.3816
CCC	18	148	26
CCC-	19	21	50.9902
CC	20	41	50.9902

to estimate both upgrade and downgrade thresholds over time. Then, estimated thresholds are retrieved in order to study factors of stickiness over time. Thus, our empirical strategy includes three steps presented as follows. Firstly, we expose the benchmark model retained. Secondly, we explain the model used to estimate stickiness thresholds. Finally, we present the model that studies factors of stickiness.

The benchmark model used is a point-in-time default prediction model. We use a Logit model denoted (DPL) based on quarter balance sheet of rated firms rather than the Moody's KMV model due to the stability of the DPL compared to the second model.

The DPL model is estimated with a logit-regression model. Surviving observations are obser-

vations of firms surviving beyond 3 years, and defaulting observations are observations of firms defaulting within 3 years. DPL is run to predict the default probability of a firm based on an estimated period of 3 years. Indeed, we use a rolling estimated period for each default probability predicted. First, we estimate the parameters of the Logit Model. Second, we predict the value of the default probability of the next quarter based on the estimated parameters of the vector X.

$$DPL = \frac{exp(\widehat{\beta}_0 + \sum_{i=1}^{11} \widehat{\beta}_i x_i)}{1 + exp(\widehat{\beta}_0 + \sum_{i=1}^{11} \widehat{\beta}_i x_i)} = \frac{exp(\widehat{\beta}_0 + \widehat{\beta}' X)}{1 + exp(\widehat{\beta}_0 + \widehat{\beta}' X)} \tag{3.1}$$

Where X is a vector of financial ratios :

$$X = (\frac{WCAP}{TA}, \frac{EBIT}{TA}, \frac{NI}{TA}, \frac{NI}{EQ}, \frac{EBIT}{INTEREST}, \frac{NI}{SALE}, \frac{LT}{TA}, \frac{ACT}{LCT}, \frac{RE}{TA}, Beta, Log(TA))$$

Where WCAP is net working capital, TA is Total asset, NI is Net income, EQ is Equity, ACT is Current asset, LT is Total liabilities, LCT is Current Liabilities, RE is Retained earning, EBIT is Earnings before interest and taxes, $Beta$ is the equity's systematic risk measured using the Market-Model[9].

The choice of variables is inspired both by the S&Ps' rating methodology[10] and by the Z-score model (Altman and Rijken (2004)). The $\frac{WCAP}{AT}$ and $\frac{ACT}{LCT}$ are proxies for the short term liquidity of the firm. The $\frac{RE}{TA}$, $\frac{EBIT}{TA}$, $\frac{NI}{SALE}$, $\frac{NI}{TA}$ and $\frac{NI}{EQ}$ are proxies for earning profitability of the firm. The $\frac{EBIT}{INTEREST}$ is an interest coverage ratio. The $\frac{LT}{TA}$ is a leverage ratio. The size, $Log(TA)$, was included as a proxy for the evidence of a "too-big-to-fail" default protection. Finally, the Market-Model Beta represents the systematic risk of the firm. The main idea of the Default Predicted

[9]The Market-Model Beta is estimated via the use of the $S\&P500$ index

[10]Report "Ratings and Ratios (2003)" made by S&P's describes 8 key ratios. http ://www.uic.edu/classes/actg/actg516rtr/Readings/Bond-Ratings/S&P-Corporate-Criteria-RR-2003.pdf

probability made by the Logit model is to be as accurate as possible based on historical balance sheets. Indeed, the DPL is predicted based on the last 12 quarterly balance sheet. Thus, it does not contain any private information. Moreover, the test of accuracy ratio (Orth (2012)) of the DPL is closer to the DP_R.

However the DPL is affected by the firm's business cycle through financial ratio that are related to the firm's operating cycle (i.e. $\frac{EBIT}{TA}$, $\frac{NI}{SALE}$, $\frac{NI}{TA}$, $\frac{NI}{EQ}$ and $\frac{EBIT}{INTEREST}$). Thus we use the Hodrick and Prescott (1997) Filter in order to control the effect of the business cycle of the firm on the estimated default probability. Thus, the original series DPL is decomposed into a trend component called $HPDPL$ and a cyclical component DPL^{cycle}. The decomposition is determined by minimizing for each issuer i, which has data from $t = 1$ to $t = T$

$$\min_{HPDPL} \sum_{t=1}^{T} (DPL_t - HPDPL_t)^2 + \lambda((HPDPL_{t+1} - HPDPL_t) - (HPDPL_t - HPDPL_{t-1}))^2 \tag{3.2}$$

Where λ is a smoothing parameter which is set a priori. The larger the value of λ, the smoother is the solution series. We set λ to the commonly used value for quarterly data of 1600. By removing the cycle effect, we obtain a default probability free of temporary fluctuation linked to the operating cycle of the firm.

The relation between the rating changes and the default probability changes based on the Logit model is illustrated in Figure 1. This figure represents the plot of observed default probabilities idealized changes (i.e. as reflected by rating changes) with the measured default probabilities of the Logit model changes during the third quarter of 2003 [11]($\Delta DP_{Rt} = \psi(\Delta HPDPL_t)$) [12]. The

[11]The choice of the quarter of the plot is arbitrary.

[12]Let DP_{Rit} be the probability of default idealized for company i at time t. The operator Δ denotes the difference of rating $\Delta DP_{Rit} = DP_{Rit} - DP_{R(it-1)}$, where 1 is measured in quarter. Respectively : $\Delta DP_{Lit} = DP_{Lit} - DP_{L(it-1)}$.

plot shows that there is a significant large number of zero ΔDP_R for a negative or a positive value of $\Delta HPDPL$, which illustrates ratings, stickiness. Indeed, CRAs are reluctant to change ratings until the change in HPDPL exceeds a certain threshold. To capture this relationship adequately we use the tobit friction model described by Posch (2011) and based on the limited dependant variable model of Tobin (1958) and Rosett (1959). The model estimates the magnitude with which latent default probability has to change to observe a change in the dependent variable.

We have an upgrade if the ΔDP_R is negative, a downgrade if the ΔDP_R is positive and potential stickiness if $\Delta DP_R = 0$. Hence, the upgrade threshold is negative and denoted α_1 and the downgrade threshold is positive and denoted α_2.

The latent rating change ΔDP^*_{Rit} is modeled by $\Delta HPDPL$ as follows :

$$\Delta DP^*_{Rit} = \xi_1 \Delta HPDPL + \varepsilon_{it} \tag{3.3}$$

$$\Delta DP_{Rt} = \begin{cases} \Delta DP^*_{Rt} - \alpha_1 & \Delta DP^*_{Rt} < \alpha_1 \\ 0 & \alpha_1 < \Delta DP^*_{Rt} < \alpha_2 \\ \Delta DP^*_{Rt} - \alpha_2 & \Delta DP^*_{Rt} > \alpha_2 \end{cases} \tag{3.4}$$

The stickiness is represented by the upgrade threshold $\alpha_1 < 0$ and the downgrade threshold $\alpha_2 > 0$, $\alpha_1 < Stickiness < \alpha_2$.

The threshold parameters, α_1 ($upgradethresholds$) and α_2 ($downgradethresholds$) are estimated based on the maximum of the likelihood function of the model[13] and are estimated in units of the dependent variable, DP_R.

[13] See detail in Appendix

5 Factors of stickiness variation over time

As explained above, the objective of this chapter is to study factors of stickiness variation over time. Therefore, dependent variables are the upgrade and downgrade thresholds (resp. α_1 and α_2) and explanatory variables are reputation proxies and the business cycle proxy.

Models of reputation argue that the reputation of the CRA affect her behavior and also can be affected by the CRA's behavior. Thus, there is an endogeneity problem due to simultaneous causality between reputation proxies and dependent variables.

Therefore, we rely on the paper of Keele and De Boef (2004) to choose the adequate model for a stationary data that suffers simultaneous causality between explanatory variables and dependent variables. Keele and De Boef (2004) prove that a single-equation Error Correction Model take into account both cointegrated and long memorized data. They provide significant evidence that the single-equation Error Correction Model is the best estimation model if we use stationary data.

Thus, we estimate a single-equation Error Correction Model in order to take into account both short term and long-term effects on the dependent variable and deal with cointegration problems.

$$\Delta\alpha_{1t} = \omega_0 + \omega_1\Delta GDP_t + \omega_2 * \Delta MktCap_t + \omega_3 * \Delta CAARUPG_t -$$

$$\omega_4[\alpha_{1(t-1)} - \omega_5 * GDP_{t-1} - \omega_6 * MktCap_{t-1} - \omega_7 * CAARUPG_{t-1}] + \varepsilon \tag{3.5}$$

$$\Delta\alpha_{2t} = \omega_0 + \omega_1\Delta GDP_t + \omega_2 * \Delta MktCap_t + \omega_3 * \Delta CaarD_t -$$

$$\omega_4[\alpha_{2(t-1)} - \omega_5 * GDP_{t-1} - \omega_6 * MktCap_{t-1} - \omega_7 * CaarD_{t-1}] + \varepsilon \tag{3.6}$$

Differentiated variables reflect the immediate and short term effect of a variable and the lagged variable captures to the long term effect. ω_4 has to be negative and contained between 0 and -1 to note a long term effect. Otherwise, if ω_4 is lower than -1 or neither ω_5, nor ω_6 nor ω_7 are significant

we conclude that there is no long term effect and then no long term relationship between dependent and independent variables.

Dependent variables of the model are, α_{1t} ($upgradethresholds_t$) and α_{2t} ($downgradethresholds_t$), the estimated thresholds of stickiness respectively for upgrades and downgrades estimated by friction model during the quarter t. Explanatory variables are as follows. First, the quarterly Gross Domestic Product growth rate of USA[14] represents the business cycle proxy. We assume that boom phase is presented by a positive quarterly Gross Domestic Product growth rate, while recession phase is presented by a negative quarterly Gross Domestic Product growth rate. Therefore, if the CRA 's rating criteria is pro-cyclical we should find an increase in both downgrade and upgrade thresholds during boom phases and a decrease in both downgrade and upgrade thresholds in downturns. Thus, the coefficient of this variable is expected to be positive in the downgrade threshold regression and negative in upgrade thresholds.

Second, as suggested Benabou and Laroque (1992) and Duff and Einig (2009), the CRA's reputation is the belief of investors that the CRA's rating is accurate. Thus, we retain the Cumulative Abnormal Average Return (CAAR) of rated firms as a proxy for stock market reaction to rating changes and therefore the CRA's reputation. Then, $Caarupg_t$, $CaarD_t$ represents Cumulative Average Abnormal Return of the window event $[-1, +1]$ through the quarter t and across firms who experienced rating upgrades, downgrades, during this quarter. We expect the CRA to take into account previous investor's perception in order to improve the ratings standards or not. The CRA should change rating standards whenever $Caarupg$ is close to zero or negative or CaarD is close to zero or positive. Thus, we should find a negative coefficient for both variables. Finally, the variable $MktCap$ represents the quarterly Market Capitalization return of McGraw-Hill company.

[14]http ://www.bea.gov/national/index.htm#gdp

It's a proxy for S&P market capitalization because the financial services segment which comprises S&P's rating business contributes to 39% of McGraw-Hill's revenue. We use this variable as a proxy for the CRA's reputation following Lôffler (2011). Indeed, the author finds that the stock price of Moody's and McGrawHill reacts negatively to the default of an issuer in the investment grade. The reaction of the market proves that CRAs' market capitalization could be used as a proxy for their reputation.

6 Results

Assuming that investors do not perceive the same way a default of a firm in the speculative grades or in the investment grades. We first conduct the study over all grades (both investment and speculative grades). Then, we split the database into two groups (investment grades and speculative grades) in order to detect whether the CRA adopts different credit rating standards over grades. We present below the results of the model that study factors of stickiness relative to all grades, investment grades and speculative grades

Table (3.2) presents results of the study of factors of stickiness variation over time. Panel A reports results of the Error Correction Model for the dependent variable upgrade thresholds (α_1). Panel B reports results of the Error Correction Model for the dependent variable downgrade thresholds (α_2). We first explain that coefficients of differenced explanatory variables represent the immediate effect of these variables on the dependent variable. For example in Panel A, the coefficient of the explanatory variable ΔGDP is equal to 4.4640 suggests that an increase of 1% in the GDP decreases the absolute value of α_1 ($upgradethresholds$) by 0.04464. Second, coefficients of lagged explanatory variables represents the long term effect and is distributed over future

TABLE 3.2 – Empirical results of factors of stickiness variation over time

Empirical results of the Error Correction Model for both upgrade and downgrade thresholds and for each group of the study (All grades, investment grades and speculative grades)

	All grades		Investment grade		Speculative grade	
Panel A :Dependent Variable : α_1 (upgradethresholds)						
Sample (adjusted) : 1996Q2 2011Q4						
Variable	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
ω_0	-0.1301	-5.4738 ***	-0.0100	-7.3815***	-0.1944	-5.943526***
ΔGDP	4.4640	2.6989 ***	0.0403	0.3851	5.9877	2.374567**
$\Delta MKTCap$	-0.1783	-1.9899 **	-0.0001	-0.0181	-0.3173	-2.380531**
$\Delta Caarupg$	0.2195	0.6850	-0.0525	-3.2648***	0.1005	0.328887
$\alpha_{1(-1)}$	-0.7355	-6.0288 ***	-0.9920	-9.1243***	-0.9150	-7.006985***
$GDP(-1)$	8.7581	3.3992 **	0.2495	2.2162 **	7.2356	2.376803**
$MktCap(-1)$	-0.2595	-1.4315	-0.0163	-2.0600**	-0.2863	-1.320353
$Caarupg(-1)$	0.6248	1.0058	-0.0329	-1.4219	0.3274	0.705806
R-squ Adj	0.3833		0.6426		0.4786	
F-statistic	6.5943		17.1809		9.2607	
Long run equilibrium	$\alpha 1 = -0.17684$ $+8.7581GDP$		$\alpha 1 = -0.01$ $+0.2494GDP$ $-0.0162MktCap$		$\alpha 1 = -0.2124$ $+7.2355GDP$	
Panel B :Dependent Variable : α_2 (downgrade thresholds)						
Sample (adjusted) : 1996Q2 2011Q4						
Variable	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
ω_0	0.0947	3.9354 ***	0.0119	6.492157	0.1414	4.8393 ***
ΔGDP	-3.1320	-1.9543**	-0.1465	-1.085014	-3.4614	-1.7588 *
$\Delta MKTCap$	0.1432	1.7180 *	0.0027	0.392073	0.2283	2.2049 **
$\Delta CaarD$	-0.0057	-0.0167	0.0275	0.724121	0.3355	1.4361
$\alpha_{2(-1)}$	-0.6573	-5.3311***	**-1.0341**	-9.506998	-0.8136	-6.2177 ***
$GDP(-1)$	-6.6031	-2.4236**	-0.3615	-2.285762	-4.3494	-1.6553
$MktCap(-1)$	0.3602	1.9782 **	0.0205	2.164275	0.3304	1.7851
$CaarD(-1)$	0.0581	0.0785	0.0986	1.73725	0.2908	0.7200
R-squ Adj	0.3077		0.5974		0.4265	
F-statistic	5.0003		14.3549		7.6941	
Long-run equilibrium	$\alpha 2 = 0.1440$ $-6.603GDP$ $+0.3602MktCap$		$\alpha 2 = 0.011$		$\alpha 2 = 0.1737$	

(1%***. 5%** and 10%*)

time periods according to the coefficient of error correction, the coefficient of the lagged dependent variable. For example in panel A, the coefficient of the lagged explanatory variable, GDP_{-1}, is equal to 8.7581 suggests that an increase of 1% in the GDP decreases the absolute value of α_1 ($upgradethresholds$) spreads over future time periods at a rate of 73.55% per time period i.e. the absolute value of α_1 decreases by $(8.7581 * 0.7355 * 1\% = 0.06441)$ at the first year, then another 0.0473 at the second year, until the change in the GDP has no effect on the dependent variable.

Finally, the long run equilibrium equation summarizes the long term effect of explanatory variables on the dependent variable. For example in panel A, the α_1 ($upgradethresholds$) for all grades has a constant equal to -0.1768 which suggests that the probability has to exceed a threshold of 17.68% in order to observe a rating upgrade. Besides, the coefficient of the GDP suggests that an increase in the GDP decreases the absolute value of the $upgradethresholds$.

Table (3.2) shows that the GDP has an immediate impact on both thresholds in panels A and B. Moreover, GDP has a long term equilibrium relation with the dependent variable. The GDP decreases the absolute value of the upgrade threshold $(\alpha_1 < 0)$ and decreases the downgrade threshold $(\alpha_2 > 0)$. Hence, a recession increases the absolute value of upgrade thresholds and downgrade thresholds. Then, the CRA is more likely to stick to its rating during recession.This finding is in contrast with those of previous studies (Nickell et al. (2000) and Amato and Furfine (2004)) who find that the CRA is more likely to downgrade ratings in a recession period. However, this finding is in line with the study of Ferri et al. (1999).

In addition, the pooled sample and the speculative grade sample show that the CRA's market capitalization has an immediate and negative impact in the upgrade threshold and an immediate and positive impact in the downgrade threshold. Then, an increase in the market capitalization increases immediately the absolute value of upgrade thresholds and downgrade thresholds. This effect largely disappears in the long run window, although, coefficients of $MktCap(-1)$ are significant for both upgrade thresholds in the investment grade and downgrade thresholds in the pooled sample.

Regarding the effect of investors' perception on the CRA's rating timeliness, we only find that upgrade thresholds of firms in the investment grade are immediately influenced by the the cumulative average abnormal return ($Caarupg$). Indeed, the higher the impact on the market the lower the absolute value of upgrade threshold is in the next quarter. Hence, the CRA varies the rating

standards in order to follow the impact of CAAR on the market only when they upgrade a firm that belong to the investment grade. Surprisingly, the downgrade threshold model is not significant in the case of investment grades. Downgrade thresholds are not related to reputation nor to business cycle. We finally note that stickiness is not symmetric between upgrade thresholds and downgrade thresholds. This finding leads to believe that the CRA reacts more timely when the default probability of the rated firm increases than when it decreases.

To conclude, the main result of our study is that the CRA's rating timeliness is significantly and negatively affected by both recession phases and the CRA's reputation. Hence, we reject our first hypothesis. However, we do not reject our second hypothesis.

7 Conclusion

This chapter aims at understanding the determinants of rating timeliness changes over time. The change in the number of downgrades and upgrades between recession periods or boom periods, can be related to firms specificity or to variation in CRAs' credit rating standards. Thus, we analyze timeliness over time in terms of thresholds (upgrade threshold and downgrade threshold) which will be analyzed by macroeconomic conditions proxy and reputation proxy. We find that CRAs' rating is more timely in boom periods than in recession periods. Moreover, the CRA's reputation affects negatively credit rating timeliness. We provide evidence that CRAs vary their rating standards according to investors' perception of previous rating changes only in the case of upgrades of investment grade. However, we do not find a significant impact of investors' perception of previous rating changes on rating timeliness for speculative grades. The main result of our study is that CRAs vary their credit rating timeliness over time due to reputation concerns.

8 Appendix

The latent rating change ΔDP^*_{Rit} is modeled by $\Delta HPDPL$ as follows :

$$\Delta DP^*_{Rit} = \xi_1 \Delta HPDPL + \varepsilon_{it}$$

$$\Delta DP_{Rt} = \begin{cases} \Delta DP^*_{Rt} - \alpha_1 & \Delta DP^*_{Rt} < \alpha_1 \\ 0 & \alpha_1 < \Delta DP^*_{Rt} < \alpha_2 \\ \Delta DP^*_{Rt} - \alpha_2 & \Delta DP^*_{Rt} > \alpha_2 \end{cases}$$

The stickiness is estimated by the upgrade threshold $\alpha_1 < 0$ and the downgrade threshold $\alpha_2 > 0$.

The threshold parameters, α_1 and α_2 are estimated based on the maximum of the likelihood function of the model.

The likelihood function of this model is the following

$$\begin{aligned} F(\Delta DP_{Rt}/\xi, \alpha_1, \alpha_2, \sigma) = \; & \Pi_{\Delta DP_{Rt}<0} 1/\sigma\phi(\tfrac{\Delta DP_{Rt1}+\alpha_1-\xi X_1}{\sigma}) \\ & .\Pi_{\Delta DP_{Rt}=0}[\phi(\tfrac{\alpha_2-\xi X_0}{\sigma}) - \phi(\tfrac{\alpha_1-\xi X_0}{\sigma})] \\ & .\Pi_{\Delta DP_{Rt}>0} 1/\sigma\phi(\tfrac{\Delta DP_{Rt2}+\alpha_2-\xi X_2}{\sigma}) \end{aligned}$$

The log-likelihood is given by $LogL() = \sum log(F)$:

$$
\begin{aligned}
LogL(\Delta DP_{Rt}/\xi,\sigma,\alpha_1,\alpha_2) = \quad & -1/2*(n_1+n_2)*log(2\pi)-(n_1+n_2)*Log(\sigma) \\
& -\tfrac{1}{2\sigma^2}*\textstyle\sum(\Delta DP_{Rt1}+\alpha_1-\xi X_1)^2 \\
& -\tfrac{1}{2\sigma^2}*\textstyle\sum(\Delta DP_{Rt2}+\alpha_2-\xi X_2)^2 \\
& +\textstyle\sum[Log(\phi(\tfrac{\alpha_2-\xi X_0}{\sigma}))-Log(\phi(\tfrac{\alpha_1-\xi X_0}{\sigma}))]
\end{aligned}
$$

$\phi(.)=\frac{1}{\sqrt{2\pi}}exp[-1/2(.)]$ density function of the standard normal function

$n_1=\sum_{\Delta DP_{Rt}<0}$, $X_1=\Delta HPDPL$ if $\Delta DP_{Rt}<0$

$n_2=\sum_{\Delta DP_{Rt}>0}$, $X_2=\Delta HPDPL$ if $\Delta DP_{Rt}>0$

Event study methodology

We use a standard event study methodology, Mackinlay (1997). The market model is run using the estimation period [-210,-31].

$$R_i=\alpha+\beta R_m+\varepsilon$$

where R_i is the log return of the stock i and R_m is the log return of the market index $(S\&P500)$. The estimated parameters are used to compute the abnormal returns in the event window $[-30,+30]$

$$AR_i=R_i-\widehat{\alpha}-\widehat{\beta}R_m$$

The abnormal returns are aggregated in order to overall inferences for the event of rating changes. The aggregation is along two dimensions, through time and across events. The cumulative abnor-

mal returns, CAR, represent the aggregation through time ($CAR_{i,t} = \sum_{t=t_0}^{t=t_1} AR_i$) and the cumulative abnormal average returns (CAAR) represent the aggregation through time and across events ($CAAR_{i,t} = \frac{1}{N} \sum_{i=1}^{i=N} CAR_{i,t}$)

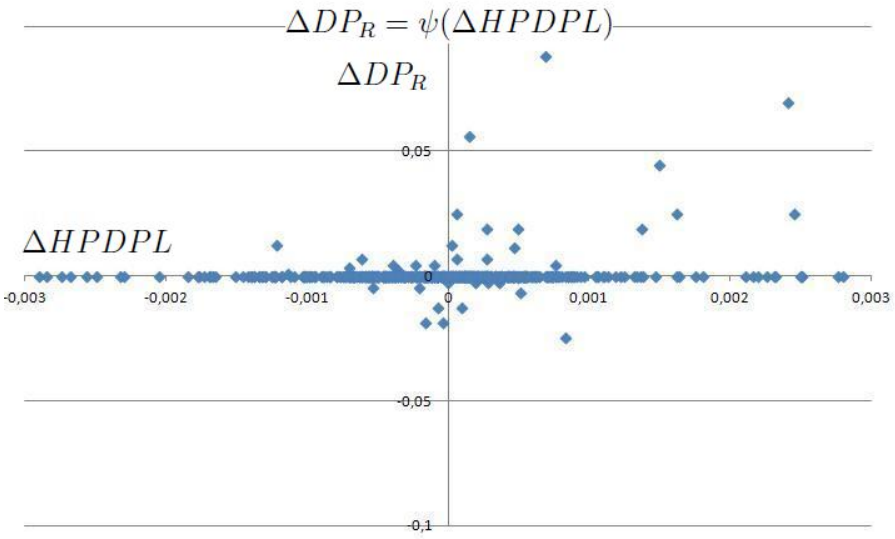

FIGURE 3.1 – Rating changes as a function of measured default probability changes

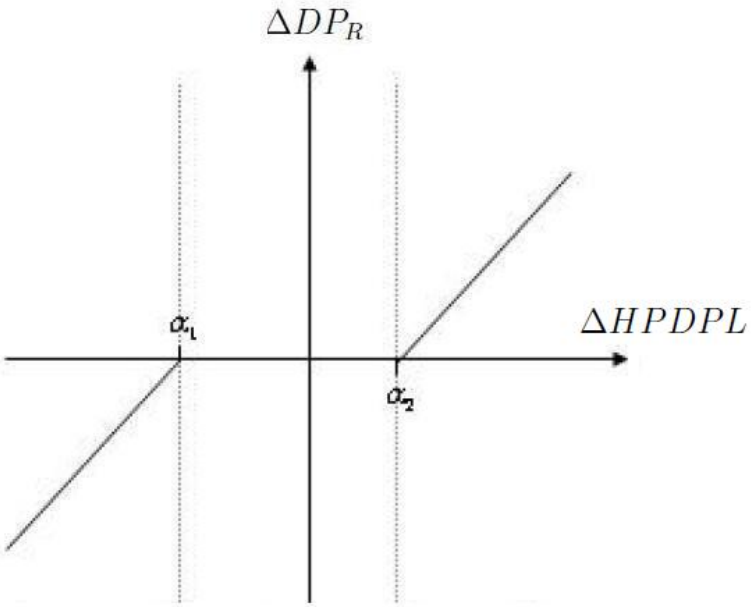

FIGURE 3.2 – Tobit friction model

Chapitre 4

Rating Inflation : A story of a Reputation Trade-Off

1 Introduction

Credit Rating Agencies (CRAs) are considered as an important provider of accurate information by legislators, regulators, issuers and investors. However, the recent failures of high graded firms [1] and their incapacity to rate complex product[2] question their role as an agency gathering and releasing truthful private information. These failures have drawn attention of regulators and investors to a potential conflict of interest in the rating industry due to the "issuer-pays" business model adopted since the 70's. Hence, the business model in the rating industry is pointed out as the main factor that

[1] As reported in the 2009 annual global corporate default study and rating transitions report of Standard&Poor's there has been a rise in default rates. The default rates in 2005 was 0.57% and 0.45% in 2006 and rises to 1.72% in 2008 (14 investment-grade defaults and 88 speculative-grade defaults) and to 3.99% in 2009 (11 investment-grade defaults and 223 speculative-grade defaults).

[2] "The three credit rating agencies were key enablers of the financial meltdown.[...] the crisis could not have been marketed and sold without their seal of approval. Investors relied on them, often blindly. [...]This crisis could not have happened without the rating agencies." The Financial Crisis Inquiry Commission (2011) page *xxv*

lead to rating inflation in order to attract more deals. Mark Froeba[3] firstly points that "The story at Moody's doesn't start in 2007 ; it starts in 2000". Secondly he affirms that rating agencies align their objective to those of issuers and not investors and develop a reputation for being business-friendly : "This was a systematic and aggressive strategy to replace a culture that was very conservative, an accuracy-and-quality oriented (culture), a getting-the-rating-right kind of culture, with a culture that was supposed to be 'business-friendly,' but was consistently less likely to assign a rating that was tougher than our competitors." [4] Moreover, firms which repeatedly issue new debts and rely heavily on debt financing may affect the CRA's rating decision. CRAs may attribute lenient ratings in order to attract more deals and increase market shares. Hence, it appears that both market concentration and competition may affect CRAs' ratings.

However, CRAs argue that any opportunistic behavior, such as rating inflation or lenient grade would damage their reputation.[5] CRAs' reputation appears as the main cornerstone and the fundamental incentive mechanism for CRAs to produce truthful ratings and avoid any conflict of interest. Thereby, CRAs seem to develop a trade-off between an issuer-friendly rating provider among issuers and an accurate rating provider among investors. We therefore question whether the CRA's reputation among investors, the competition in the rating industry and the market concentration lead to ratings inflation.

Our empirical methodology aims at studying whether the market concentration represented by the number of rated firms by the CRA, the CRA's reputation among investors represented by the

[3] Mark Froeba is a Harvard-educated lawyer and senior vice president who joined Moody's structured finance group in 1997.

[4] How Moody's sold its ratings - and sold out investors by McClatchy Newspapers October 18, 2009. http ://www.mcclatchydc.com/2009/10/18/77244/how-moodys-sold-its-ratings-and.html#storylink=cpy

[5] A report by Standard & Poor's to the SEC in 2002 states that "The ongoing value of Standard & Poor's credit ratings business is wholly dependent on continued market confidence in the credibility and reliability of its credit ratings." Standard & Poor's Ratings Service, U.S. Securities and Exchange Commission Public Hearing-November 15, 2002 Role and Function of Credit Rating Agencies in the U.S. Securities Markets http ://www.sec.gov/news/extra/credrate/standardpoors.htm

CRA's market capitalization and the competition in the rating industry represented by Fitch's market share, affect the firm's rating accuracy over time. We use Compustat North American database to identify Standard&Poor's rating of long term issuer credit rating and balance sheet of rated firms. Moreover, we use the Center for Research in Security Prices (CRSP) database in order to obtain stock prices of rated firms. The quarterly panel data covers the period from 1995 until 2011 and contains 912 rated firms. We use two approaches to evaluate the CRA's rating quality. The first approach uses to firm credit ratings levels. The second approach attempts to avoid the endogeneity issue between variables and proposes an empirical strategy inspired from the event study methodology. Such a methodology needs three steps. We first estimate the slope coefficients in a probit model that relates the firm's rating category to a list of firm's financial ratios during the period from the first quarter of 1995 until the last quarter of 1999. Second, we predict the firm's rating category on the period 2000-2011 using the estimated slope coefficients. Third, we calculate a directional error measure as a difference between the rating predicted by the ordered probit and the actual rating assigned by S&P on the period 2000-2011. Finally, we perform a series of regressions with different levels of control. We estimate the effect of the market concentration, the CRA's reputation among investors and the competition in the rating industry on the directional error measure.

We first find that only the competition in the rating industry leads the CRA to assign higher ratings, closer to the top rating of AAA. Hence, we may conclude at this stage that the rise in competition leads to rating inflation. However, interpreting this result as evidence of the effect of competition on the CRA's behavior may not be valid due to the endogeneity of retained factors and the CRA's behavior. The second approach, inspired from the event study methodology, shows that all three variables are highly significant and that coefficients of competition and the CRA's reputation among investors are both positive. However, the coefficient of the number of rated firms

by S&P is negative. On the one hand, we find that the Fitch's market share and the CRA's reputation among investors lead to rating inflation. On the other hand, we find that the growth of rated firms induces the CRA to assign stringent ratings. Therefore, the CRA's ratings over the last decade appear to be balanced between these factors. There is a possible interpretation of CRAs ratings' inflation. A higher competition in the rating industry and a higher CRA's reputation lead the CRA to assign inflated ratings. However, a higher number of issuers leads the CRA to disclose truthful ratings in order to build a credible reputation. Our results also suggest that firms that rely heavily on debt financing receive an inflated rating. Thus, while competition weakens the CRA's reputational concerns for providing accurate ratings, the increase in the number of issuers helps the CRA to create a credible reputation.

Blume et al. (1998) study whether a company that maintains the same values for its accounting measures and equity risk measures over time receive a lower rating today than in prior years. Therefore, they use a database from 1978 to 1995 that includes only investment grade firms and find that CRAs use more stringent standards in assigning ratings which means that a rated firm may experience a rating downgrade even if its accounting and equity risk measures do not change. Amato and Furfine (2004) adopt a methodology close to that of Blume et al. (1998) and a database that contains all grades and spans between 1984 and 2001. They find that the standard of rating agencies have become more lenient over time. Our second approach shows that the CRA uses largely more stringent standards in assigning ratings either for firms in investment grades or speculative grades. These findings are in line with those of Blume et al. (1998) and in contrast with those of Amato and Furfine (2004). Our study also shows that the CRA's rating inflation is negatively and significantly affected by the growth in the number of rated firms. Hence, a higher number of issuers leads the CRA to give truthful ratings in order to build a credible reputation. Cheng and Neamtiu

(2009) study rating quality (i.e. timeliness, accuracy and volatility) before and after the collapse of Enron and the Sarbanes-Oxley Act (July 2002)[6]. They find that CRAs improve rating timeliness, increase rating accuracy and reduce rating volatility during the period between July 2003 and December 2005 in comparison with the period between January 1996 and July 2002. They interpret that the improvement in rating quality is related to reputation concerns as a response from CRAs to the Sarbanes-Oxley act. However, our findings regarding the effect of the CRA's reputation among investors on rating accuracy are not in line with Cheng and Neamitu (2009)'s finding. Our results suggest on the contrary that the higher the CRA's reputation among investors the more inflated the rating is.

Closer to our study, Becker and Milbourn (2011) show that increased competition in the rating industry leads to rating inflation. Our findings are therefore consistent with theirs. Moreover, our findings emphasize that the growth in the number of issuers can discipline CRAs and help them restore their credibility on the market. Recently, Bae et al. (2013 find no relation between Fitch's market share and ratings, suggesting that competition does not lead to rating inflation. By analyzing several determinants of CRA's rating precision, we stress the idea that the CRA elaborates a trade-off between reputation concerns and rating accuracy. On the one hand the CRA improves her credibility by providing accurate ratings when the number of rated firms increases and on the other hand competition and high reputation among investors lead the CRA to provide inaccurate and inflated ratings.

The remainder of the chapter is organized as follows. In section 2 we present the empirical hypotheses. In section 3 we present the data. Section 4 exposes the empirical strategy and results. Finally, we conclude this study in section 5.

[6]"Section 702 (b)[...] requires the SEC to carefully study the role and function of CRAs."

2 Hypotheses

We study a firm's credit ratings accuracy i.e. its accuracy at assessing a firm's ability to meet her financial commitments, disclosed by a CRA after a careful analysis of the firm's situation. This product is usually called a simple product compared to mortgage-backed securities (MBSs) and Collateralized debt obligations (CDOs) products that are more complex and opaque than a firm's overall creditworthiness. The debate on rating accuracy urged the literature on the reputation and credibility of certifiers to expose different factors that may affect the certifier's behavior. First, Benabou and Laroque (1992) and Mathis et al. (2008) show that reputation has a disciplining role but it is not sufficient to ensure truthful information transmission. Indeed, they show that the certifier faces a trade-off between a short-run incentive to manipulate information in order to increase the current profit and long term incentive to build up reputation. Hence, a high CRA's reputation induces the CRA to assign an inflated rating. Bouvard and Levy (2013) present a model where the CRA does not manipulate information and is always truthful ; rating inflation is a result of underinvestment in a costly auditing process. In their model, the CRA faces two conflicting reputation concerns, high-quality firms seek for accurate ratings providers and low-quality firms seek a CRA perceived as an accurate rating provider but they dislike too precise ratings. Thus, Bouvard and Levy (2013) show that the certifier's incentives to assign inflated ratings are purely driven by the two-sided reputation and his willingness to blend high and low quality firms when he is perceived as an accurate ratings provider.

All these studies share the view that the CRA's rating quality is contingent on her reputation among investors. The first factor is then the CRA's reputation among investors defined as the belief of investors and issuers that the CRA is able to produce precise and truthful information.

Hypothesis 1 *The CRA's reputation among investors affects positively the rating inflation.*

Second, Frenkel (2014) studies the repeated interactions of a credit rating agency with the same sellers, who can accumulate private information about the CRA. Frenkel (2014) introduces the concept of a double reputation building in the rating industry, one reputation for investors as accurate rating providers and the other for the issuer as a 'business-friendly' agent. He shows that the a CRA's misreporting behavior emerges if the CRA knows that the published rating is interpreted differently by issuers and investors. Frenkel (2014) argues that in a market with few issuers who repeatedly require ratings of new deals, issuers can assess the type of the CRA, more precisely than investors who only realize that a rating is not accurate in the case of default. Thereby, the main result is that rating inflation may occur in a market with a small number of issuers who repeatedly interact with the CRA. The idea is that the CRA's desire to keep and attract more deals when it has a small number of issuers reduces her reputational incentive to provide accurate ratings. Then, if the CRA faces a repeated interaction in the bond rating market it will adopt an opportunistic behavior and inflate ratings. We therefore predict that the market concentration affects negatively the rating's accuracy.

Hypothesis 2 *The market concentration affects positively the rating inflation.*

The third factor listed in the literature is the competition in the credit rating industry. This factor is either explained by the idea that the increased competition among CRAs reduces the reputational incentive to provide accurate ratings or by the phenomenon of "rating shopping". The first explanation is supported by the theoretical paper of Bar-Isaac and Shapiro (2013) who show that if reputational losses are lower in the increased competition, there are less incentives to provide accurate ratings.

The second explanation provided by Skreta and Veldkamp (2009) focuses on the effect of the "rating shopping" and competition on the CRA's rating quality. Skreta and Veldkamp (2009) show that rating shopping is contingent on the asset complexity which causes a bias in ratings. When the asset is simple, each rating is perfectly precise (unbiased) and there is no benefit to look for an other shadow rating. This explanation seems to be hard to explain that competition leads to rating inflation in the bond market ratings. Indeed, as emphasized by Skreta and Veldkamp (2009), "when assets are simple, agencies' ratings are similar and the incentive to ratings shop is low". Therefore, the increased competition leads to rating inflation when the CRA's reputation incentive to provide accurate rating is low.

Hypothesis 3 *Competition in the rating industry affects positively the rating inflation.*

3 Database

To assess ratings accuracy over time, we use Compustat North American database to identify Standard&Poor's rating of long term issuer credit rating and the balance sheet of rated firms. Moreover, we use the Center for Research in Security Prices (CRSP) database in order to obtain stock prices of rated firms. In addition, only non-financial firms are selected.[7]

The quarterly panel data covers the period from 1995 until 2011 and contains 912 rated firms. The panel data includes the time series of 35784 firm-quarter observations with known S&P ratings.The table below shows descriptive statistics for each rating category. Each firm-quarter observation consists of the S&P rating at the end of each quarter. Investment grade contains rating

[7]Financial firms with Standard Industry Classification Code=$6020, 6021, 6022, 6029, 6035, 6036$ are deleted. Moreover, in order to focus our analysis on the rating accuracy, we eliminate observations with a "Withdraw Rating" observation.

TABLE 4.1 – Summary statistics of the database

Descriptive statistics		
Mean statistic per rating class		
S&P rating	Numerical value	Obs.
AAA	1	267
AA+	2	87
AA	3	567
AA-	4	795
A+	5	1534
A	6	2860
A-	7	2524
BBB+	8	3369
BBB	9	4244
BBB-	10	3560
BB+	11	2215
BB	12	3282
BB-	13	3901
B+	14	3337
B	15	1789
B-	16	925
CCC+	17	302
CCC	18	160
CCC-	19	22
CC	20	44

categories AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB and BBB-, while Speculative grade contains rating categories BB+, BB, BB-, B+, B, B-, CCC+,CCC, CCC- and CC.

3.1 The Variables

In this section we present the explanatory variables chosen to assess our hypotheses. First, the logarithm of quarterly Market Capitalization of McGraw-Hill company, $LnMktCap$, is used as a proxy for the CRA's reputation among investors. It's a proxy for S&P market capitalization because the financial services segment which comprises S&P's rating business contributes to 39% of McGraw-

Hill's revenue. We use this variable as a proxy for the CRA's reputation among investors following Lôffler (2011). Indeed, the author finds that the stock price of Moody's and McGrawHill reacts negatively to the default of an issuer in the investment grade. The reaction of the market proves that CRAs' market capitalization could be used as a proxy for their reputation. This variable is predicted to have a positive effect on firms' credit ratings.

Second, the logarithm of the number of rated firms by Standard&Poor's, $Lnfirms$, is used as a proxy for the market concentration. The choice of this variable is based on the study of Frenkel (2014). The author shows that the CRA may inflate the rating in a concentrated market in order to develop a second reputation for the issuer as an "issuer-friendly" rater. The CRA adopts this strategy only when she is confronted to a small number of issuers. Then, whenever the number of rated firms shrinks, the CRA's willingness to inflate the rating increases. This variable is extracted from the 2012 Annual Global Corporate Default Study and Rating Transition of Standard&Poor's. This variable is predicted to have a negative effect on firms' credit ratings.

Third, the annual Fitch market share, $Fitch$, is used as a proxy for the competition in the rating industry. This variable is extracted from the paper of Bae, Kang and Wang (2013) (Table VII). The Fitch market share is estimated by dividing the number of issues rated by Fitch by the sum of the number of issues rated by S&P, Moody's, and Fitch.

We extract from the paper of Bae, Kang and Wang (2013) the average of Fitch market share in 24 industries from 2000 to 2008 . We complete this variable from 2009 to 2011 using the Annual Reports on Nationally Recognized Statistical Rating Organizations. This variable is predicted to have a positive effect on firms' credit ratings.

These variables are presented in the figure (4.1). A visual inspection of our variables, $LnMktCap$, $Lnfirms$ and $Fitch$ shows that they seem not to be stationary time series data. From Augmented

Dickey-Fuller (ADF) and Philip-Perron methods we can not reject the null hypothesis of a unit root in level series at 5% significance. However, the null hypothesis of a unit root is rejected for the first difference series. Hereafter, we use the first difference of these variables in our empirical strategy.

4 Empirical strategy

We use two approaches to evaluate the CRA's rating quality. The first approach relies on firms' credit ratings level. The firm's credit rating is a qualitative and discrete-valued indicator of credit-worthiness. A firm's main aim is to obtain a rating as close as possible to the AAA rating which may create a pressure on CRAs to shift the rating closer to the AAA rating scale. Therefore, we consider that the CRA's reputation among investors, the market concentration and the competition among raters are three exogenous factors that affect directly the rating quality. This strong assumption raises the question of the endogeneity of the CRA's reputation trade-off between providing accurate rating and lenient rating and factors of growth of competition. We attempt to resolve this problem by providing several types of regressions. One of the major criticism addressed by Bae Kang and Wang (2013) regarding the first approach of Becker and Milbourn (2011) is that their regressions omitted to control for serial correlation over time. We therefore include in our study regressions that use robust standard errors clustered by both time and firm (Thompson (2011) and Peterson (2009)). We control for heteroskedasticity in the errors in all of our regressions.

The second approach compares the observed rating issued by the CRA with a benchmark rating that we assume free of the CRA's trade-off behavior between rating accuracy and profits. The idea behind this approach is the assumption that before 2000 the CRA's behavior was very conservative and oriented to a culture based on accuracy and rating quality. We therefore adopt an empirical

strategy inspired from the event study methodology. Hence, the second approach needs four steps. In the first step, we estimate the ordered probit model with the firm's credit rating as the dependent variable and the firm's financial characteristics as explanatory variables on the period that spans between 1995 and 1999. In the second step, we predict the firm's rating on the period from 2000 to 2011 based on the estimated coefficients. In the third step, we calculate a simple difference between the predicted rating by the ordered probit and the actual rating assigned by S&P rating agency. The intuition is that this measure should be free of endogeneity and that the gap between the predicted and the actual rating can be explained by our variables. We finally regress this measure that captures a change in the rating standards over the last decade on the CRA's reputation among investors (CRA's market capitalization), the market concentration (the number of rated firms by the CRA) and the competition among raters (the Fitch's market share).

4.1 The First Approach

The first Approach concerns the direct effect of the CRA's reputation among investors, market concentration and competition among raters on the level of firm credit ratings. We perform a series of regressions with different levels of controls. Errors of each regression are heteroskedasticity-robust standard errors. Results are presented in table (4.2).

The columns 1, 2 and 3 present OLS regressions with different levels of control, only firm controls in column 1, firm controls and industry fixed effect in column 2 and firm controls and firm fixed effect in column 3. These OLS regressions suffer from residual autocorrelation detected by the Durbin-Watson statistics. We further conduct a series of OLS regressions with clustered standard errors by firm, clustered standard errors by time, clustered standard errors by both firm and time and finally clustered standard errors by industry. The coefficient on Fitch's market share

TABLE 4.2 – Empirical results of the direct effect of variables on the assigned ratings by S&P

Each Column presents the coefficient estimates from an Ordinary Least Squares (OLS) or Ordered Probit. Intercepts are not reported. The Sample period is from 2000 until 2011. The Dependent Variable refers to ratings assigned by Standard&Poor's credit rating agency and is coded from AAA=1 to CC=20 (See Table (4.1) for more details). Firm Controls are $(\frac{WCAP}{TA}, \frac{EBIT}{TA}, \frac{NI}{TA}, \frac{NI}{EQ}, \frac{EBIT}{INTEREST}, \frac{NI}{SALE}, \frac{LT}{TA}, \frac{ACT}{LCT}, \frac{RE}{TA}, Beta, Log(TA))$ Industries are two-digit level Standard Industrial Classification (SIC). Heteroskedasticity-Robust standard errors for the cofficient estimates are in parentheses

	Dependent Variable : Firm Credit Rating							
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)	OLS (7)	Ordered Probit (8)
$Fitch$	-2.256 ***	-2.155 ***	-1.254 ***	-2.256 ***	-2.256 ***	-2.256 ***	-2.256 ***	-1.027 ***
t-Stat	(-17.498)	(-17.999)	(-16.602)	(-15.971)	(-2.481)	(-2.476)	(-10.508)	(-18.296)
$Lnfirms$	4.986 ***	4.268 ***	0.400	4.986 ***	4.986	4.986	4.986 ***	2.115 ***
t-Stat	(4.586)	(4.190)	(0.745)	(6.306)	(0.879)	(0.886)	(6.116)	(4.293)
$LnMktCap$	-0.138	-0.171 *	-0.005	-0.138 **	-0.138	-0.138	-0.138 **	-0.047
t-Stat	(-1.300)	(-1.720)	(-0.093)	(-2.027)	(-0.272)	(-0.275)	(-2.050)	(-0.972)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed effect	No	Yes	No	No	No	No	No	No
Firm Fixed Effect	No	No	Yes	No	No	No	No	No
cluster Standard Errors by firm	No	No	No	Yes	No	Yes	No	No
Cluster Standard Errors by Quarter	No	No	No	No	Yes	Yes	No	No
Cluster Standard Errors by Industry	No	No	No	No	No	No	Yes	No
N	29 000	29 000	29 000	29 000	29 000	29 000	29 000	29 000
R-squared	0.546	0.607	0.903	0.546	0.546	0.546	0.546	n/a
Durbin-Watson stat	0.184	0.195	0.303	n/a	n/a	n/a	n/a	n/a

*1%***. 5%** and 10%**

remains negative and significant, while the effects of the number of rated firm, $Lnfirms$, and of the CRA's market capitalization, $LnMktCap$, disappear once we cluster standard errors by time, which suggests that the direct effect of these variables on firm credit ratings is likely due to the residual autocorrelation.

In column 8, we present an ordered probit regression in order to treat firm credit ratings as a qualitative variable. The ordered probit model allows to treat differently each category and therefore overcomes the disadvantage of the OLS regression that treats each category as equal. We estimate this ordered probit model with firm controls and using heteroskedasticity-robust standard errors. We find that the coefficient on Fitch's market share remains negative and significant, which suggests that competition leads to rating inflation. Moreover, we find that the coefficient of the

number of rated firm, $Lnfirms$, is positive and significant. This finding supports the view that the lower the number of rated firms by the CRA, the more inflated the rating is. Therefore, each time the number of rated firms by the CRA shrinks, the CRA adopts an issuer-friendly rating attitude. Finally, regarding the effect of the CRA's market capitalization, we find an insignificant coefficient, which suggests that the CRA's attitude is not related to her reputation among investors.

These findings reinforce those of Becker and Milbourn (2011). Indeed, column (6) suggests that only competition leads to rating inflation. This column presents results that avoid any serial correlation over both time and firms, which leads to provide unbiased estimators (Thompson (2011) and Peterson (2009)). However, this finding contradicts with those of Bae, Kang and Wang (2013) . These authors suggest that the direct effect of the Fitch's market share on rating inflation is driven by serial correlations. To deal with this problem they include a lagged firm credit rating while according to Thompson (2011) and Peterson (2009) it is more accurate to cluster standard errors by both time and firm.

On the one hand this approach provides significant evidence that overall the competition in rating industry leads to rating inflation and on the other hand it does not deal with the endogeneity issue between the growth of competition, the number of rated firms and the CRA's market capitalization. Since theoretical papers argue that the CRA faces a trade-off between her reputation and rating inflation, one may question whether the growth in competition is not affected by S&P's rating standards. Moreover, the market concentration and the CRA's incentive to provide an issuer-friendly rating may affect and be affected by the CRA's rating standards. Indeed, what theoretical papers suggest is that the CRA's behavior affects and can be affected by these variables. Therefore, we can not conclude at this stage that the effect of competition on rating levels is not driven by omitted variables or else. We therefore propose another way to seek the effect of these variables on

rating standards that we develop in the second approach.

4.2 The Second Approach

The Rating Inflation Measure

We base our approach on the idea that during the 90s CRAs' rating methodology was conservative and free of any trade-off between rating inflation and profits. Hence, we propose an empirical strategy inspired from the event study methodology. Such a methodology requires three steps.

We first estimate the slope coefficients in a probit model that relates the firm's rating category to a list of observed explanatory variables through an unobserved continuous linking variable (Blume et al. (1998)). The estimation period spans between the first quarter of 1995 and the last quarter of 1999.

The ordered probit model considers an unobservable variable that maps values of rating categories to observed explanatory variables. Thus, we consider R_{it} the rating of firm i at quarter t and X_{it} a vector of observable variables of firm i at quarter t that influences the firm's rating. R_{it} is the rating of the firm converted into numerical value as represented above in the database section (table (4.1)). The first part of the ordered probit model links the unobserved variable R_{it}^{*} to the observed category rating R_{it} according to :

$$R_{it} = \begin{cases} 1 & if R_{it}^{*} \in (\infty, \mu_1) \\ r & if R_{it}^{*} \in (\mu_{r-1}, \mu_{r+1}) \quad r = 2, 3, ...19 \\ 20 & if R_{it}^{*} \in (\mu_{20}, \infty) \end{cases} \tag{4.1}$$

Where μ_r are partition points independent of t. The second part of the ordered probit model relates

X_{it} to R^*_{it} by means of a linear equation :

$$R^*_{it} = \beta X_{it} + \varepsilon_{it} \tag{4.2}$$

Where β is a vector of slope coefficients, ε_{it} is an unobserved error term and X is a vector of financial ratios presented as follows :

$$X = (\frac{WCAP}{TA}, \frac{EBIT}{TA}, \frac{NI}{TA}, \frac{NI}{EQ}, \frac{EBIT}{INTEREST}, \frac{NI}{SALE}, \frac{LT}{TA}, \frac{ACT}{LCT}, \frac{RE}{TA}, Beta, Log(TA))$$

Where WCAP is net working capital, TA is total asset, NI is net income, EQ is equity, ACT is current asset, LT is total liabilities, LCT is current Liabilities, RE is retained earning, EBIT is earnings before interest and taxes, $Beta$ is the equity's systematic risk measured using the Market-Model[8].

The choice of variables is inspired both by the S&Ps' rating methodology[9] and by the Z-score model (Altman and Rijken (2004)). The $\frac{WCAP}{TA}$ and $\frac{ACT}{LCT}$ are proxies for the short term liquidity of the firm. The $\frac{RE}{TA}$, $\frac{EBIT}{TA}$, $\frac{NI}{SALE}$, $\frac{NI}{TA}$ and $\frac{NI}{EQ}$ are proxies for the earnings' profitability of the firm. The $\frac{EBIT}{INTEREST}$ is an interest coverage ratio. The $\frac{LT}{TA}$ is a leverage ratio. The size, $Log(TA)$, was included as a proxy for the evidence of a "too-big-to-fail" default protection. Finally, the market-model Beta represents the systematic risk of the firm.

Second, we predict the firm's rating category on the period 2000-2011 using the estimated slope coefficients. Then the objective is to predict the most probable rating category conditional on the estimated slope coefficients and explanatory variables in the vector X_{it}. Let θ be the set of the parameters of the probit model set to their maximum likelihood estimates. The linking variable R^*_{it}

[8]The Market-Model Beta is estimated via the use of the $S\&P500$ index

[9]Report "Ratings and Ratios (2003)" made by S&P's describes 8 key ratios. http ://www.uic.edu/classes/actg/actg516rtr/Readings/Bond-Ratings/S&P-Corporate-Criteria-RR-2003.pdf

is conditional on θ and the explanatory variables X_{it}. The probability that a firm is assigned a rating of category r called, $PredRank_{it}$, is then given by :

$$PredRank_{it} = Pr(R_{it} = r|\theta) = \begin{cases} Pr(\mu_1 > \beta X_{it} + \varepsilon_{it}|\theta) & if r = 1 \\ Pr(\beta X_{it} + \varepsilon_{it} > \mu_{r-1}|\theta) & if r = 2, 3, ...19 \\ Pr(\beta X_{it} + \varepsilon_{it} > \mu_{20}|\theta) & if r = 20 \end{cases} \tag{4.3}$$

Third, we calculate a simple difference between the predicted rating and the observed rating on the period 2000-2011 where we suppose that the CRA deviates her rating standards. We compute a directional error measure, DEM, defined as the difference between the predicted rating $(PredRank_{it})$ of rated firm i at quarter t and the correspondent observed rating, R_{it} made by the CRA. This measure captures the positive directional bias (that reflects an overrating) or the negative directional bias (that reflects an underrating). Hence, this measure can be defined as a rating inflation measure. The higher this measure the more inflated the rating is. Formally :

$$DEM_{it} = PredRank_{it} - R_{it} \tag{4.4}$$

We present the yearly summary statistics of the simple difference between the observed rating and the predicted rating using the ordered probit model in table (4.3). The table shows a decline in the observed rating assigned by the CRA compared to the one predicted by the probit model on the basing of rating standards of the period 1995-1999. This decline suggests that the CRA applies more stringent rating standards in assigning ratings during the 2000s.

TABLE 4.3 – The predicted rating using the ordered probit model Versus The actual rating assigned by S&P rating agency

The predicted rating using the ordered probit model Versus The actual rating assigned by S&P rating agency									
	All Grades			Investment Grade			Speculative Grade		
Year	Higher predicted rating than actual rating	Lower predicted rating than actual rating	Equal predicted rating to actual rating	Higher predicted rating than actual rating	Lower predicted rating than actual rating	Equal predicted rating to actual rating	Higher predicted rating than actual rating	Lower predicted rating than actual rating	Equal predicted rating to actual rating
2000	52.552%	27.337%	20.111%	46.617%	32.261%	21.122%	61.930%	19.557%	18.514%
2001	55.283%	24.423%	20.295%	49.000%	28.833%	22.167%	64.311%	18.084%	17.605%
2002	60.175%	21.497%	18.328%	54.764%	24.980%	20.256%	67.457%	16.810%	15.733%
2003	63.620%	19.090%	17.290%	57.778%	21.152%	21.070%	70.676%	16.600%	12.724%
2004	66.411%	16.965%	16.624%	63.451%	17.647%	18.902%	69.935%	16.153%	13.912%
2005	69.474%	14.996%	15.530%	69.255%	14.596%	16.149%	69.721%	15.445%	14.834%
2006	73.994%	13.694%	12.313%	74.667%	13.098%	12.235%	73.312%	14.297%	12.391%
2007	77.829%	11.314%	10.857%	78.335%	10.348%	11.318%	77.378%	12.176%	10.447%
2008	78.190%	10.981%	10.829%	78.943%	9.768%	11.289%	77.514%	12.069%	10.417%
2009	74.004%	14.194%	11.803%	72.735%	12.510%	14.755%	75.144%	15.706%	9.150%
2010	76.803%	12.342%	10.855%	78.227%	9.720%	12.053%	75.499%	14.744%	9.758%
2011	77.152%	12.635%	10.212%	77.795%	10.100%	12.105%	76.551%	15.007%	8.442%

Factors of Rating Inflation

We finally propose to estimate whether our variables affect the rating inflation measure by a series of regressions with different levels of control. We therefore regress the Directional Error Measure that captures a change in the rating standards over the last decades on the CRA's reputation among investors (CRA's market capitalization), the market concentration (the number of rated firms by the CRA) and the competition among raters (the Fitch's market share). Formally :

$$DEM_{it} = c_0 + c_1 Fitch_t + c_2 LnMktCap_t + c_3 Lnfirms_t + c_4 Z_{it} + \xi_{it} \tag{4.5}$$

DEM_{it} is the Directional Error Measure of firm i at quarter t used as a proxy for rating inflation. $Fitch_t$ represents the annual Fitch market share used as a proxy for the competition in the rating industry. $LnMktCap$ is the logarithm of quarterly Market Capitalization of McGraw-Hill company used as the CRA's reputation among investors. $Lnfirms$ is the logarithm of the number of rated firms by Standard&Poor's used as a proxy for the market concentration. Finally,we include a list of control variables (Leverage, Dummy IG, Crisis) in the vector Z_{it}. Leverage is the ratio of total

liabilities divided by total assets, Dummy IG is a dummy variable equal to 1 if the rating assigned by S&P belongs to the Investment Grade[10] and Crisis is a dummy variable equal to 1 during crisis periods according to the National Bureau of Economic Research's website.[11] We use the firm's leverage as an indicator of firm indebtedness to identify whether a firm with high leverage exerts a pressure on the CRA to inflate ratings, (Frenkel (2014)). We use the Dummy IG as an indicator of a firm's default probability to identify whether firms with low probability of default enjoy an inflated rating compared to those with a high default probability, (Frenkel (2014)). We use the dummy Crisis variable as an indicator of the business cycle to identify whether crisis periods affect negatively rating inflation, (Bar-Isaac and Shapiro (2013)). We run models both with and without these control variables. Moreover, we use different types of estimation in order to estimate this model. We first conduct an OLS regression with robust heteroskedasticity and autocorrelation consistent standard errors. Second, we estimate an ordinary least squares regression with firm Fixed-Effect. Third, we apply an instrumental variable estimation (OLS-IV) with robust heteroskedasticity and autocorrelation consistent standard errors. We use the first, second, third and fourth lags of each variable (Fitch, LnMktCap, Lnfirms) as instruments. Finally, we conduct an ordered probit estimation corrected for potential heteroskedasticity using the Huber-White estimator.

Results of the effect of factors on the directional error measure are presented in table (4.4). For each methodology employed, we run models both with and without control variables. In column (1), we regress the directional error on Fitch's market share, the number of rated firms by the CRA and the CRA's market capitalization. All three variables are highly significant. Coefficients on Fitch's market share and the CRA's market capitalization are both positive and significant at the 1% level, implying that these factors lead to rating inflation. However, the coefficient on the number

[10]Investment grade contains rating categories AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB and BBB-.
[11]The National Bureau of Economic Research's website is http ://www.nber.org/cycles.html.

TABLE 4.4 – Results of the impact of variables on the Directional Error Measure

Each Column presents the coefficient estimates from an Ordinary Least Squares (OLS) or Ordered Probit. We run models both with and without control variables. Intercepts are not reported. The sample contains an unbalanced panel data from 2000 until 2011. The Dependent Variable refers to the Difference between the predicted rating by the ordered probit model and the actual rating of a firm assigned by S&P rating agency. In the first and second columns, we conduct an ordinary least squares regression with robust heteroskedasticity and autocorrelation consistent (HAC) standard errors. In columns (3) and (4), we estimate an ordinary least squares regression with firm Fixed-Effect and robust heteroskedasticity standard errors. In columns (5) and (6), we apply an instrumental variables estimation (OLS-IV) with robust heteroskedasticity and autocorrelation consistent (HAC) standard errors in order to tackle the endogeneity concerns regarding explanatory variables. We use the first, second, third and fourth lags of each variable (Fitch, LnMktCap, Lnfirms) as instruments. In columns (7) and (8), we conduct an ordered probit estimation corrected for potential heteroskedasticity using the Huber-White estimator.
Standard errors for the cofficient estimates are in parentheses

	Dependent Variable : Directional Error Measure : DEM							
	OLS (1)	OLS (2)	OLS-FE (3)	OLS-FE (4)	OLS-IV (5)	OLS-IV(6)	Ordered Probit (7)	Ordered Probit (8)
$Fitch$	1.736 ***	1.325 ***	1.451 ***	1.078 ***	1.741 ***	1.328 ***	0.686 ***	0.552 ***
t-Stat	(11.019)	(9.326)	(14.111)	(11.076)	(6.962)	(7.474)	(12.640)	(10.077)
$Lnfirms$	-3.224 **	-3.770 ***	-2.233 ***	-3.107 ***	-3.213 **	-3.740 ***	-1.267 ***	-1.576 ***
t-Stat	(-2.406)	(-2.808)	(-2.859)	(-3.828)	(-1.911)	(-2.332)	(-2.643)	(-2.998)
$LnMktCap$	0.422 ***	0.253 **	0.440 ***	0.286 ***	0.420 ***	0.251 *	0.172 ***	0.111 **
t-Stat	(3.272)	(1.979)	(5.363)	(3.473)	(2.860)	(1.730)	(3.671)	(2.133)
Leverage		3.268 ***		3.671 ***		3.269 ***		1.346 ***
t-Stat		(37.240)		(30.612)		(38.856)		(37.017)
Dummy IG		1.452 ***		2.018 ***		1.451 ***		0.614 ***
t-Stat		(47.669)		(36.243)		(43.446)		(49.096)
Dummy Crisis		-0.164 ***		-0.172 ***		-0.163 **		-0.069 ***
t-Stat		(-3.569)		(-6.235)		(-2.495)		(-3.950)
N	29 000	29 000	29 000	29 000	29 000	29 000	29 000	29 000

*1%***, 5%** and 10%**

of rated firms is negative and significant at the 5% level, suggesting that the growth of rated firms affects negatively rating inflation. The slope coefficient is greater than both other coefficients which suggests that the growth of the number of rated firms exhorts the CRA to attribute stringent ratings more than both other coefficients lead to rating inflation. In other words, the more concentrated the market is, the more inflated the rating is. In column (2), we first notice that all three variables are highly significant and have the same sign as in column (1). Second, all control variables are highly significant. The coefficient on the investment grade dummy is positive and significant at the 1% level, implying that firms rated investment grade are more likely to have an inflated rating than those rated speculative grade. The coefficient on leverage is positive and significant at the 1% level, meaning that firms that rely heavily on debt financing receive an inflated rating. Finally, the crisis dummy variable affects negatively the dependent variable which suggests that the CRA assigns

more severe ratings during crisis periods than during boom periods. In columns (3) and (4), we include firm fixed-effects in order to take into account firm heterogeneity. We find that columns (3) and (4) are respectively close to columns (1) and (2). In columns (5) and (6), we apply an instrumental variables regression in order to tackle the endogeneity concerns regarding explanatory variables. In column (5), the instrumental variables regression confirms the results from the other estimations. In column (6), we find results close to those in columns (2) and (4). However, the CRA's market capitalization is only significant at the 10% level. Finally, the findings of the ordered probit model presented in columns (7) and (8) confirm that the competition among raters, the market concentration and the CRA's reputation among investors lead to rating inflation.

Overall, our results should be interpreted carefully. On the one hand, we find that the Fitch's market share and the CRA's reputation among investors lead to rating inflation. On the other hand, we find that the increase of the number of rated firms induces the CRA to assign stringent ratings. One possible interpretation of CRAs' ratings inflation is the following. Higher competition in the rating industry and a CRA's higher reputation lead the CRA to assign inflated ratings. However, a higher number of issuers leads the CRA to disclose truthful ratings in order to build a credible reputation. Thus, while competition weakens the CRA's reputational concerns for providing accurate ratings, the growth in the number of issuers helps the CRA to create a credible reputation. Moreover, our results suggest that the CRA operates a trade-off between her reputation and ratings' accuracy. Hence, the higher the CRA's reputation is the lower the rating's accuracy is and vice versa.

Our findings are in line with those of Becker and Milbourn (2011) and support the view that competition leads to rating inflation. However, our findings emphasize that the growth in the number of issuers restores the CRA's credibility on the market. Thus, it is obvious that the rating of

firms who rely frequently on the market enjoy an inflated rating compared to those who operate infrequently on the market. Also, our findings complement with Bae et al. (2013). They find that the CRA's assigned ratings do not exhibit any positive correlation between Fitch's market share and stringentness over time. We find that the CRA elaborates a trade-off between reputation concerns and rating accuracy. On the one hand the CRA provides accurate ratings when the number of rated firms increases and on the other hand competition and high reputation among investors lead the CRA to provide inaccurate and inflated ratings.

5 Conclusion

Our empirical methodology aims at studying whether the market concentration represented by the number of rated firms by the CRA, the CRA's reputation among investors represented by the CRA's market capitalization and the competition in the rating industry represented by Fitch's market share affect the firm's level rating accuracy over time. Therefore, we focus on the long term issuer credit rating that reflects the CRA's opinion of an obligor and its overall financial capacity to pay its financial obligations in the long run. We find that higher competition and reputation lead the CRA to assign inflated ratings. However, a higher number of issuers leads the CRA to give truthful ratings in order to build a credible reputation. These findings are in line with existing theoretical papers suggesting that on the one hand competition likely weakens the CRA's reputational concerns for providing accurate ratings and on the other hand the growth in the number of issuers helps the CRA to create a credible reputation by providing truthful informations. Hence, the CRA operates a trade-off between her reputation and rating accuracy.

6 Appendix

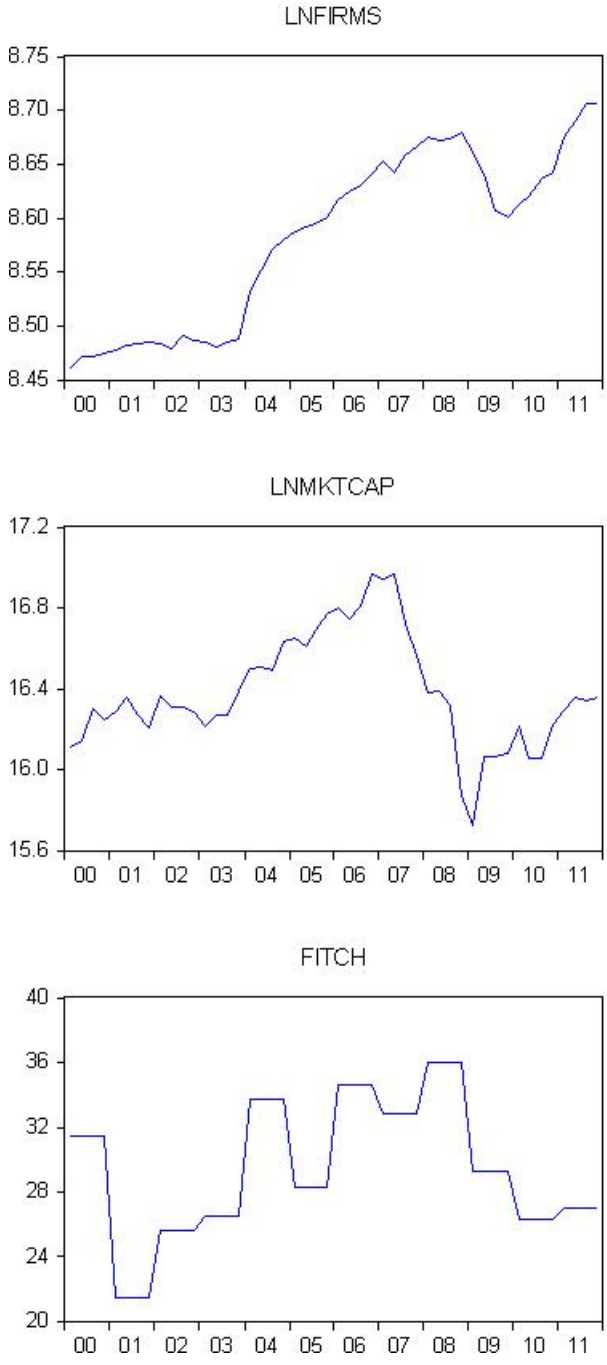

FIGURE 4.1 – Explanatory variables

Conclusion de la deuxième partie

Les résultats de cette deuxième partie confirment que les agences de notation ajustent leur comportement en fonction de leur réputation. Nos résultats suggèrent que plus la réputation de l'agence de notation est élevée, plus l'agence de notation se montre réticente à accorder des notations précises et ponctuelles. Plus spécifiquement, les résultats du troisième chapitre montrent que les annonces de notation sont plus ponctuelles en période d'expansion économique qu'en période de récession économique. De plus, cette étude illustre que la réputation de l'agence de notation affecte négativement la ponctualité des annonces de notation. Ainsi, les résultats du troisième chapitre suggèrent que plus la réputation de l'agence de notation est élevée, plus l'agence de notation se montre réticente à modifier les notations des entreprises.

Les résultats du quatrième chapitre montrent que la concurrence et la réputation de l'agence de notation affectent positivement et significativement l'inflation des notations. En revanche, nous constatons que l'augmentation du nombre d'entreprises notées par l'agence de notation conduit à l'attribution de notations rigoureuses. De plus, les résultats de cette étude suggèrent que les entreprises qui dépendent fortement du financement par emprunt reçoivent une notation surestimée. Enfin, il ressort de ce chapitre que l'agence de notation semble opérer un arbitrage entre sa réputation et la précision de ses notations.

En conclusion, nos études montrent certes que les agences de notation modifient leurs comportements de notation en fonction de leur réputation mais ce mécanisme d'incitation comporte également des limites. En effet, d'autres facteurs semblent favoriser l'attribution de notations surévaluées.

Conclusion générale

Conclusion générale

Notre travail de thèse illustre, sous plusieurs aspects, l'impact de la réputation des agences de notation sur la perception de leurs annonces, ainsi que sur leur propre comportement à divulguer des informations précises et ponctuelles. Elle est constituée de deux parties contenant chacune deux chapitres. Dans les premier et second chapitres, nous étudions la perception des investisseurs des annonces de notation suite à la survenance d'erreur de notation. Dans les troisième et quatrième chapitres, nous étudions les déterminants de la ponctualité et de la précision des annonces de notation financière divulguées par l'agence de notation Standard&Poor's.

La première partie de la thèse contient les premier et second chapitres. Cette partie examine en quoi un événement susceptible d'affecter négativement la réputation des agences de notation affecte la réaction des investisseurs aux annonces de notation. Pour ce faire, nous comparons la réaction des investisseurs aux annonces de ces intermédiaires avant et après la survenance d'un événement signifiant que les agences de notation ont commis des erreurs de notation. Les résultats de cette partie soutiennent l'hypothèse d'un effet de réputation via un changement de la réaction des investisseurs, suite à leur observation de l'incapacité des agences de notation à divulguer des informations correctes. En conclusion, les imprécisions de notation affectent négativement la réputation des agences de notation et réduisent leur impact sur le marché.

La deuxième partie de la thèse contient les troisième et quatrième chapitres. Le troisième chapitre illustre que la ponctualité est négativement affectée par la réputation de l'agence de notation. Ainsi, plus la réputation de l'agence de notation est élevée, plus elle observe une période d'attente avant de changer les notations. De plus, il ressort de ce chapitre que les notations semblent plus ponctuelles en période d'expansion économique qu'en période de récession. Ainsi en période de récession, et plus spécifiquement de crise, l'augmentation du nombre de dégradations de notation ne constitue pas une augmentation de la ponctualité mais seulement une détérioration générale de la qualité des entreprises. Au contraire, pendant ces périodes, l'agence de notation semble agir et annonce un changement de la notation longtemps après le changement effectif de la situation de l'entreprise. En second lieu, les résultats de la quatrième étude soutiennent l'hypothèse selon laquelle la réputation de l'agence de notation et la concurrence de l'activité de notation induisent une surévaluation de la note. De plus, l'étude souligne que plus la dette et la notation de l'entreprise sont élevées, plus l'agence est incitée à accorder une note surévaluée. Néanmoins, l'augmentation du nombre d'entreprises notées permet de réduire cette surévaluation. Ainsi, l'augmentation du nombre des entreprises notées suggère une baisse de la dépendance de l'agence de notation envers un nombre limité d'émetteurs et lui accorde la possibilité de diversifier son portefeuille. Les résultats de cette étude suggèrent que la concurrence détériore la qualité des notes. De même, l'agence de notation semble effectuer un arbitrage entre la qualité des notations accordées et sa réputation. En effet, plus la réputation est élevée plus la note est surévaluée.

Nous soulignons à présent les limites et les perspectives de recherche de chaque chapitre de recherche présent dans notre travail de thèse.

L'étude menée concernant les agences de notation financière a été concentrée exclusivement sur les

notations des émetteurs à long terme. L'étude a permis de mettre en lumière que l'incapacité des agences de notation à évaluer correctement les produits complexes a affecté leur réputation et ainsi leur impact sur le marché des produits simples. Les résultats du premier chapitre illustrent l'importance de la réputation dans l'activité de notation et l'importance de la capacité de l'investisseur à juger la véracité de l'information. En ce sens, ce travail mérite d'être complété par une étude sur les effets d'une transparence des contrats de notation entre émetteur et agence de notation. Cette étude aura le mérite de montrer le rôle de la réputation dans un environnement transparent et en absence de tout conflit d'intérêt lié au phénomène de *"rating shopping"*.

Le deuxième chapitre illustre également un effet de réputation via le changement de la réaction des investisseurs suite à l'incapacité de KLD à évaluer correctement le comportement RSE de l'entreprise Enron. Cette étude a le mérite de poser la question concernant la fiabilité des notations KLD suite à cette affaire. KLD a été récemment rachetée par l'agence MSCI qui a apporté quelques changements au mode de notation mais tout en gardant le système d'annonce de notation annuel. De ce fait, il serait important d'étudier l'impact des annonces de notation KLD/MSCI sur la composition des portefeuilles gérés par les institutions ou des fonds d'investissement éthique. Une telle étude aura le mérite d'évaluer l'effet de réputation suite à l'affaire Enron et également l'effet du rachat par l'agence MSCI.

Le troisième et le quatrième chapitre examinent uniquement des notations issues par l'agence de notation financière S&P. En ce sens, les résultats observés sont à traiter et à généraliser avec précaution. Une extension naturelle serait de reproduire ces études en utilisant les notations de Moody's et Fitch ratings.

Le troisième chapitre suggère que la ponctualité des annonces de S&P est négativement affectée

par la réputation de l'agence de notation. Egalement, il ressort que l'agence de notation observe une période d'attente plus longue en période de récession ou crise financière qu'en période d'expansion économique avant d'effectuer un changement de notation. De ce fait, il serait opportun d'étudier si les agences de notation utilisent d'autres moyens de communication afin de dévoiler certains changements dans la situation de l'entreprise sans pour autant changer sa note. Ainsi, une étude complémentaire concernant la ponctualité des mises sous-surveillance *"Rating Watch"* ou des mises sous-perspective *"Rating Outlook"* serait utile. Cette étude permettrait d'examiner plus en détails si les agences de notation communiquent plus rapidement leurs intuitions concernant la situation réelle des entreprises notées tout en gardant leurs notes stables.

Les résultats du quatrième chapitre, allant dans le sens de l'effet néfaste de la concurrence sur la précision de la note, renforcent la question de la concurrence dans l'industrie de la notation. Par conséquent, cette question impose d'examiner empiriquement les effets du droit de renégociation du contrat accordé aux entreprises. L'idée serait d'évaluer et de comparer la précision des informations transmises dans l'industrie des agences de notation avec une autre industrie de production d'information dans laquelle le phénomène *"Rating shopping"* engendré par la clause de renégociation de contrat serait absent.

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Essais sur l'impact des crises financières sur la réputation et le comportement des agences de notation

Résumé

Cette thèse étudie l'impact de la réputation des agences de notation sur la perception de leurs annonces par les investisseurs, ainsi que sur leur propre comportement à divulguer des informations précises et ponctuelles. Elle est constituée de quatre chapitres. Dans les premier et second chapitres, nous étudions comment la perception des investisseurs des notations des agences change suite à l'observation d'une erreur de notation. Les résultats montrent que les investisseurs réagissent peu ou pas aux changements d'annonce après avoir observé des notations erronées, ce qui suggère que la mauvaise performance des agences de notation affecte négativement leur réputation. Dans les troisième et quatrième chapitres, nous étudions les déterminants de la ponctualité et de la précision des annonces de notation financière. Il ressort que la réputation de l'agence de notation affecte la qualité des notations. En particulier, plus la réputation est élevée, et plus la note semble surévaluée et non-ponctuelle.

Mots-clefs: Agences de notation, Erreurs de notation, Réaction des investisseurs, Réputation, Ponctualité, Précision, Compétition.

Abstract

This thesis studies the impact of the reputation of rating agencies on investors' perception of ratings, and on rating agencies' ability to disclose accurate and timely information. It consists of four chapters. In the first and second chapters, we study changes in investors' perception of rating agencies' ratings following the observation of rating failures. The results show that investors either ignore or react less to ratings after such failures, which suggests that rating agencies' poor performance affects negatively their reputation. In the third and fourth chapters, we study the determinants of ratings' timeliness and accuracy disclosed by credit rating agencies. The results suggest that the reputation of the rating agency affects the quality of ratings. In particular, the higher the rating agency's reputation, the less accurate and timely the rating is.

Keywords: Rating Agencies, Reputation, Rating Failures, Investors' Reaction, Reputation, Timeliness, Accuracy, Competition.